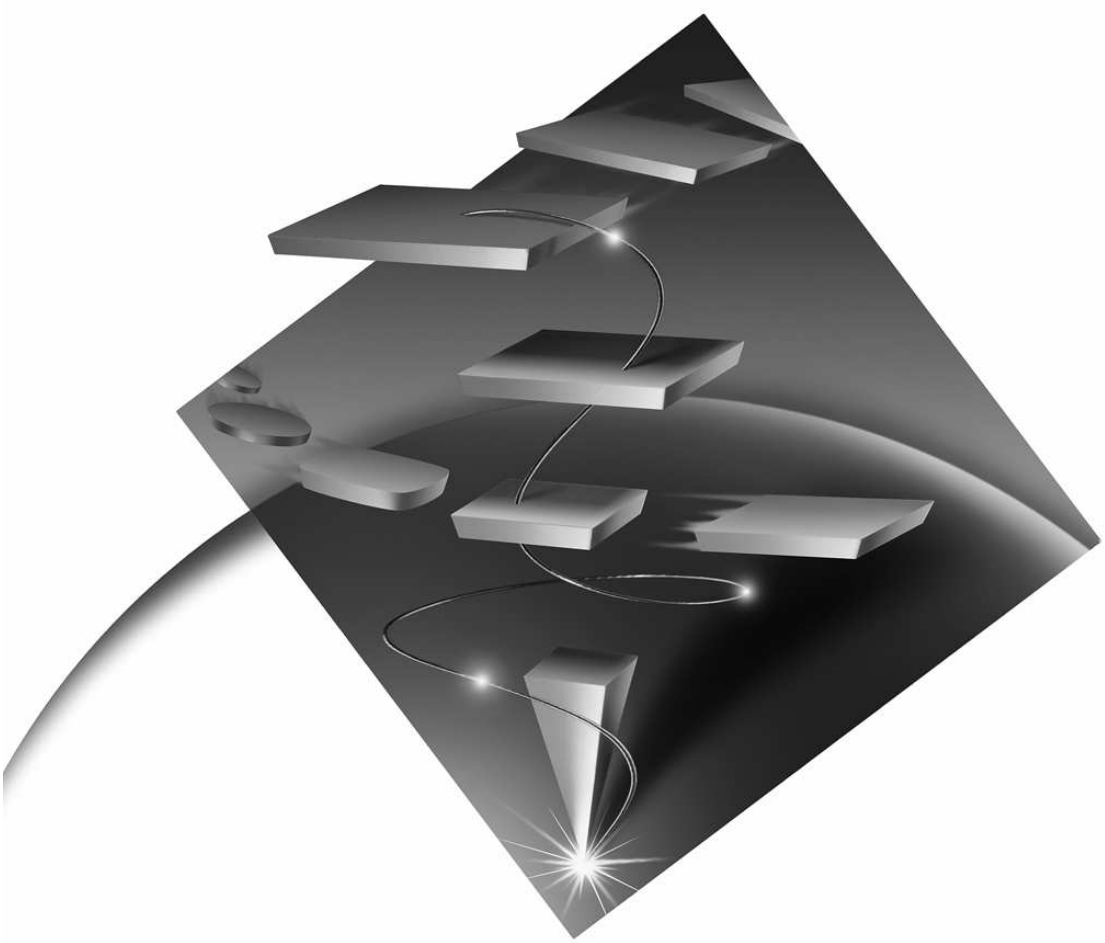
eNetwork Personal Communications
Version 4.2
for Windows 95 and Windows NT

System Management Programming



SC31-8480-00

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Version 4.2
for Windows 95 and Windows NT

System Management Programming

SC31-8480-00

Note

Before using this information and the product it supports, be sure to read the general information under Appendix B, “Notices” on page 559.

First Edition (September 1997)

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About This Book

This book describes how to develop programs that use IBM Personal Communications for Windows 95 and Windows NT and Communications Server for Windows NT. In this book, Windows** refers to Windows 95 and Windows NT**. Throughout this book, *workstation* refers to all supported personal computers. When only one model or architecture of the personal computer is referred to, only that type is specified.

While in most instances, developing programs for Personal Communications and Communications Server is very similar in that they each support many of the same verbs, there are some differences. These differences are denoted through the use of icons. See “Icons” on page xii for specific details. Throughout this book, *the Program* refers to both Personal Communications and Communications Server . When only the Personal Communications program or only the Communications Server program applies, then that specific program name is used.

Who Should Read This Book

This book is intended for programmers and developers who plan to use Node Operator Facility (NOF) API messages to manage and query the operation of Personal Communications or Communications Server , or plan to use ASCII Configuration files or both.

This book is also intended for developers who are writing network management applications that use the underlying management services support provided by Personal Communications and Communications Server to communicate with remote (host focal point) network management applications.

How to Use This Book

This book is organized into three parts. Part 1, “Personal Communications and Communications Server Node Operator Facility” on page 1 contains the following chapters:

- Chapter 1, “Introduction” on page 5, describes the purpose of this book.
- Chapter 2, “Overview of the Verbs in This Book” on page 9, describes the Node Operator Facility API structure and the verbs it supports. The chapter outlines the categories of the verbs implemented and the additional signals provided by Personal Communications and Communications Server .
- Chapter 3, “Node Operator Facility Entry Points” on page 19, describes the entry point extensions.
- Chapters 4 through 11 describe the syntax of each verb. A copy of the structure that holds the information for each verb is included and each entry described, followed by a list of possible return codes.

Part 2, “Personal Communications and Communications Server Management Services API” on page 461, contains the following chapters:

- Chapter 12, “Introduction to Management Services API” on page 463, describes the management services API.

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Chapter 13, “Management Services Entry Points” on page 467, describes the entry points for the management services verbs.

Chapter 14, “Management Services Verbs” on page 477, describes the syntax of each verb. A copy of the structure that holds the information for each verb is included and each entry described, followed by a list of possible return codes.

Part 3, “Personal Communications and Communications Server ASCII Configuration” on page 491 contains the following chapters:

Chapter 15, “Introduction to ASCII Configuration” on page 493 describes the Personal Communications and Communications Server ASCII configuration and verification utility.

Chapter 16, “ ASCII Configuration Keywords” on page 497 describes the kinds and types of keywords.

Icons

In this book, when it is necessary to communicate special information, the following icons appear:

This icon represents a note, important information that can affect the operation of Personal Communications or Communications Server or the completion of a task.

This icon appears when the information applies only to the Personal Communications program.

This icon appears when the information applies only to the Communications Server program.

Conventions Used in This Book

The following conventions are used throughout the Personal Communications or Communications Server library. Some of the conventions listed might not be used in this particular book.

Text Conventions

Bold	Bold type indicates verbs, functions, and parameters that you can use in a program or at a command prompt. These values are case sensitive and should be entered exactly as they appear in the text.
Italics	Italic type indicates the following things: A variable that you supply a value for. The names of window controls, such as lists, check boxed, entry fields, push buttons, and menu choices. They appear in the text as they appear in the window. Book titles. A letter is being used as a letter or a word is being used as a word. **Example:** When you see an *a*, make sure it is not supposed to be an *an*.
Bold italics	Bold italic type is used to emphasize a word.
UPPERCASE	Uppercase indicates constants, file names, keywords, and options that you can use in a program or at a command prompt. You can enter these values in uppercase or lowercase.
Double quotation marks	Double quotation marks indicate messages you see in a window. An example of this would be the messages that appear in the operator information area (OIA) of an emulator session.
Example type	Example type indicates information that you are instructed to type at a command prompt or in a window.

Number Conventions

Binary numbers	Represented as BX'xxxx xxxx' or BX'x' except in certain instances where they are represented with text ("A value of binary xxxx xxxx is...").
Bit positions	Start with 0 at the rightmost position (least significant bit).
Decimal numbers	Decimal numbers over 4 digits are represented in metric style. A space is used rather than a comma to separate groups of 3 digits. For example, the number sixteen thousand, one hundred forty-seven is written 16 147.
Hexadecimal numbers	Represented in text as hex xxxx or X'xxxx' ("The address of the adjacent node is hex 5D, which is specified as X'5d'.")

Where to Find More Information

For information about SNA, APPN, or LU 6.2 architecture, refer to the following IBM documents:

IBM Systems Network Architecture: LU 6.2 Reference: Peer Protocols, SC31-6808 (softcopy only)

IBM Systems Network Architecture: APPN Architecture Reference, SC30-3422

IBM Systems Network Architecture: Management Services SC30-3346

IBM Systems Network Architecture: Formats, GA27-3136

IBM APPN Architecture and Product Implementations Tutorial GG24-3669

IBM Communications Manager/2 System Management Programming Reference, SC31-6173 (softcopy only)

IBM Communications Manager/2 APPC Programming Guide and Reference, SC31-6160 (softcopy only)

IBM System/370 Principles of Operation, GA22-7000

IBM Systems Network Architecture: Technical Overview GC30-3073

IBM Systems Network Architecture: VTAM Programming for LU Type 6.2, SC30-3400

IBM Systems Network Architecture Concepts and Products GC30-3073

IBM Systems Network Architecture Format and Protocol Reference Manual: Architecture Logic for LU Type 6.2, SC30-3269

IBM Systems Network Architecture: Transaction Programmer's Reference Manual for LU Type 6.2, GC30-3084

IBM Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic, SC30-3112

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Chapter 1. Introduction

This part describes the Node Operator Facility (NOF) API provided by Personal Communications and Communications Server .

Purpose of the Document

The aim of the document is to:

Provide a brief overview of the structure of the Node Operator Facility API
Define the syntax of the signals that flow across the interface.

Personal Communications and Communications Server Node Operator Facility

The Personal Communications and Communications Server Node Operator Facility enables communication between the node operator, and the control point (CP) and logical units (LUs). The Node Operator Facility receives node configuration information from the operator, which it uses to initialize the control point when the node is started. The Node Operator Facility also receives requests to query and display node configuration information. The node operator is able to:

Define and delete LUs, DLCs, ports, and links
Activate and deactivate links and sessions
Query the control point and LUs for database and status information

The node operator can be a human operator working with an interactive display, a command file accessed by a file interface, or a transaction program. The Node Operator Facility communicates with the node operator by using a verb interface.

Entry Points

Personal Communications and Communications Server provide a library file that handles Node Operator Facility verbs.

Node Operator Facility verbs have a straightforward language interface. Your program fills in fields in a block of memory called a *verb control block*. Then your program calls the entry point and passes a pointer to the verb control block. When its operation is complete, Node Operator Facility returns, having used and then modified the fields in the verb control block. Your program can then read the returned parameters from the verb control block.

Following is a list of entry points for Node Operator Facility verbs:

WinAsyncNOF()

WinAsyncNOFEx()

WinNOFCancelAsyncRequest()

WinNOFCleanup()

WinNOFStartup()

WinNOFRegisterIndicationSink()

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WinNOFUnregisterIndicationSink()

WinNOFGetIndication()

See Chapter 3, Node Operator Facility Entry Points for detailed descriptions of the entry points.

Verb Control Blocks (VCBs)

Programming Note: The base operating system optimizes performance by executing some subsystems in the calling application's address space. This means that incorrect use of local descriptor table (LDT) selectors by application programs can cause improper operation, or perhaps system failures. Accordingly, application programs should not perform pointer arithmetic operations that involve changing the LDT selector field of a pointer.

The segment used for the verb control block (VCB) must be a read/write data segment. Your program can either declare the VCB as a variable in your program, allocate it, or suballocate it from a larger segment. It must be sufficiently large to contain all the fields for the verb your program is issuing.

An application program should not change any part of the verb control block after it has been issued until the verb completes. When Node Operator Facility finishes the execution of a verb, it copies a complete, modified VCB back onto the original block. Therefore, if your program declares a verb control block as a variable, consider declaring it in static storage rather than on the stack of an internal procedure.

Fill all reserved and unused fields in each VCB with zeros (X'00'). In fact, it might be more time-efficient to set the entire verb control block to zeros before your program assigns the values to the parameters. Setting reserved fields to zeros is particularly important.

Note: If the VCB is not read/write, or if it is not at least 10 bytes (that is, large enough to hold the Node Operator Facility primary and secondary return codes), Node Operator Facility cannot access it, and the base operating system abnormally ends the process. This termination is recognized as a *general protection fault*, processor exception trap D.

Node Operator Facility returns the INVALID_VERB_SEGMENT primary return code when the VCB is too short or the incorrect type of segment is used.

Writing Node Operator Facility (NOF) Programs

Personal Communications and Communications Server provide a dynamic link library (DLL) file, that handles NOF verbs.

The DLL is reentrant; multiple application processes and threads can call the DLL concurrently.

NOF verbs have a straightforward language interface. Your program fills in fields in a block of memory called a *verb control block* (VCB). Then it calls the NOF DLL and passes a pointer to the verb control block. When its operation is complete, NOF returns, having used and then modified the fields in the VCB. Your program can then read the returned parameters from the verb control block.

Table 1 on page 7 shows source module usage of supplied header files and libraries needed to compile and link NOF programs. Some of the header files may include other required header files.

Table 1. Header Files and Libraries for NOF

Operating System	Header File	Library	DLL Name
WINNT & WIN95	WINNOF.H	WINNOF32.LIB	WINNOF32.DLL
WIN3.1	WINNOF.H	WINNOF.LIB	WINNOF.DLL
OS/2	APPC_C.H	APPC.LIB	APPC.DLL

Communications Server SNA API Client Support

Included with Communications Server are a set of clients for the WIN95, WINNT, WIN3.1, and OS/2 operating systems. These clients are referred to as SNA API clients in this book and only support a subset of the full node operator facility. Specifically, **WINNOF** is the only entry point supported on the Windows clients (95, NT, 3.1). The following is a list of the NOF verbs supported:

QUERY_LOCAL_LU

QUERY_LU_0_TO_3

QUERY_LU_POOL

QUERY_MODE

QUERY_MODE_DEFINITION

QUERY_PARTNER_LU

QUERY_PARTNER_LU_DEFINITION

QUERY_PU

QUERY_SESSION

QUERY_TP

QUERY_TP_DEFINITION

Verbs Supported by Communications Server and *NOT* by Personal Communications

The following list of verbs are supported by Communications Server and not by Personal Communications.

DEFINE_DOWNSTREAM_LU

DEFINE_DOWNSTREAM_LU_RANGE

DEFINE_DSPU_TEMPLATE

DELETE_DOWNSTREAM_LU

DELETE_DOWNSTREAM_LU_RANGE

DELETE_DSPU_TEMPLATE

QUERY_ADJACENT_NN

QUERY_DIRECTORY_STATS

QUERY_DOWNSTREAM_LU

QUERY_DOWNSTREAM_PU

QUERY_DSPU_TEMPLATE

QUERY_ISR_SESSION

QUERY_NN_TOPOLOGY_NODE

QUERY_NN_TOPOLOGY_STATS

QUERY_NN_TOPOLOGY_TG

DOWNSTREAM_LU_INDICATION

DOWNSTREAM_PU_INDICATION

ISR_INDICATION

NN_TOPOLOGY_NODE_INDICATION

NN_TOPOLOGY_TG_INDICATION

Keywords Supported by Communications Server and *NOT* by Personal Communications

The following list of keywords in the ASCII Configuration file are supported by Communications Server and not by Personal Communications.

ANYNET_SOCKETS_OVER_SNA

DOWNSTREAM_LU

DSPU_TEMPLATE

SPLIT_STACK

TN3270E_DEF

Chapter 2. Overview of the Verbs in This Book

The verb interface described in this book allows your programs to perform most of the configuration, system management, and node definition functions associated with a Personal Communications or Communications Server network environment. This chapter provides an overview of each of these functions and the associated verbs.

How to Read Verb Descriptions

Chapters 4 through 11 describe the configuration, system management, and attach manager verbs.

Supplied Parameters

Each verb description has a section that provides a detailed description of the parameters and any associated parameter values supplied by the program.

In some cases, you must supply a variable value for a parameter.

Returned Parameters

Each verb description has a section that provides a detailed description of the parameters and any associated parameter values returned to the program.

Return Codes

The configuration, system management, and attach manager verbs described in this book have return codes associated with them that supply information about the success of verb execution or that provide error information. These codes are listed in the “Returned Parameters” section for each verb.

Additional Information

Many of the verb descriptions also contain a section titled “Additional Information.” This section provides additional useful information about the verb.

Common VCB Fields

This chapter documents the syntax of each verb passed across the Node Operator Facility API. It also describes the parameters passed in and returned for each verb.

```
typedef struct nof_hdr
{
        unsigned  short   opcode;
         unsigned char     reserv2;              /* reserved */
        unsigned  char     format;
        unsigned  short   primary_rc;
        unsigned  long     secondary_rc;
} NOF_HDR;
```

Each VCB has a number of common fields. These are listed and described below.

opcode Verb operation code. This field identifies the verb.

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format	Identifies the format of the VCB. The value that this field must be set to in order to specify the current version of the VCB is documented individually under each verb.
primary_rc	Primary return code. Possible values for each verb are listed in each verb section.
secondary_rc	Secondary return code. This supplements the information provided by the primary return code.

Verb Summary

The Node Operator Facility API is composed of verbs that can be used to do the following things:

Configure node resources
Activate and deactivate links and sessions
Query information held by the node
Change the number of sessions
Handle unsolicited indications
Provide password support
“ping” a remote LU
Define, query, and delete CPI-C side information

Node Configuration

The following verbs can be used to define resources:

DEFINE_ADJACENT_NODE

DEFINE_CN

DEFINE_COS

DEFINE_DEFAULT_PU

DEFINE_DLC

DEFINE_DLUR_DEFAULTS

DEFINE_DOWNSTREAM_LU

DEFINE_DOWNSTREAM_LU_RANGE

DEFINE_FOCAL_POINT

DEFINE_INTERNAL_PU

DEFINE_LOCAL_LU

DEFINE_LS

DEFINE_LU_0_TO_3

DEFINE_LU_0_TO_3_RANGE

DEFINE_LU_POOL

DEFINE_MODE

DEFINE_PARTNER_LU

DEFINE_PORT

DEFINE_TP

The following verbs can be used to delete resources:

DELETE_ADJACENT_NODE

DELETE_CN

DELETE_COS

DELETE_DLC

DELETE_DOWNSTREAM_LU

DELETE_DOWNSTREAM_LU_RANGE

DELETE_FOCAL_POINT

DELETE_INTERNAL_PU

DELETE_LOCAL_LU

DELETE_LS

DELETE_LU_0_TO_3

DELETE_LU_0_TO_3_RANGE

DELETE_LU_POOL

DELETE_MODE

DELETE_PARTNER_LU

DELETE_PORT

DELETE_TP

Activation and Deactivation

The following verbs are used at link level:

START_DLC

START_LS

START_PORT

STOP_DLC

STOP_LS

STOP_PORT

The following verbs are used for dependent LU requestor function:

START_INTERNAL_PU

STOP_INTERNAL_PU

The following verbs are used at session level:

ACTIVATE_SESSION

DEACTIVATE_CONV_GROUP

DEACTIVATE_SESSION

The following verb is used to force a high performance routing (HPR) RTP connection to switch paths:

PATH_SWITCH

Querying the Node

These verbs return node information in named fields:

QUERY_DEFAULT_PU

QUERY_MDS_STATISTICS

QUERY_NN_TOPOLOGY_STATS

QUERY_NODE

QUERY_STATISTICS

The following verbs can return one or more units of information:

QUERY_ADJACENT_NN

QUERY_CN

QUERY_CN_PORT

QUERY_COS

QUERY_DEFAULTS

QUERY_DLUS

QUERY_DOWNSTREAM_PU

QUERY_FOCAL_POINT

QUERY_LU_POOL

QUERY_MDS_APPLICATION

QUERY_MODE_TO_COS_MAPPING

QUERY_NMVT_APPLICATION

QUERY_PU

QUERY_TP

This information can be thought of as being stored in the form of a list. The verb can specify a named entry in the list, which is then considered to be a place marker (or index value) in the list. The **list_options** field on these verbs specifies from which point in the list information will be returned.

If **list_options** is set to AP_FIRST_IN_LIST, then the fields specifying the index value will be ignored, and the returned list will start at the beginning.

If **list_options** is set to AP_LIST_INCLUSIVE, then the returned list will start from the specified index value.

If **list_options** is set to AP_LIST_FROM_NEXT, then the returned list will start from the entry after the specified index value.

The index value specifies the starting point for returned information. Once this has been determined, some of the query verbs also provide additional filtering options for the returned list. These are specified independently of the index value. Note that unless specified otherwise, the returned list will be ordered according to IBM's 6611 APPN MIB. (See Appendix A, “IBM APPN MIB Tables” on page 557, for information on how verb parameters map to MIB table entries.)

The number of entries to be returned or the buffer size to be filled is set. (If both are set, then the verb is returned with the lower of the two specified quantities of information.) Because the application buffer size typically limits the amount of information that can be returned, the Node Operator Facility returns additional information indicating the total amount of buffer space required to return the requested information, and the total number of entries this represents.

In addition to returning one or more units of information, the following verbs are also able to return different levels of information. The **list_options** field specifies whether summary or detailed information will be returned by including either AP_DETAIL or AP_SUMMARY in the **list_options** field. These options are specified by **ORing** one of the previous **list_options**, for example: AP_DETAIL | AP_FIRST_IN_LIST.

QUERY_DIRECTORY_LU

QUERY_DLC

QUERY_DLUR_LU

QUERY_DLUR_PU

QUERY_DOWNSTREAM_LU

QUERY_ISR_SESSION

QUERY_LOCAL_LU

QUERY_LOCAL_TOPOLOGY

QUERY_LS

QUERY_LU_0_TO_3

QUERY_MODE

QUERY_MODE_DEFINITION

QUERY_NN_TOPOLOGY_NODE

QUERY_NN_TOPOLOGY_TG

QUERY_PARTNER_LU

QUERY_PARTNER_LU_DEFINITION

QUERY_PORT

QUERY_RTP_CONNECTION

QUERY_SESSION

QUERY_TP_DEFINITION

Session Limit Verbs

CHANGE_SESSION_LIMIT

INITIALIZE_SESSION_LIMIT

RESET_SESSION_LIMIT

Unsolicited Indications

Applications displaying node information can use these indications (which are issued when a change occurs and return summary information only) to trigger the query verbs (returning detailed information). The node only produces the signals listed below as unsolicited indications of the named events if there are any applications registered to receive the information. Applications should therefore unregister if they no longer require the information.

DLC_INDICATION

DLUR_LU_INDICATION

DLUS_INDICATION

DOWNSTREAM_LU_INDICATION

DOWNSTREAM_PU_INDICATION

FOCAL_POINT_INDICATION

ISR_INDICATION

LOCAL_LU_INDICATION

LOCAL_TOPOLOGY_INDICATION

LS_INDICATION

LU_0_TO_3_INDICATION

MODE_INDICATION

NN_TOPOLOGY_NODE_INDICATION

NN_TOPOLOGY_TG_INDICATION

PLU_INDICATION

PORT_INDICATION

PU_INDICATION

REGISTRATION_FAILURE

RTP_INDICATION

SESSION_INDICATION

The entry points used for indications are:

WinNOFRegisterIndicationSink	Register to receive an indication
WinNOFUnregisterIndicationSink	Unregister from receiving an indication
WinNOFGetIndication	Receive an indication

These indications are passed to any indication sinks that have registered with the Node Operator Facility. If the component generating the indication is unable to send it, then it sets the **data_lost** indicator on the next indication it issues. If the **data_lost** flag has been set to AP_YES on an indication, then subsequent data fields can be set to null. This flag is used to notify the application that a change has occurred whose details have been lost, indicating that the application should respond by issuing the appropriate query verb.

Security Verbs

The following security verbs allow management of passwords for LU-LU verification or conversation security.

DEFINE_LU_LU_PASSWORD
DEFINE_USERID_PASSWORD
DELETE_LU_LU_PASSWORD
DELETE_USERID_PASSWORD

APING Verbs

The following verb allows a management application to “ping” a remote LU in the network.

APING

CPI-C Verbs

The following verbs allow CPI-C side information to be defined, queried, and deleted.

DEFINE_CPIC_SIDE_INFO

DELETE_CPIC_SIDE_INFO

QUERY_CPIC_SIDE_INFO

See the *CPI-C Reference* for more information about the CPI-C support provided by Personal Communications and Communications Server for Windows 95 and Windows NT.

Attach Manager Verbs

The following verbs can be used to control the attach manager:

DISABLE_ATTACH_MANAGER

ENABLE_ATTACH_MANAGER

QUERY_ATTACH_MANAGER

DLC Processes, Ports, and Link Stations

DLC Processes

Personal Communications or Communications Server can create multiple DLC processes. Each DLC process is created by Personal Communications or Communications Server in response to a START_DLC verb issued at the Node Operator Facility API. Each DLC is responsible for communication over a link, or set of links, using a specific data link protocol (such as SDLC or Token Ring).

Each DLC process can manage one or more ports. Ports are described below.

Ports

A port represents a unique access point (such as a MAC/SAP address pair) in the local machine and is associated with a DLC process. Each DLC can have one or more ports. A port can be one of the following types:

Switched port Can have one or more adjacent link stations that are active at any one time. (Note that this differs from the definition in the *SNA APPN Architecture Reference*.)

Nonswitched port Can have both point-to-point and multipoint link connections. Adjacent link stations on a nonswitched link connection must be defined by a Node Operator Facility component. Multipoint nonswitched links require primary/secondary relationships to be defined properly on all nodes to avoid unpredictable results.

SATF port Uses a shared-access transport facility such as token ring. It allows connectivity between any pair of link stations attaching to the facility. The initial role for all link stations being activated on a token ring must always be defined as negotiable, so that link activation can be initiated through any link station.

Note: SATF ports can also be associated with Connection Networks. In this case, topology updates are used to broadcast the address of the unique access point.

Link Stations

A link station is associated with a port and represents a connection to an adjacent node. A port can have multiple link stations. Link stations can be categorized in the following way:

Defined link station A link station that has been defined explicitly (using a DEFINE_LS verb).

Dynamic link station A link station that has been created as a result of activating a dynamic connection through a connection network (also known as a virtual routing node (VRN)).

Implicit link station A link station that has been created as a result of a call received from a previously unknown partner node on a switched or SATF port. (This type of port is not defined in the *SNA APPN Architecture Reference*.)

Temporary link station

A link station that is created when a CONNECT_IN is received over the DLC interface on a switched or SATF port. It is either deleted, or becomes dynamic or implicit, when the remote node identity is determined.

Chapter 3. Node Operator Facility Entry Points

This chapter describes the entry points for Node Operator Facility verbs.

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WinNOF()

This function provides a synchronous entry point for all of the Node Operator Facility verbs.

Syntax

```
void WINAPI WinNOF(long vcb,
                   unsigned short vcb_size)
```

Parameter	Description
vcb	Pointer to verb control block.
vcb_size	Number of bytes in the verb control block.

Returns

No return value. The **primary_rc** and **secondary_rc** fields in the verb control block indicate any error.

Remarks

This is the main synchronous entry point for the Node Operator Facility API. This call blocks until the verb completes.

WinAsyncNOF()

This function provides an asynchronous entry point for all of the Node Operator Facility verbs.

Syntax

```
HANDLE WINAPI WinAsyncNOF(HWND hwnd,
                          long  vcb,
                          unsigned short vcb_size)
```

Parameter	Description
hwnd	Window handle to receive completion message.
vcb	Pointer to verb control block.
vcb_size	Number of bytes in the verb control block.

Returns

The return value specifies whether the asynchronous request was successful. If the function was successful, the actual return value is a handle. If the function was not successful, a zero is returned.

Remarks

Each application thread can only have one outstanding request at a time when using this entry point.

When the asynchronous operation is complete, the application's window *hWnd* receives the message returned **RegisterWindowMessage** with **"WinAsyncNOF"** as the input string. The *wParam* argument contains the asynchronous task handle returned by the original function call.

If the function returns successfully, a **WinAsyncNOF()** message will be posted to the application when the operation completes or the conversation is canceled.

Note: See also **WinNOFCancelAsyncRequest()**.

WinAsyncNOFEx()

This function provides an asynchronous entry point for all of the Node Operator Facility verbs. Use this entry point instead of the blocking calls to allow multiple verbs to be handled on the same thread.

Syntax

```
HANDLE WINAPI WinAsyncNOFEx(HANDLE handle,
                            long  vcb,
                            unsigned short vcb_size);
```

Parameter	Description
handle	Handle of the event that the application will wait on.
vcb	Pointer to verb control block.
vcb_size	Number of bytes in the verb control block.

Returns

The return value specifies whether the asynchronous request was successful. If the function was successful, the actual return value is a handle.

Remarks

This entry point is intended for use with WaitForMultipleObjects in the Win32** API. For more information about this function, see the programming documentation for the Win32 API.

When the asynchronous operation is complete, the application is notified by way of the signaling of the event. Upon signaling of the event, examine the primary return code and secondary return code for any error conditions.

Note: See also **WinNOFCancelAsyncRequest()**.

WinNOFCancelAsyncRequest()

This function cancels an outstanding **WinAsyncNOF** based request.

Syntax

int WINAPI WinNOFCancelAsyncRequest(HANDLE handle);

Parameter	Description
handle	Supplied parameter; specifies the handle of the request to be canceled.

Returns

The return value specifies whether the asynchronous request was canceled. If the value is zero, the request was canceled. Otherwise the value is:

WNOFALREADY
An error code indicating that the asynchronous request being canceled has already completed, or the handle was not valid.

Remarks

An asynchronous request previously issued by one of the **WinAsyncNOF** functions can be canceled prior to completion by issuing the **WinNOFCancelAsyncRequest()** call, specifying the handle returned by the initial function in *handle*.

Canceling an asynchronous request stops any update to the application verb control block and stops the application being notified that the verb has completed (either by way of the window message or event). It does not cancel the underlying request. To actually cancel the underlying request, the application must issue the appropriate NOF verb (that is, STOP_LS to cancel START_LS).

Should an attempt to cancel an existing asynchronous **WinAsyncNOF** routine fail with an error code of WNOFALREADY, one of two things has occurred. Either the original routine has already completed and the application has dealt with the resulting notification, or the original routine has already completed but the application has not dealt with the completion notification.

Note: See also **WinAsyncNOF()**.

WinNOFCleanup()

This function terminates and deregisters an application from the Node Operator Facility API.

Syntax

```
BOOL WINAPI WinNOFCleanup(void);
```

Returns

The return value specifies whether the deregistration was successful. If the value is not zero, the application was successfully deregistered. The application was not deregistered if a value of zero is returned.

Remarks

Use **WinNOFCleanup()** to indicate deregistration of a Node Operator Facility application from the Node Operator Facility API.

WinNOFCleanup unblocks any thread waiting in **WinNOFGetIndication**. These return with WNOFNOTREG, (the application is not registered to receive indication). **WinNOFCleanup** unregisters the application for all indications. **WinNOFCleanup** returns any outstanding verb (synchronous or asynchronous) with the error AP_CANCELLED. However, the verb completes inside the node.

It is not a requirement to use **WinNOFStartup** and **WinNOFCleanup**. However, an application must be consistent in its use of these calls. You should use both of them or never use either of them.

Note: See also **WinNOFStartup()**.

WinNOFStartup()

This function allows an application to specify the version of Node Operator Facility API required and to retrieve the version of the API supported by the product. This function can be called by an application before issuing any further Node Operator Facility API calls to register itself.

Syntax

```
int WINAPI WinNOFStartup(WORD wVersionRequired,
                         LPWNOFDATA  nofdata);
```

Parameter	Description
wVersionRequired	Specifies the version of Node Operator Facility API support required. The high-order byte specifies the minor version (revision) number; the low-order byte specifies the major version number.
nofdata	Returns the version of Node Operator Facility API and a description of API implementation.

Returns

The return value specifies whether the application was registered successfully and whether the Node Operator Facility API implementation can support the specified version number. If the value is zero, it was registered successfully and the specified version can be supported. Otherwise, the return value is one of the following values:

WNOFSYSERROR
The underlying network subsystem is not ready for network communication.

WNOFVERNOTSUPPORTED
The version of Node Operator Facility API support requested is not provided by this particular implementation.

WNOFBADPOINTER
Incorrect nofdata parameter.

Remarks

This call is intended to help with compatibility of future releases of the API. The current version is 1.0.

It is not a requirement to use **WinNOFStartup** and **WinNOFCleanup**. However, an application must be consistent in its use of these calls. You should use both of them or never use either of them.

Note: See also **WinNOFCleanup()**.

WinNOFRegisterIndicationSink()

This allows the application to register to receive unsolicited indications.

Syntax

```
BOOL WINAPI WinNOFRegisterIndicationSink(unsigned short indication_opcode,
                                         unsigned short queue_size,
                                         unsigned short *primary_rc,
                                         unsigned long *secondary_rc);
```

Parameter	Description
indication_opcode	The indication to register for.
queue_size	Number of unreceived indications to queue. Zero means use the current value (the initial default value is set to 10). There is only one queue for all indications registered by application.
primary_rc	Returned: primary return code
secondary_rc	Returned: secondary return code

Returns

The function returns a value indicating whether the registration was successful. If the value is not zero, the registration was successful. If the value is zero, the registration was not successful.

Remarks

Use **WinNOFRegisterIndicationSink** to register to receive unsolicited indications of type **indication_opcode**.

An application must issue a **WinNOFRegisterIndicationSink** for each type of indication it wants to receive.

Note: See also **WinNOFUnregisterIndicationSink** and **WinNOFGetIndication**.

WinNOFUnregisterIndicationSink()

This allows the application to stop receiving unsolicited indications.

Syntax

```
BOOL WINAPI WinNOFUnregisterIndicationSink(unsigned short indication_opcode,
                                           unsigned short *primary_rc,
                                           unsigned long *secondary_rc);
```

Parameter	Description
indication_opcode	The indication to unregister from.
primary_rc	Returned: primary return code.
secondary_rc	Returned: secondary return code.

Returns

The function returns a value indicating whether the unregistration was successful. If the value is not zero, the unregistration was successful. If the value is zero, the unregistration was not successful.

Remarks

Use **WinNOFUnregisterIndicationSink** to stop receiving unsolicited indications of type **indication_opcode**.

An application must issue a **WinNOFUnregisterIndicationSink** for each type of indication it wants to stop receiving.

Note: See also **WinNOFRegisterIndicationSink** and **WinNOFGetIndication**.

WinNOFGetIndication()

This allows the application to received unsolicited indications.

Syntax

```
int WINAPI WinNOFGetIndication(long buffer,
                               unsigned short *buffer_size,
                               unsigned long timeout);
```

Parameter	Description
buffer	Pointer to a buffer to receive indication.
buffer_size	Size of buffer. Returned: the size of the indication.
timeout	Time to wait for indication in milliseconds.

Returns

The function returns a value indicating whether an indication was received.

0 Indication returned.

WNOFTIMEOUT
Timeout waiting for indication.

WNOFSYSNOTREADY
The underlying network subsystem is not ready for network communication.

WNOFNOTREG
The application is not registered to receive indications.

WNOFBADSIZE
The buffer is too small to receive the indication. Reissue the **WinNOFGetIndication** call with a large enough buffer. The size of the indication is returned in the **buffer_size** parameter.

WNOFBADPOINTER
Either the buffer or **buffer_size** parameter is not valid.

WNOFSYSERROR
An unexpected system error has occurred.

Remarks

This is a blocking call, it returns in one of the following circumstances:

An indication is returned

The timeout expires

The application issues a WinNOFCleanup call

The product is stopped

A system error occurs

Note: See also **WinNOFRegisterIndicationSink** and **WinNOFUnregisterIndicationSink**.

Chapter 4. Node Configuration Verbs

The following verbs are used to define and delete node configuration information.

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DEFINE_ADJACENT_NODE

DEFINE_ADJACENT_NODE adds entries to the node directory database for the resources on an adjacent node.

Note: This verb is not required, and should not be issued, if there is an active path to the adjacent node using CP-CP sessions.

This verb can be issued on an end node, in which case the node's control point is added to the root of the directory.

To define the node's control point LU, set the following fields:

Specify the node's control point name in the **cp_name** field

Add an ADJACENT_NODE_LU structure, specifying the control point name in the **fqlu_name** field.

Any additional LUs on the node are added to the directory as children of the node's control point. DEFINE_ADJACENT_NODE can also be used to add LU definitions to an existing node definition. LUs can be removed in the same way by issuing the DELETE_ADJACENT_NODE verb. If the verb fails part way through processing, all new directory entries are removed, leaving the directory as it was before the verb was issued.

VCB Structure

The DEFINE_ADJACENT_NODE verb contains a variable number of ADJACENT_NODE_LU overlays. The ADJACENT_NODE_LU structures are concatenated onto the end of DEFINE_ADJACENT_NODE structure.

```
typedef struct define_adjacent_node
{
        unsigned short   opcode;                  /* verb operation code        */
        unsigned  char   reserv2;                 /*  reserved                  */
        unsigned  char   format;                  /*  format                    */
        unsigned short   primary_rc;              /* primary return code        */
        unsigned long    secondary_rc;            /* secondary return code      */
        unsigned char    cp_name[17];             /* CP name                    */
        unsigned char    description[RD_LEN]; /* resource description       */
        unsigned  char   reserv3[19];             /*  reserved                  */
        unsigned short   num_of_lus;              /* number of LUs              */
        unsigned  char   reserv4[2];              /*  reserved                  */
} DEFINE_ADJACENT_NODE;

typedef struct adjacent_node_lu
{
        unsigned char    wildcard_lu;             /* wildcard LU name           */
                                                  /*  indicator                 */
        unsigned char    fqlu_name[17];           /* fully qualified LU name */
        unsigned  char   reserv1[6];              /*  reserved                  */
} ADJACENT_NODE_LU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_ADJACENT_NODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

cp_name The fully qualified name of the control point in the adjacent end node. This should match the name the node sends on its XIDs (if it supports them), and the adjacent control point name specified on the DEFINE_LS for the link to the node. The name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

description Resource description (returned on QUERY_DIRECTORY_LU). This is a 16-byte (nonzero) string in a locally displayable character set. All 16 bytes are significant.

num_of_lus The number of adjacent LU overlays that follow the DEFINE_ADJACENT_NODE VCB.

adjacent_node_lu.wildcard_lu
Indicates whether the specified LU name is a wildcard name (AP_YES or AP_NO).

adjacent_node_lu.fqlu_name
The LU name to be defined. If this name is not fully qualified the network ID of the CP name is assumed. The name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of either one or two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_CP_NAME

AP_INVALID_LU_NAME
AP_INVALID_WILDCARD_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc	AP_INVALID_CP_NAME
	AP_INVALID_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR
secondary_rc	AP_MEMORY_SHORTAGE
	AP_DIRECTORY_FULL

DEFINE_CN

DEFINE_CN defines a connection network (also known as a virtual routing node or VRN). The verb provides the network-qualified name of the connection network along with its transmission group (TG) characteristics. It also provides a list of the names of the local ports that can access this connection network.

DEFINE_CN can be used to redefine an existing connection network. In particular, new ports can be added to the list of ports that access the connection network by issuing another DEFINE_CN. (Ports can be removed in the same way by issuing the DELETE_CN verb.)

VCB Structure

```
typedef struct define_cn
{
        unsigned short  opcode;          /* verb operation code          */
        unsigned  char  reserv2;         /*  reserved                    */
        unsigned  char  format;          /*  format                      */
        unsigned short  primary_rc;      /* primary return code          */
        unsigned long   secondary_rc;    /* secondary return code        */
        unsigned  char  fqcn_name[17];   /*  name  of  connection  network */
        CN_DEF_DATA     def_data;        /* CN defined data              */
        unsigned  char  port_name[8][8];
                                         /* port names                   */
} DEFINE_CN;

typedef struct cn_def_data
{
        unsigned  char  description[RD_LEN];
                                         /* resource description        */
        unsigned char   num_ports;       /* number of ports on CN       */
        unsigned  char  reserv1[16];     /*  reserved                    */
        TG_DEFINED_CHARS tg_chars;       /* TG characteristics           */
} CN_DEF_DATA;

typedef struct tg_defined_chars
{
        unsigned char   effect_cap;      /* effective capacity           */
        unsigned  char  reserve1[5];     /*  reserved                    */
        unsigned char   connect_cost;    /* connection cost              */
        unsigned char   byte_cost;       /* byte cost                    */
        unsigned  char  reserve2;        /*  reserved                    */
        unsigned  char  security;        /*  security                    */
        unsigned char   prop_delay;      /* propagation delay            */
        unsigned char   modem_class;     /* modem class                  */
        unsigned char   user_def_parm_1; /* user-defined parameter 1     */
        unsigned char   user_def_parm_2; /* user-defined parameter 2     */
        unsigned char   user_def_parm_3; /* user-defined parameter 3     */
} TG_DEFINED_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_CN

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

fqcn_name Fully qualified name (17 bytes long) of connection network being defined. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

def_data.description
Resource description (returned on QUERY_CN). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.num_ports
Number of ports associated with this connection network. There can be as many as eight ports per DEFINE_CN verb, and up to and including 239 ports in total per CN.

def_data.tg_chars.effect_cap
Actual units of effective capacity. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Each unit of effective capacity is equal to 300 bits per second.

def_data.tg_chars.connect_cost
Cost per connect time. Valid values are integer values in the range 0—255, where 0 is the lowest cost per connect time and 255 is the highest.

def_data.tg_chars.byte_cost
Cost per byte. Valid values are integer values in the range 0—255, where 0 is the lowest cost per byte and 255 is the highest.

def_data.tg_chars.security
Security values as described in the list below:

AP_SEC_NONSECURE
No security exists.

AP_SEC_PUBLIC_SWITCHED_NETWORK
Data transmitted over this connection network will flow over a public switched network.

AP_SEC_UNDERGROUND_CABLE
Data transmitted over secure underground cable.

AP_SEC_SECURE_CONDUIT
The line is a secure conduit that is not guarded.

AP_SEC_GUARDED_CONDUIT
Conduit is protected against physical tapping.

AP_SEC_ENCRYPTED
Encryption over the line.

AP_SEC_GUARDED_RADIATION
Line is protected against physical and radiation tapping.

def_data.tg_chars.prop_delay
Propagation delay representing the time it takes for a signal to travel the length of the link, in microseconds. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Default values are listed below:

AP_PROP_DELAY_MINIMUM
No propagation delay.

AP_PROP_DELAY_LAN
Less than 480 microseconds delay.

AP_PROP_DELAY_TELEPHONE
Between 480 and 49 512 microseconds delay.

AP_PROP_DELAY_PKT_SWITCHED_NET
Between 49 512 and 245 760 microseconds delay.

AP_PROP_DELAY_SATELLITE
Longer than 245 760 microseconds delay.

AP_PROP_DELAY_MAXIMUM
Maximum propagation delay.

def_data.tg_chars.modem_class
Reserved. This field should always be set to zero.

def_data.tg_chars.user_def_parm_1
User defined parameter in the range 0—255.

def_data.tg_chars.user_def_parm_2
User defined parameter in the range 0—255.

def_data.tg_chars.user_def_parm_3
User defined parameter in the range 0—255.

port_name Array of up to eight port names defined on the connection network. Each named port must have already been defined by a DEFINE_PORT verb. Each port name is an 8-byte string in a locally displayable character set and must match that on the associated DEFINE_PORT verb. Additional ports can be defined on the connection network by issuing another DEFINE_CN specifying the new port names.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_CN_NAME

AP_INVALID_NUM_PORTS_SPECIFIED
AP_INVALID_PORT_NAME
AP_INVALID_PORT_TYPE
AP_DEF_LINK_INVALID_SECURITY
AP_EXCEEDS_MAX_ALLOWED

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PORT_ACTIVE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_COS

DEFINE_COS adds a class-of-service definition. The DEFINE_COS verb can also be used to modify any fields in a previously defined COS.

The definition provides node and TG “rows.” These rows associate a range of node and TG characteristics with weights that are used for route calculation. The lower the weight the more favorable the route.

VCB Structure

The DEFINE_COS verb contains a variable number of **cos_tg_row** and **cos_node_row** overlays. The **cos_tg_row** structures are concatenated onto the end of DEFINE_COS (and ordered in ascending weight) and are followed by the **cos_node_row** structures (also ordered in ascending weight).

```
typedef struct define_cos
{
        unsigned short   opcode;              /* verb operation code          */
        unsigned  char   reserv2;             /*  reserved                    */
        unsigned  char   format;              /*  format                      */
        unsigned short   primary_rc;          /* primary return code          */
        unsigned long    secondary_rc;        /* secondary return code        */
        unsigned char    cos_name[8];         /* class-of-service name        */
        unsigned  char   description[RD_LEN];
                                              /* resource description         */
        unsigned  char   transmission_priority;
                                              /* transmission priority        */
        unsigned  char   reserv3[9];          /*  reserved                    */
        unsigned char    num_of_node_rows; /* number of node rows             */
        unsigned  char   num_of_tg_rows;      /*  number  of  TG  rows        */
} DEFINE_COS;

typedef struct cos_node_row
{
        COS_NODE_STATUS  minimum;             /*  minimum                     */
        COS_NODE_STATUS  maximum;             /*  max                         */
        unsigned  char   weight;              /*  weight                      */
        unsigned  char   reserv1;             /*  reserved                    */
} COS_NODE_ROW;

typedef struct cos_node_status
{
        unsigned char    rar;                 /* route additional resistance */
        unsigned char    status;              /* node status.                */
        unsigned  char   reserv1[2];          /*  reserved                    */
} COS_NODE_STATUS;

typedef struct cos_tg_row
{
        TG_DEFINED_CHARS  minimum;            /*  minimum                     */
        TG_DEFINED_CHARS  maximum;            /*  maximum                     */
        unsigned  char   weight;              /*  weight                      */
        unsigned  char   reserv1;             /*  reserved                    */
} COS_TG_ROW;
```

```
typedef struct tg_defined_chars
{
        unsigned char   effect_cap;         /* effective capacity          */
        unsigned  char  reserve1[5];        /*  reserved                     */
        unsigned char   connect_cost;       /* cost per connect time       */
        unsigned char   byte_cost;          /* cost per byte                */
        unsigned  char  reserve2;           /*  reserved                    */
        unsigned  char  security;           /*  security                    */
        unsigned char   prop_delay;         /* propagation delay            */
        unsigned char   modem_class;        /* modem class                  */
        unsigned char   user_def_parm_1;    /* user-defined parameter 1     */
        unsigned char   user_def_parm_2;    /* user-defined parameter 2     */
        unsigned char   user_def_parm_3;    /* user-defined parameter 3     */
} TG_DEFINED_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_COS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

cos_name Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description Resource description (returned on QUERY_COS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

transmission_priority
Transmission priority. This is set to one of the following values:

AP_LOW
AP_MEDIUM
AP_HIGH
AP_NETWORK

num_of_node_rows Number of node row overlays that follow the DEFINE_COS VCB. The maximum is 8. Each node row contains a set of minimum node characteristics, a set of maximum node characteristics, and a weight. When computing the weights for a node, its characteristics are checked against the minimum and maximum characteristics defined for each node row. The node is then assigned the weight of the first node row, which confines all the node's characteristics within the limits specified. If the node characteristics do not satisfy any of the listed node rows, the node is considered unsuitable for this COS, and is assigned an infinite weight. Note that the node rows must be concatenated in ascending order of weight.

num_of_tg_rows Number of TG row overlays that follow the node row overlays. The maximum is 8. Each TG row contains a set of minimum TG characteristics, a set of maximum TG characteristics, and a weight. When computing the weights

for a TG, its characteristics are checked against the minimum and maximum characteristics defined for each TG row. The TG is then assigned the weight of the first TG row, which confines all the TG's characteristics within the limits specified. If the TG characteristics do not satisfy any of the listed TG rows, the TG is considered unsuitable for this COS, and is assigned an infinite weight. Note that the TG rows must be concatenated in ascending order of weight.

cos_node_row.minimum.rar
Route additional resistance minimum. Values must be in the range 0—255.

cos_node_row.minimum.status
Specifies the minimum congestion status of the node. This can be one of the following values:

AP_UNCONGESTED
The node is not congested.

AP_CONGESTED
The number of ISR sessions is greater than the **isr_sessions_upper_threshold**.

cos_node_row.maximum.rar
Route additional resistance maximum. Values must be in the range 0—255.

cos_node_row.maximum.status
Specifies the maximum congestion status of the node. This can be one of the following values:

AP_UNCONGESTED
The node is not congested.

AP_CONGESTED
The number of ISR sessions is greater than the **isr_sessions_upper_threshold**.

cos_node_row.weight
Weight associated with this node row. Values must be in the range 0—255.

cos_tg_row.minimum.effect_cap
Minimum limit for actual units of effective capacity. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Each unit of effective capacity is equal to 300 bits per second.

cos_tg_row.minimum.connect_cost
Minimum limit for cost per connect time. Valid values are integer values in the range 0—255, where 0 is the lowest cost per connect time and 255 is the highest.

cos_tg_row.minimum.byte_cost
Minimum limit for cost per byte. Valid values are integer values in the range 0—255, where 0 is the lowest cost per byte and 255 is the highest.

cos_tg_row.minimum.security
Minimum limits for security values as described in the list below:

AP_SEC_NONSECURE
No security exists.

AP_SEC_PUBLIC_SWITCHED_NETWORK
Data transmitted over this connection network will flow over a public switched network.

AP_SEC_UNDERGROUND_CABLE
Data transmitted over secure underground cable.

AP_SEC_SECURE_CONDUIT
The line is a secure conduit that is not guarded.

AP_SEC_GUARDED_CONDUIT
Conduit is protected against physical tapping.

AP_SEC_ENCRYPTED
Encryption over the line.

AP_SEC_GUARDED_RADIATION
Line is protected against physical and radiation tapping.

cos_tg_row.minimum.prop_delay
Minimum limits for propagation delay representing the time it takes for a signal to travel the length of the link, in microseconds. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Default values are listed below:

AP_PROP_DELAY_MINIMUM
No propagation delay.

AP_PROP_DELAY_LAN
Less than 480 microseconds delay.

AP_PROP_DELAY_TELEPHONE
Between 480 and 49 512 microseconds delay.

AP_PROP_DELAY_PKT_SWITCHED_NET
Between 49 512 and 245 760 microseconds delay.

AP_PROP_DELAY_SATELLITE
Longer than 245 760 microseconds delay.

AP_PROP_DELAY_MAXIMUM
Maximum propagation delay.

cos_tg_row.minimum.modem_class
Reserved. This field should always be set to zero.

cos_tg_row.minimum.user_def_parm_1
Minimum limit for user-defined parameter in the range 0—255.

cos_tg_row.minimum.user_def_parm_2
Minimum limit for user-defined parameter in the range 0—255.

cos_tg_row.minimum.user_def_parm_3
Minimum limit for user-defined parameter in the range 0—255.

cos_tg_row.maximum.effect_cap
Maximum limit for actual units of effective capacity. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Each unit of effective capacity is equal to 300 bits per second.

cos_tg_row.maximum.connect_cost
Maximum limit for cost per connect time. Valid values are integer values in the range 0—255, where 0 is the lowest cost per connect time and 255 is the highest.

cos_tg_row.maximum.byte_cost
Maximum limit for cost per byte. Valid values are integer values in the range 0—255, where 0 is the lowest cost per byte and 255 is the highest.

cos_tg_row.maximum.security
Maximum limits for security values as described in the list below:

AP_SEC_NONSECURE
No security exists.

AP_SEC_PUBLIC_SWITCHED_NETWORK
Data transmitted over this connection network will flow over a public switched network.

AP_SEC_UNDERGROUND_CABLE
Data transmitted over secure underground cable.

AP_SEC_SECURE_CONDUIT
The line is a secure conduit that is not guarded.

AP_SEC_GUARDED_CONDUIT
Conduit that is protected against physical tapping.

AP_SEC_ENCRYPTED
Encryption over the line.

AP_SEC_GUARDED_RADIATION
Line is protected against physical and radiation tapping.

cos_tg_row.maximum.prop_delay
Maximum limits for propagation delay representing the time it takes for a signal to travel the length of the link, in microseconds. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Default values are listed below:

AP_PROP_DELAY_MINIMUM
No propagation delay.

AP_PROP_DELAY_LAN
Less than 480 microseconds delay.

AP_PROP_DELAY_TELEPHONE
Between 480 and 49 512 microseconds delay.

AP_PROP_DELAY_PKT_SWITCHED_NET
Between 49 512 and 245 760 microseconds delay.

AP_PROP_DELAY_SATELLITE
Longer than 245 760 microseconds delay.

AP_PROP_DELAY_MAXIMUM
Maximum propagation delay.

cos_tg_row.maximum.modem_class
Reserved. This field should always be set to zero.

cos_tg_row.maximum.user_def_parm_1
Maximum limit for user-defined parameter in the range 0—255.

cos_tg_row.maximum.user_def_parm_2
Maximum limit for user-defined parameter in the range 0—255.

cos_tg_row.maximum.user_def_parm_3
Maximum limit for user-defined parameter in the range 0—255.

cos_tg_row.weight Weight associated with this TG row.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_COS_NAME

AP_INVALID_NUMBER_OF_NODE_ROWS
AP_INVALID_NUMBER_OF_TG_ROWS
AP_NODE_ROW_WGT_LESS_THAN_LAST
AP_TG_ROW_WGT_LESS_THAN_LAST

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_COS_TABLE_FULL

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DEFAULTS

DEFINE_DEFAULTS allows the user to define or redefine default actions of the node.

VCB Structure

```
typedef struct define_defaults
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        DEFAULT_CHARS     default_chars;   /* default information      */
} DEFINE_DEFAULTS;

typedef struct default_chars
{
        unsigned  char    description[RD_LEN];
                                           /* resource description    */
        unsigned  char    mode_name[8];    /*  default  mode  name     */
        unsigned  char    reserv[248];     /*  reserved                */
} DEFAULT_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DEFAULTS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

default_chars.description
Resource description (returned on QUERY_DEFAULTS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

default_chars.mode_name
Name of the mode that will serve as the default. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb specifies a default mode that is not valid (for example, not EBCDIC A), or is valid but has not been defined, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_MODE_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DEFAULT_PU

DEFINE_DEFAULT_PU allows the user to define, redefine, or modify any field of a default PU. It also allows the user to delete the default PU, by specifying a null PU name. If a PU name is not specified explicitly on a TRANSFER_MS_DATA verb, then the management services information carried on the TRANSFER_MS_DATA is sent on the default PU's session with the host SSCP. For more information about this see Chapter 14, “Management Services Verbs” on page 477.

VCB Structure

```
typedef struct define_default_pu
{
        unsigned short  opcode;          /* verb operation code     */
        unsigned char   reserv2;         /* reserved                */
        unsigned char   format;          /* format                  */
        unsigned short  primary_rc;      /* primary return code     */
        unsigned long   secondary_rc;    /* secondary return code   */
        unsigned char   pu_name[8];      /* PU name                 */
        unsigned char   description[RD_LEN];
                                         /* resource description    */
        unsigned char   reserv3[16];     /* reserved                */
} DEFINE_DEFAULT_PU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DEFAULT_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pu_name Name of local PU that will serve as the default. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description Resource description (returned on QUERY_DEFAULT_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DLC

DEFINE_DLC defines a new DLC or modifies an existing DLC. This verb defines the DLC name, which is unique throughout the node, and some DLC-specific data, which is concatenated to the basic structure. This data is used during initialization of the DLC, and the format is specific to the DLC type (such as Token Ring). Only the DLC-specific data appended to the verb can be modified using the DEFINE_DLC verb. To do this, a STOP_DLC verb must first be issued so that the DLC is in a reset state.

See “DLC Processes, Ports, and Link Stations” on page 16, for more information about the relationship between DLCs, ports and link stations.

VCB Structure

```
typedef struct define_dlc
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    dlc_name[8];     /* name of DLC                  */
        DLC_DEF_DATA     def_data;        /* DLC defined data             */
} DEFINE_DLC;

typedef struct dlc_def_data
{
        unsigned  char   description[RD_LEN];
                                          /* resource description        */
        unsigned char    dlc_type;        /* DLC type                    */
        unsigned char    neg_ls_supp;     /* negotiable LS support       */
        unsigned char    port_types;      /* allowable port types        */
        unsigned  char   reserv3[11];     /*  reserved                   */
        unsigned short   dlc_spec_data_len; /* Length of DLC specific data */
} DLC_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DLC

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dlc_name Name of the DLC. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. For OEM devices, this name is manufacturer-specific. Valid values are LAN, SDLC, AnyNet, X25 or TWINAX (padded to 8 chars with spaces).

def_data.description

Resource description (returned on QUERY_DLC). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.dlc_type Type of the DLC.Personal Communications and Communications Server support the following types:

AP_ANYNET
AP_LLC2
AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

def_data.neg_ls_supp
Specifies whether the DLC supports negotiable link stations (AP_YES or AP_NO). If the **dlc_type** is AP_TWINAX, then only AP_NO is supported. If the **dlc_type** is AP_ANYNET, then only AP_YES is supported.

def_data.port_types
Specifies the allowable port types for the supplied **dlc_type**. The value corresponds to one or more of the following values ORed together.

AP_PORT_NONSWITCHED
AP_PORT_SWITCHED
AP_PORT_SATF

Use the following table to set the fields for the corresponding DLC type.

Table 2. Port Types for DLC Types

DLC Type	Port Type
AP_ANYNET	AP_PORT_SATF
AP_LLC2	AP_PORT_SATF
AP_OEM_DLC	AP_PORT_SWITCHED or AP_PORT_NONSWITCHED
AP_SDLC	AP_PORT_SWITCHED or AP_PORT_NONSWITCHED
AP_TWINAX	AP_PORT_NONSWITCHED
AP_X25	AP_PORT_SWITCHED or AP_PORT_NONSWITCHED

def_data.dlc_spec_data_len
This field should always be set to zero.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLC_NAME

AP_INVALID_DLC_TYPE
AP_INVALID_PORT_TYPE

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_DLC_ACTIVE

AP_INVALID_DLC_TYPE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DLUR_DEFAULTS

DEFINE_DLUR_DEFAULTS allows the user to define, redefine, or revoke a default dependent LU server (DLUS) and a backup default DLUS. The default DLUS name is used by DLUR when it initiates SSCP-PU activation for PUs that do not have an explicitly specified associated DLUS. If a DLUS name is not specified explicitly on the DEFINE_DLUR_DEFAULTS verb then the current default (or backup DLUS) is revoked.

VCB Structure

```
typedef struct define_dlur_defaults
{
        unsigned short  opcode;                 /* verb operation code      */
        unsigned  char  reserv2;                /*  reserved                */
        unsigned  char  format;                 /*  format                  */
        unsigned short  primary_rc;             /* primary return code      */
        unsigned long   secondary_rc;           /* secondary return code */
        unsigned  char  description[RD_LEN];
                                                /* resource description    */
        unsigned char   dlus_name[17];          /* DLUS name                */
        unsigned char   bkup_dlus_name[17]; /* Backup DLUS name             */
        unsigned  char  reserv3;                /*  reserved                */
        unsigned short  dlus_retry_timeout; /* DLUS Retry Timeout           */
        unsigned short  dlus_retry_limit;   /* DLUS Retry Limit             */
        unsigned  char  reserv4[16];            /*  reserved                */
} DEFINE_DLUR_DEFAULTS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DLUR_DEFAULTS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

description Resource description. This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

dlus_name Name of the DLUS node that will serve as the default. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If this field is set to all zeros, the current default DLUS is revoked.

bkup_dlus_name Name of the DLUS node that will serve as the backup default. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If this field is set to all zeros, the current backup default DLUS is revoked.

dlus_retry_timeout Interval in seconds between second and subsequent attempts to contact a DLUS. The interval between the initial attempt and the first retry is always one second. If zero is specified, the default value of 5 seconds is used.

dlus_retry_limit Maximum number of retries after an initial failure to contact a DLUS. If zero is specified, the default value of 3 is used. If X'FFFF' is specified, Personal Communications or Communications Server will retry indefinitely.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLUS_NAME

AP_INVALID_BKUP_DLUS_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DOWNSTREAM_LU

The DEFINE_DOWNSTREAM_LU verb is used for PU concentration. When PU concentration is used, downstream LUs are able to communicate with an upstream host. To do this, Communications Server maps each downstream LU to a dependent local LU , referred to as the *host LU*.

DEFINE_DOWNSTREAM_LU defines a new downstream LU and cannot be used to modify an existing definition. The downstream LU is mapped to the specified host LU (defined using the DEFINE_LU_0_TO_3 verb). The host LU can also be specified in terms of an LU pool.

VCB Structure

```
typedef struct define_downstream_lu
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     dslu_name[8];        /* Downstream LU name           */
        DOWNSTREAM_LU_DEF_DATA def_data;   /* defined data                    */
} DEFINE_DOWNSTREAM_LU;

typedef struct downstream_lu_def_data
{
        unsigned  char    description[RD_LEN];
                                               /* resource description        */
        unsigned char     nau_address;         /* Downstream LU NAU address   */
        unsigned char     dspu_name[8];        /* Downstream PU name          */
        unsigned char     host_lu_name[8];   /* Host LU or Pool name          */
        unsigned  char    reserv2[8];          /*  reserved                    */
} DOWNSTREAM_LU_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DOWNSTREAM_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dslu_name Name of the downstream LU that is being defined. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

def_data.description
Resource description (returned on QUERY_DOWNSTREAM_LU). The length of this field should be a multiple of four bytes, and not zero.

def_data.nau_address
Network addressable unit address of the DOWNSTREAM LU. This must be in the range 1–255.

def_data.dspu_name
Name of the DOWNSTREAM PU (as specified on the DEFINE_LS). This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

def_data.host_lu_name
Name of the host LU or host LU pool that the downstream LU is mapped to. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DNST_LU_NAME

AP_INVALID_NAU_ADDRESS

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_PU_NAME

AP_INVALID_PU_TYPE
AP_PU_NOT_DEFINED
AP_LU_ALREADY_DEFINED
AP_LU_NAU_ADDR_ALREADY_DEFD
AP_INVALID_HOST_LU_NAME
AP_LU_NAME_POOL_NAME_CLASH

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DOWNSTREAM_LU_RANGE

The DEFINE_DOWNSTREAM_LU_RANGE verb is used for PU concentration. When PU concentration is used, downstream LUs are able to communicate with an upstream host. To do this, Communications Server maps each downstream LU to a dependent local LU , referred to as the *host LU*.

DEFINE_DOWNSTREAM_LU_RANGE allows the definition of multiple downstream LUs within a specified NAU range (but cannot be used to modify an existing definition). The node operator provides a base name and an NAU range. The LU names are generated by combining the base name with the NAU addresses.

For example, a base name of LUNME combined with an NAU range of 1 to 4 would define the LUs LUNME001, LUNME002, LUNME003, and LUNME004. A base name of less than five non-pad characters results in LU names of less than eight non-pad characters. Communications Server then right-pads these to eight characters.

Each downstream LU is mapped to the specified host LU (defined using the DEFINE_LU_0_TO_3 verb).

VCB Structure

```
typedef struct define_downstream_lu_range
{
    unsigned short   opcode;              /* verb operation code          */
    unsigned  char   reserv2;             /*  reserved                    */
    unsigned  char   format;              /*  format                      */
    unsigned short   primary_rc;          /* primary return code          */
    unsigned long    secondary_rc;        /* secondary return code        */
    unsigned char    dslu_base_name[5];/* Downstream LU base name         */
    unsigned  char   reserv3;             /*  reserved                    */
    unsigned  char   description[RD_LEN];
                                          /* resource description        */
    unsigned char    min_nau;             /* min NAU address in range     */
    unsigned char    max_nau;             /* max NAU address in range     */
    unsigned char    dspu_name[8];        /* Downstream PU name           */
    unsigned char    host_lu_name[8];     /* Host LU or pool name         */
    unsigned  char   reserv4[8];          /*  reserved                    */
} DEFINE_DOWNSTREAM_LU_RANGE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DOWNSTREAM_LU_RANGE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dslu_base_name Base name for downstream LU name range. This is a 5-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This base name is appended with three type-A EBCDIC numeric characters, representing the decimal value of the NAU address, for each LU in the NAU range.

description Resource description (returned on QUERY_DOWNSTREAM_LU). The length of this field should be a multiple of four bytes, and not zero.

min_nau Minimum NAU address in the range. This can be from 1 to 255 inclusive.

max_nau Maximum NAU address in the range. This can be from 1 to 255 inclusive.

dspu_name Name of the DOWNSTREAM PU (as specified on the DEFINE_LS). This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

host_lu_name Name of the host LU or host LU pool that all the downstream LUs within the range are mapped to. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DNST_LU_NAME

AP_INVALID_NAU_ADDRESS

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_LU_NAME_POOL_NAME_CLASH

AP_LU_ALREADY_DEFINED
AP_INVALID_HOST_LU_NAME
AP_PU_NOT_DEFINED
AP_INVALID_PU_NAME
AP_INVALID_PU_TYPE
AP_LU_NAU_ADDR_ALREADY_DEFD

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_DSPU_TEMPLATE

This verb is used for PU concentration. When PU concentration is used, downstream LUs are able to communicate with an upstream host. To do this, Communications Server maps each downstream LU to a dependent local LU, referred to as the host LU. DEFINE_DSPU_TEMPLATE defines a template for the downstream LUs which are present on a group of downstream workstations. This template is used to put in place definitions for the downstream LUs when a workstation connects into Communications Server over an implicit link (one not previously defined). These templates are referred to by the **implicit_dspu_template** field on the DEFINE_PORT verb. DEFINE_DSPU_TEMPLATE can either be used to define a new template or to modify an existing template (although the existing instances of the modified template is not affected).

VCB Structure

```
typedef struct define_dspu_template
{
    unsigned short  opcode;                 /* verb operation code          */
    unsigned  char  reserv2;                /*  reserved                    */
    unsigned  char  format;                 /*  format                      */
    unsigned short  primary_rc;             /* primary return code          */
    unsigned long   secondary_rc;           /* secondary return code        */
    unsigned char   template_name[8];       /* name of template             */
    unsigned char   description[RD_LEN]; /* resource description            */
    unsigned  char  reserv1[12];            /*  reserved                    */
    unsigned short  max_instance;           /* Max active template          */
                                            /*  instances                   */
    unsigned  short num_of_dslu_templates;
                                            /* number of DSLU templates     */
} DEFINE_DSPU_TEMPLATE;

typedef struct dslu_template
{
    unsigned char   min_nau;                /* min NAU address in range     */
    unsigned char   max_nau;                /* max NAU address in range     */
    unsigned  char  reserv1[10];            /*  reserved                    */
    unsigned char   host_lu[8];             /* host LU or pool name         */
} DSLU_TEMPLATE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_DSPU_TEMPLATE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

template_name Name of the DSPU template. (This corresponds to the name specified in the **implicit_dspu_template** field on PORT_DEF_DATA). This is an 8_byte string in a locally-displayable character set. All 8 bytes are significant and must be set.

description Resource description (returned on QUERY_DSPU_TEMPLATE). The length of this should be a multiple of four bytes, and non-zero.

max_instance This is the maximum number of instances of the template which can be active concurrently. While this limit is reached, no new instances can be created. This can be from 0 to 65535 inclusive, where 0 means no limit.

num_of_dslu_templates
The number of DSLU template overlays which follow the DEFINE_DSPU_TEMPLATE VCB. This can be from 0 to 255 inclusive.

dslu_template.min_nau
Minimum NAU address in the range. This can be from 1 to 255 inclusive.

dslu_template.max_nau
Maximum NAU address in the range. This can be from 1 to 255 inclusive.

dslu_template.host_lu
Name of the host LU or host LU pool that all the downstream LUs within the range will be mapped onto. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC Spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TEMPLATE_NAME
AP_INVALID_NAU_ADDRESS
AP_INVALID_NAU_RANGE
AP_CLASHING_NAU_RANGE
AP_INVALID_NUM_DSPU_TEMPLATES

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_HOST_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_FOCAL_POINT

Personal Communications or Communications Server can have a number of types of relationships with different focal points. The DEFINE_FOCAL_POINT verb defines a focal point with which Personal Communications or Communications Server has an implicit relationship (which can be of type primary or backup). These relationships, and the ways in which they can be established, are described below. Relationships between a management services focal point (FP) and a management services entry point (EP) for a given category are established when they exchange Management Services Capabilities messages. The following types of FP-EP relationships can be established.

Explicit

This relationship is established by an operator at the focal point assigning the entry point to its sphere of control. The focal point initiates exchange of Management Services Capabilities.

Implicit (primary)

The relationship is established when an operator at an entry point assigns the entry point to a specified focal point (for example, when the operator issues a DEFINE_FOCAL_POINT verb). The entry point initiates the Management Services Capabilities exchange.

Implicit (backup)

This relationship is established when an entry point loses either an explicit or implicit primary focal point. The entry point initiates Management Services Capabilities exchange. The identity of the backup focal point can be defined (using the DEFINE_FOCAL_POINT verb) or can be acquired via Management Services Capabilities exchange.

Default

This relationship is established when an FP acquires an EP without operator intervention. The FP initiates the MS Capabilities exchange. This relationship only applies to EPs that are NNs

Domain

This relationship is established when a serving network node (NN) informs the end node entry point of the identity of the focal point. Domain relationships are only valid in end nodes.

Host

This relationship does not involve Management Services Capabilities exchange and is established by the configuration of an SSCP-PU session from the entry point node to a host. It is the lowest precedence focal point relationship.

Each DEFINE_FOCAL_POINT verb can only be used to define an implicit focal point (which can be of type primary or backup). Each DEFINE_FOCAL_POINT verb is issued for a specific management services category. Within this category the DEFINE_FOCAL_POINT verb can be used to

Define a focal point
Replace a focal point (or backup focal point)
Revoke the currently active focal point.

The fields on a DEFINE_FOCAL_POINT verb are used as follows.

The **ms_category** must always be filled in. The combination of the **fp_fqcp_name** and **ms_appl_name fields** specify the focal point (or backup focal point if the **backup** field is set to AP_YES) for the specified category.

If the verb is being issued to revoke the currently active focal point without providing a new one, the **fp_fqcp_name** and **ms_appl_name** fields should be set to all zeros. When a DEFINE_FOCAL_POINT verb defining or replacing a focal point is received, Personal Communications or Communications Server attempts to establish an implicit primary focal point relationship with the specified focal point by sending a Management Services Capabilities request. When Personal Communications or Communications Server receives a DEFINE_FOCAL_POINT verb revoking the currently active focal point, it sends a Management Services Capabilities revoke message to the focal point. It is recommended that the DELETE_FOCAL_POINT verb (specifying AP_ACTIVE) be used to revoke the currently active focal point.

VCB Structure

```
typedef struct define_focal_point
{
          unsigned short   opcode;              /* verb operation code              */
          unsigned  char   reserv2;             /*  reserved                        */
          unsigned  char   format;              /*  format                          */
          unsigned short   primary_rc;          /* primary return code              */
          unsigned long    secondary_rc;        /* secondary return code            */
          unsigned  char   reserved;            /*  reserved                        */
          unsigned  char   ms_category[8];      /*  management  services  category  */
          unsigned char    fp_fqcp_name[17]; /* Fully qualified focal            */
                                             /* point CP name                    */
          unsigned char    ms_appl_name[8];     /* Focal point application name */
          unsigned  char   description[RD_LEN];
                                             /* resource description             */
          unsigned char    backup;              /* is focal point a backup          */
          unsigned  char   reserv3[16];         /*  reserved                        */
} DEFINE_FOCAL_POINT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_FOCAL_POINT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

ms_category Management services category. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services categories as described in SNA management services, or an 8-byte type 1134 EBCDIC installation-defined name.

fp_fqcp_name Focal point's fully qualified control point name. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no

embedded spaces.) If the focal point is being revoked, this field should be set to all zeros.

ms_appl_name Focal point application name. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services applications as described in SNA Management Services, or an 8-byte type 1134 EBCDIC installation-defined name. If the focal point is being revoked, this field should be set to all zeros.

description Resource description (returned on QUERY_FOCAL_POINT). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

backup Specifies whether a backup focal point is being defined (AP_YES or AP_NO). This field is reserved if the currently active focal point is being revoked. It is recommended that the DELETE_FOCAL_POINT verb (specifying AP_ACTIVE) be used to revoke the currently active focal point.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_FP_NAME

AP_INVALID_CATEGORY_NAME

If the verb does not execute successfully, the Program returns the following parameters:

primary_rc AP_REPLACED

AP_UNSUCCESSFUL

secondary_rc AP_IMPLICIT_REQUEST_REJECTED

AP_IMPLICIT_REQUEST_FAILED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

The Program returns the following parameter if the verb does not execute because of a system error or because the Program failed to contact the focal point successfully:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_INTERNAL_PU

The DEFINE_INTERNAL_PU verb defines a DLUR-served local PU. This verb is not used to define a local PU which is directly attached to the host. See “DEFINE_LS” on page 68 for this purpose.

VCB Structure

```
typedef struct define_internal_pu
{
        unsigned short   opcode;                  /* verb operation code     */
        unsigned  char   reserv2;                 /*  reserved                */
        unsigned  char   format;                  /*  format                  */
        unsigned short   primary_rc;              /* primary return code     */
        unsigned long    secondary_rc;            /* secondary return code */
        unsigned char    pu_name[8];              /* internal PU name        */
        INTERNAL_PU_DEF_DATA def_data;            /* defined data            */
} DEFINE_INTERNAL_PU;

typedef struct internal_pu_def_data
{
        unsigned  char   description[RD_LEN];
                                                  /* resource description    */
        unsigned char    dlus_name[17];           /* DLUS name               */
        unsigned char    bkup_dlus_name[17]; /* backup DLUS name          */
        unsigned char    pu_id[4];                /* PU identifier           */
        unsigned  char   reserv2[8];              /*  reserved               */
} INTERNAL_PU_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_INTERNAL_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pu_name Name of the internal PU that is being defined. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

def_data.description
Resource description (returned on QUERY_DLUR_PU and QUERY_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.dlus_name
Name of the DLUS node that DLUR will use when it initiates SSCP-PU activation. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the field is set to all zeros, the global default DLUS (if it has been defined, using the DEFINE_DLUR_DEFAULTS verb) is used in DLUR-initiated SSCP-PU activation.

def_data.bkup_dlus_name
Name of the DLUS node that will serve as the backup DLUS for this PU. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the field is set to all zeros, the global backup default DLUS (if it has been defined by the DEFINE_DLUR_DEFAULTS verb) is used as the backup for this PU.

def_data.pu_id PU identifier. This a 4-byte hexadecimal string. Bits 0—11 are set to the Block number and bits 12—31 to the ID number that uniquely identifies the PU. This must match the **pu_id** configured at the host.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PU_NAME

AP_INVALID_PU_ID
AP_INVALID_DLUS_NAME
AP_INVALID_BKUP_DLUS_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PU_ALREADY_DEFINED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_LOCAL_LU

The DEFINE_LOCAL_LU verb requests the definition of a local LU with the specified characteristics, or, if the LU already exists, the modification of the **attach_routing_data** characteristic of the LU. Note that if a DEFINE_LOCAL_LU is used to modify an existing definition then any parameter other than the **attach_routing_data** field will be ignored.

VCB Structure

```
typedef struct define_local_lu
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     lu_name[8];          /* local LU name                */
        LOCAL_LU_DEF_DATA def_data;            /* defined data                 */
} DEFINE_LOCAL_LU;

typedef struct local_lu_def_data
{
        unsigned  char    description[RD_LEN];
                                               /* resource description         */
        unsigned char     lu_alias[8];         /* local LU alias               */
        unsigned char     nau_address;         /* NAU address                  */
        unsigned  char    syncpt_support;      /*  is  sync-point  supported?  */
        unsigned short    lu_session_limit;    /* LU session limit             */
        unsigned char     default_pool;        /* member of default_lu_pool    */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned char     pu_name[8];          /* PU name                      */
        unsigned  char    reserv3[8];          /*  reserved                    */
        unsigned  char    attach_routing_data[128];
                                               /* routing data for             */
                                               /* incoming attaches            */
} LOCAL_LU_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_LOCAL_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name Name of the local LU that is being defined. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

def_data.description
Resource description (returned on QUERY_LOCAL_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.lu_alias Alias of the local LU to define. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

def_data.nau_address
Network addressable unit address of the LU, which must be in the range 0—255. A nonzero value implies the LU is a dependent LU. Zero implies the LU is an independent LU.

def_data.syncpt_support
This field should always be set to AP_NO unless a sync point manager is available for this LU.

def_data.lu_session_limit
Maximum number of sessions supported by the LU. Zero means no limit. If the LU is independent then this can be set to any value. If the LU is dependent then this must be set to 1.

def_data.default_pool
Set to AP_YES if the LU is a member of the dependent LU6.2 default pool.

def_data.pu_name Name of the PU that this LU will use. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is only used by dependent LUs, and should be set to all binary zeros for independent LUs.

def_data.attach_routing_data
Type of attach routing data.

AP_REGISTERED_OR_DEFAULT_ATTACH_MGR
Specifies that a DYNAMIC_LOAD_INDICATION resulting from an attach arriving for the transaction program (TP) at this local LU is sent to the attach manager that has registered to receive DLIs for this LU, or to the default attach manager if no attach manager has registered for this LU.

AP_REGISTERED_ATTACH_MGR_ONLY
Specifies that a DYNAMIC_LOAD_INDICATION resulting from an attach arriving for the transaction program (TP) at this local LU is sent only to the attach manager that has registered to receive DLIs for this LU. If no attach manager has registered for this LU, the attach is rejected.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

AP_INVALID_NAU_ADDRESS
AP_INVALID_SESSION_LIMIT

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc	AP_STATE_CHECK
secondary_rc	AP_PU_NOT_DEFINED
	AP_INVALID_LU_NAME AP_LU_ALREADY_DEFINED AP_ALLOCATE_NOT_PENDING AP_LU_ALIAS_ALREADY_USED AP_PLU_ALIAS_ALREADY_USED AP_PLU_ALIAS_CANT_BE_CHANGED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR
secondary_rc	AP_MEMORY_SHORTAGE

DEFINE_LS

DEFINE_LS is used to define a new link station (LS) or modify an existing one. This verb provides the LS name, which is unique throughout the node, and the name of the port this LS should use. This port must already have been defined using a DEFINE_PORT verb. Link-specific data is concatenated to the basic structure. DEFINE_LS can only be used to modify one or more fields of an existing link station if the link station is in a reset state (after a STOP_LS has been issued), and the **port_name** specified on the DEFINE_LS has not changed since the previous definition of the LS.

See “DLC Processes, Ports, and Link Stations” on page 16, for more information about the relationship between DLCs, ports, and link stations.

The setting of a large number of the fields in **LS_DEF_DATA** depends on the value of the **adj_cp_type** field.

There are eight values that **adj_cp_type** can take(which are described further under **def_data.adj_cp_type**), four of which are used for links to adjacent Type 2.1 (APPN) nodes:

AP_NETWORK_NODE
AP_END_NODE
AP_APPN_NODE
AP_BACK_LEVEL_LEN_NODE

and four of which are used for links carrying PU Type 2.0 traffic only:

AP_HOST_XID3
AP_HOST_XID0
AP_DSPU_XID
AP_DSPU_NOXID.

There are four types of APPN nodes, which are distinguished as follows

An APPN network node includes the Network Name Control Vector (CV) in its XID3, supports parallel TGs, sets the networking capabilities bit in its XID3, and can support CP-CP sessions on a link.

An APPN end node includes the Network Name CV in its XID3, supports parallel TGs, does not set the networking capabilities bit in its XID3, and can support CP-CP sessions on a link.

An up-level node includes the Network Name CV in its XID3, can support parallel TGs, does not set the networking capabilities bit in its XID3, and does not support CP-CP sessions.

A back-level node does not include the Network Name CV in its XID3, does not support parallel TGs, does not set the networking capabilities bit in its XID3, and does not support CP-CP sessions.

The following fields must be set for all links:

port_name
adj_cp_type
dest_address
auto_act_supp
disable_remote_act

limited_resource
link_deact_timer
ls_attributes
adj_node_id
local_node_id
target_pacing_count
max_send_btu_size
link_spec_data_len
ls_role

Other fields must be set as follows:

If **adj_cp_type** is set to AP_NETWORK_NODE, AP_END_NODE, or AP_APPN_NODE the following fields must be set:

adj_cp_name
tg_number
solicit_sscp_sessions
dspu_services
hpr_supported
hpr_link_lvl_error
default_nn_server
cp_cp_sess_support
use_default_tg_chars
tg_chars

If **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE the following fields must be set:

adj_cp_name
solicit_sscp_sessions
dspu_services
use_default_tg_chars
tg_chars

If a local PU is to use the link (**adj_cp_type** is set to AP_HOST_XID3 or AP_HOST_XID0, or **solicit_sscp_sessions** is set to AP_YES on a link to an APPN node) the following field must be set:

pu_name

If a downstream PU is to use the link and will be served by PU Concentration (**dspu_services** is set to AP_PU_CONCENTRATION) the following field must be set:

dspu_name

If a downstream PU is to use the link and will be served by DLUR (**dspu_services** is set to AP_DLUR) the following fields must be set:

dspu_name
dlus_name
bkup_dlus_name

VCB Structure

```
typedef struct define_ls
{
        unsigned short    opcode;              /* verb operation code              */
        unsigned  char    reserv2;             /*  reserved                        */
        unsigned  char    format;              /*  format                          */
        unsigned short    primary_rc;          /* primary return code              */
        unsigned long     secondary_rc;        /* secondary return code            */
        unsigned char     ls_name[8];          /* name of link station             */
        LS_DEF_DATA       def_data;            /* LS defined data                  */
} DEFINE_LS;

typedef struct ls_def_data
{
        unsigned  char    description[RD_LEN];
                                               /* resource description             */
        unsigned char     port_name[8];        /* name of associated port          */
        unsigned char     adj_cp_name[17];     /* adjacent CP name                 */
        unsigned char     adj_cp_type;         /* adjacent node type               */
        LINK_ADDRESS      dest_address;        /* destination address              */
        unsigned char     auto_act_supp;       /* auto-activate supported          */
        unsigned char     tg_number;           /* Pre-assigned TG number           */
        unsigned  char    limited_resource;    /*  limited  resource               */
        unsigned  char    solicit_sscp_sessions;
                                               /* solicit SSCP sessions            */
        unsigned char     pu_name[8];          /* Local PU name (reserved if       */
                                               /* solicit_sscp_sessions is set     */
                                               /* to AP_NO)                        */
        unsigned char     disable_remote_act; /* disable remote activation flag */
        unsigned char     dspu_services;       /* Services provided for            */
                                               /* downstream PU                    */
        unsigned char     dspu_name[8];        /* Downstream PU name (reserved     */
                                               /* if dspu_services is set to       */
                                               /* AP_NONE or AP_DLUR)              */
        unsigned char     dlus_name[17];       /* DLUS name if dspu_services       */
                                               /* set to AP_DLUR                   */
        unsigned char     bkup_dlus_name[17]; /* Backup DLUS name if              */
                                               /* dspu_services set to AP_DLUR     */
        unsigned char     hpr_supported;       /* does the link support HPR?       */
        unsigned char     hpr_link_lvl_error; /* does link use link-level         */
                                               /* error recovery for HPR frms?     */
        unsigned short    link_deact_timer;    /* HPR link deactivation timer      */
        unsigned  char    reserv1;             /*  reserved                        */
        unsigned char     default_nn_server;   /* Use as deflt LS to NN server     */
        unsigned  char    ls_attributes[4];    /*  LS  attributes                  */
        unsigned char     adj_node_id[4];      /* adjacent node ID                 */
        unsigned  char    local_node_id[4];    /*  local  node  ID                 */
        unsigned char     cp_cp_sess_support; /* CP-CP session support            */
        unsigned  char    use_default_tg_chars;
                                               /* Use the default tg_chars         */
        TG_DEFINED_CHARS tg_chars;             /* TG characteristics               */
        unsigned short    target_pacing_count;/* target pacing count              */
        unsigned  short   max_send_btu_size;   /*  max  send  BTU  size            */
        unsigned char     ls_role;             /* link station role to use         */
                                               /*    on this link                  */
        unsigned char     max_ifrm_rcvd;       /* max number of I-frames rcvd      */
        unsigned  char    reserv3[34];         /*  reserved                        */
```

```
        unsigned short    link_spec_data_len; /* length of link specific data     */
} LS_DEF_DATA;

typedef struct tg_defined_chars
{
        unsigned char     effect_cap;          /* effective capacity              */
        unsigned  char    reserve1[5];         /*  reserved                        */
        unsigned char     connect_cost;        /* connection cost                  */
        unsigned char     byte_cost;           /* byte cost                        */
        unsigned  char    reserve2;            /*  reserved                        */
        unsigned  char    security;            /*  security                        */
        unsigned char     prop_delay;          /* propagation delay                */
        unsigned char     modem_class;         /* modem class                      */
        unsigned char     user_def_parm_1;     /* user-defined parameter 1         */
        unsigned char     user_def_parm_2;     /* user-defined parameter 2         */
        unsigned char     user_def_parm_3;     /* user-defined parameter 3         */
} TG_DEFINED_CHARS;

typedef struct link_address
{
        unsigned  short   length;              /*  length                          */
        unsigned short reserve1;               /* reserved                         */
        unsigned  char    address[MAX_LINK_ADDR_LEN];
                                               /*  address                         */
} LINK_ADDRESS;

typedef struct link_spec_data
{
        unsigned  char    link_data[SIZEOF_LINK_SPEC_DATA];

}  LINK_SPEC_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_LS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

ls_name Name of link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

Setting the field **ls_name** to the special value “$ANYNET$” (an ASCII string) has the effect of informing the Node Operator Facility that this is the link station to which independent LU session traffic that is to be routed by the AnyNet DLC should be sent. A link station of this name must be defined on a port over the AnyNet DLC if AnyNet routing is required.

def_data.description

Resource description (returned on QUERY_LS, QUERY_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.port_name

Name of port associated with this link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This named port must have already been defined by a DEFINE_PORT verb.

def_data.adj_cp_name

Fully qualified 17-byte adjacent control point name, which is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only relevant for links to APPN nodes and is otherwise ignored. For links to APPN nodes it can be set to all zeros unless the field **tg_number** is set to a number in the range one to 20 or the field **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE. If it is set to all zeros, it is not checked against the name received from the adjacent node during XID exchange. If it is not set to all zeros, it is checked against the name received from the adjacent node during XID exchange unless **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE (in which case it is used to identify the adjacent node).

def_data.adj_cp_type

Adjacent node type.

AP_NETWORK_NODE
Specifies that the node is an APPN network node.

AP_END_NODE
Specifies that the node is an APPN end node or an up-level node.

AP_APPN_NODE
Specifies that the node is an APPN network node, an APPN end node, or an up-level node. The node type will be learned during XID exchange.

AP_BACK_LEVEL_LEN_NODE
Specifies that the node is a back_level_len node. That is, it does not send the control point name in the XID. For a link using the AnyNet DLC supporting independent LU sessions, you must specify AP_BACK_LEVEL_LEN_NODE.

AP_HOST_XID3
Specifies that the node is a host and that Personal Communications or Communications Server responds to a polling XID from the node with a format 3 XID.

AP_HOST_XID0
Specifies that the node is a host and that Personal Communications or Communications Server responds to a polling XID from the node with a format 0 XID. For a link using the AnyNet DLC supporting dependent LU sessions, you must specify AP_HOST_XID0.

AP_DSPU_XID
Specifies that the node is a downstream PU and that Personal Communications or Communications Server includes XID exchange in link activation.

AP_DSPU_NOXID
Specifies that the node is a downstream PU and that Personal Communications or Communications Server does not include XID exchange in link activation.

Note: A link station to a VRN is always dynamic and is therefore not defined.

def_data.dest_address.length
Length of destination link station's address on adjacent node.

def_data.dest_address.address
Link station's destination address on adjacent node. For a link using the AnyNet DLC, the **dest_address** specifies the adjacent node ID or adjacent control point name. If an adjacent node ID is specified, the length must be 4 and the address must contain the 4-byte hexadecimal node ID (1-byte block ID, 3-byte PU ID). If an adjacent control point name is specified, the length must be 17 and the address must contain the control point name in EBCDIC, padded with EBCDIC blanks.

def_data.auto_act_supp
Specifies whether the link can be activated automatically when required by a session. (AP_YES or AP_NO). If the link is not to an APPN node then this field can always be set to AP_YES and has no requirements on other parameters. If the link is to an APPN node, then this field cannot be set to AP_YES if the link also supports CP-CP sessions; and can only be set to AP_YES if a pre-assigned TG number is also defined for the link **tg_number** and is set to a value between one and 20). These requirements will always be met if **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE because **cp_cp_sess_support** and **tg_number** are ignored in this case).

def_data.tg_number
Pre-assigned TG number. This field is only relevant if the link is to an adjacent APPN node and is otherwise ignored. If **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE then it is also ignored and is assumed to be set to one. For links to adjacent APPN nodes this must be set in the range one to 20. This number is used to represent the link when the link is activated. Personal Communications or Communications Server will not accept any other number from the adjacent node during activation of this link. To avoid link-activation failure because of a mismatch of preassigned TG numbers, the same TG number must be defined by the adjacent node on the adjacent link station (if using preassigned TG numbers). If a preassigned TG number is defined then the **adj_cp_name** must also be defined (and cannot be set to all zeros) and the **adj_cp_type** must be set to

AP_NETWORK_NODE or AP_END_NODE. If zero is entered the TG number is not preassigned and is negotiated when the link is activated.

def_data.limited_resource
Specifies whether this link station is to be deactivated when there are no sessions using the link. This is set to one of the following values:

AP_NO
The link is not a limited resource and will not be deactivated automatically.

AP_YES or AP_NO_SESSIONS
The link is a limited resource and will be deactivated automatically when no active sessions are using it. A limited resource link station can be configured for CP-CP session support. (This is done by setting this field to AP_YES and **cp_cp_sess_support** to AP_YES.) In this case, if CP-CP sessions are brought up over the link, Personal Communications or Communications Server will not treat the link as a limited resource (and will not bring the link down).

AP_INACTIVITY
The link is a limited resource and will be deactivated automatically when no active sessions are using it, or when no data has flowed on the link for the time period specified by the **link_deact_timer** field. Note that link stations on a nonswitched port cannot be configured as limited resource.

def_data.solicit_sscp_sessions
AP_YES requests the adjacent node to initiate sessions between the SSCP and the local control point and dependent LUs. (In this case the **pu_name** must be set.) AP_NO requests no sessions with the SSCP on this link. This field is only relevant if the link is to an APPN node and is otherwise ignored. If the adjacent node is defined to be a host (**adj_cp_type** is set to AP_HOST_XID3 or AP_HOST_XID0), then Personal Communications or Communications Server always requests the host to initiate sessions between the SSCP and the local control point and dependent LUs (and again the **pu_name** must be set).

def_data.pu_name Name of local PU that will use this link if the adjacent node is defined to be a host or **solicit_sscp_sessions** is set to AP_YES on a link to an APPN node. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If the adjacent node is not defined to be a host, and is not defined as an APPN node with **solicit_sscp_sessions** set to AP_YES, this field is ignored.

def_data.disable_remote_act
Specifies whether remote activation of this link is supported (AP_YES or AP_NO).

def_data.dspu_services

Specifies the services that the local node provides to the downstream PU across this link. This is set to one of the following:

AP_PU_CONCENTRATION
Local node will provide PU concentration for the downstream PU.

AP_DLUR
Local node will provide DLUR services for the downstream PU.

AP_NONE
Local node will provide no services for this downstream PU.

The **dspu_name** must also be set if this field is set to AP_PU_CONCENTRATION or AP_DLUR.

This field must be set to AP_PU_CONCENTRATION or AP_DLUR if the adjacent node is defined as a downstream PU (that is, **adj_cp_type** is set to AP_DSPU_XID or AP_DSPU_NOXID). It can be set to AP_PU_CONCENTRATION or AP_DLUR on a link to an APPN node if **solicit_sscp_sessions** is set to AP_NO. This field is ignored if the adjacent node is defined as a host.

def_data.dspu_name

Name of the downstream PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

This field must be set if **dspu_services** is set to AP_PU_CONCENTRATION or AP_DLUR and is otherwise ignored.

def_data.dlus_name

Name of DLUS node which DLUR solicits SSCP services from when the link to the downstream node is activated. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the field is set to all zeros, then the global default DLUS (if it has been defined using the DEFINE_DLUR_DEFAULTS verb) is solicited when the link is activated. If the **dlus_name** is set to zeros and there is no global default DLUS, then DLUR will not initiate SSCP contact when the link is activated. This field is ignored if **dspu_services** is not set to AP_DLUR.

def_data.bkup_dlus_name

Name of DLUS node which serves as the backup for the downstream PU. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the field is set to all zeros, then the global backup default DLUS (if it has been

defined by the DEFINE_DLUR_DEFAULTS verb) is used as the backup for this PU. This field is ignored if **dspu_services** is not set to AP_DLUR.

def_data.hpr_supported
Specifies whether HPR is supported on this link (AP_YES or AP_NO). This field is only relevant if the link is to an APPN node and is otherwise ignored.

def_data.hpr_link_lvl_error
Specifies whether HPR traffic should be sent on this link using link-level error recovery (AP_YES or AP_NO). This parameter is ignored if **hpr_supported** is set to AP_NO.

def_data.link_deact_timer
Limited resource link deactivation timer (in seconds).

If **limited_resource** is set to AP_INACTIVITY, then a link is automatically deactivated if no data traverses the link for the duration of this timer.

If zero is specified, the default value of 30 is used. Otherwise, the minimum value is 5. (If it is set any lower, the specified value will be ignored and 5 will be used.) This parameter is reserved if **limited_resource** is set to AP_NO.

def_data.default_nn_server
Specifies whether a link can be automatically activated by an end node to support CP-CP sessions to a network node server. (AP_YES or AP_NO). Note that the link must be defined to support CP-CP sessions for this field to take effect.

def_data.ls_attributes
Specifies further information about the adjacent node.

def_data.ls_attributes[0]
Host type.

AP_SNA
Standard SNA host.

AP_FNA
FNA (VTAM-F) host.

AP_HNA
HNA host.

def_data.ls_attributes[1]
Network Name CV suppression option for a link to a back-level node. (This field is ignored unless **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE or AP_HOST_XID3.)

AP_NO
Include Network Name CV in XID3.

AP_SUPPRESS_CP_NAME
Do not include Network Name CV in XID3.

def_data.adj_node_id
Node ID of adjacent node. This a 4-byte hexadecimal string. If **adj_cp_type** indicates the adjacent node is a T2.1 node,

this field is ignored unless it is nonzero, and either the **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE or the adjacent node does not send a Network Name CV in its XID3. If **adj_cp_type** is set to AP_HOST_XID3 or AP_HOST_XID0, this field is always ignored. If **adj_cp_type** is set to AP_DSPU_XID and this field is nonzero, it is used to check the identity of the downstream PU. If **adj_cp_type** is set to AP_DSPU_NOXID, this field is either ignored (if **dspu_services** is AP_PU_CONCENTRATION) or used to identify the downstream PU to DLUS (if **dspu_services** is AP_DLUR).

def_data.local_node_id
Node ID sent in XIDs on this link station. This a 4-byte hexadecimal string. If this field is set to zero, the **node_id** will be used in XID exchanges. If this field is nonzero, it replaces the value for XID exchanges on this LS.

def_data.cp_cp_sess_support
Specifies whether CP-CP sessions are supported (AP_YES or AP_NO). This field is only relevant if the link is to an APPN node and is otherwise ignored. If **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE then it is also ignored and is assumed to be set to AP_NO.

def_data.use_default_tg_chars
Specifies whether the default TG characteristics supplied on the DEFINE_PORT verb should be used (AP_YES or AP_NO). If this is set to AP_YES then the **tg_chars** field will be ignored. This field is only relevant if the link is to an APPN node and is otherwise ignored.

def_data.tg_chars TG characteristics (See “DEFINE_CN” on page 33). This field is only relevant if the link is to an APPN node and is otherwise ignored.

def_data.target_pacing_count
Numeric value between 1 and 32 767, inclusive, indicating the desired pacing window size for BINDs on this TG. The number is only significant when fixed bind pacing is being performed. Personal Communications or Communications Server does not currently use this value.

def_data.max_send_btu_size
Maximum BTU size that can be sent from this link station. This value is used to negotiate the maximum BTU size than can be transmitted between a link station pair. If the link is not HPR-capable then this must be set to a value greater than or equal to 99. If the link is HPR-capable then this must be set to a value greater than or equal to 768.

def_data.ls_role The link station role that this link station should assume. This can be any one of AP_LS_NEG, AP_LS_PRI or AP_LS_SEC to select a role of negotiable, primary or secondary. The field can also be set to AP_USE_PORT_DEFAULTS to select the value configured on the DEFINE_PORT verb. If the **dlc_type** is AP_TWINAX, then only AP_LS_SEC is supported. If

dlc_type is AP_ANYNET (and **ls_name** is "$ANYNET$"), then AP_LS_PRI is not supported.

def_data.max_ifrm_rcvd
The maximum number of I-frames that can be received by the XID sender before acknowledgment. Set to zero if the default value from DEFINE_PORT should be used.

def_data.link_spec_data_len
This field should always be set to zero.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_DEF_LINK_INVALID_SECURITY
AP_INVALID_CP_NAME
AP_INVALID_LIMITED_RESOURCE
AP_INVALID_LINK_NAME
AP_INVALID_LS_ROLE
AP_INVALID_NODE_TYPE
AP_INVALID_PORT_NAME
AP_INVALID_AUTO_ACT_SUPP
AP_INVALID_PU_NAME
AP_INVALID_SOLICIT_SSCP_SESS
AP_INVALID_DLUS_NAME
AP_INVALID_BKUP_DLUS_NAME
AP_INVALID_NODE_TYPE_FOR_HPR
AP_INVALID_TARGET_PACING_COUNT
AP_INVALID_BTU_SIZE
AP_HPR_NOT_SUPPORTED
AP_INVALID_TG_NUMBER
AP_MISSING_CP_NAME
AP_MISSING_CP_TYPE
AP_MISSING_TG_NUMBER
AP_PARALLEL_TGS_NOT_SUPPORTED

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_LOCAL_CP_NAME
AP_DEPENDENT_LU_SUPPORTED
AP_DUPLICATE_DEST_ADDR
AP_INVALID_NUM_LS_SPECIFIED
AP_LS_ACTIVE
AP_PU_ALREADY_DEFINED
AP_DSPU_SERVICES_NOT_SUPPORTED

AP_DUPLICATE_TG_NUMBER
AP_TG_NUMBER_IN_USE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_LU_0_TO_3

This verb defines an LU of type 0, 1, 2 or 3. It allows the LU to be added to an LU pool. If the pool does not already exist it is added. This verb cannot be used to modify existing definitions.

Personal Communications or Communications Server supports implicit LU type 0, 1, 2 or 3 definition by ACTLU. Implicit definitions cannot be deleted, but are removed when the LU becomes inactive. To obtain information about implicit definitions, use QUERY_LU_0_TO_3 or register for LU_0_TO_3_INDICATIONs. An implicit LU definition can be redefined using DEFINE_LU_0_TO_3, provided **lu_name**, **pu_name**, and **nau_address** are correct, and **pool_name** is all zeros (the LU is then treated as if it had been configured by the operator in the first place).

VCB Structure

```
typedef struct define_lu_0_to_3
{
        unsigned short    opcode;                 /* verb operation code          */
        unsigned  char    reserv2;                /*  reserved                    */
        unsigned  char    format;                 /*  format                      */
        unsigned short    primary_rc;             /* primary return code          */
        unsigned long     secondary_rc;           /* secondary return code        */
        unsigned char     lu_name[8];             /* LU name                      */
        LU_0_TO_3_DEF_DATA def_data;              /* defined data                 */
} DEFINE_LU_0_TO_3;

typedef struct lu_0_to_3_def_data
{
        unsigned  char    description[RD_LEN];
                                                  /* resource description        */
        unsigned char     nau_address;            /* LU NAU address              */
        unsigned char     pool_name[8];           /* LU pool name                */
        unsigned char     pu_name[8];             /* PU name                     */
        unsigned char     priority;               /* LU priority                 */
        unsigned char     lu_model;               /* LU model                    */
        unsigned  char    reserv2[8];             /*  reserved                   */
        unsigned char     app_spec_def_data[16]; /* Application Specified Data */
} LU_0_TO_3_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_LU_0_TO_3

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name Name of the local LU that is being defined. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

def_data.description
Resource description (returned on QUERY_LU_0_TO_3). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.nau_address
Network addressable unit address of the LU, which must be in the range 1—255.

def_data.pool_name
Name of LU pool to which this LU belongs. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If the LU does not belong to a pool, this field is set to all binary zeros. If the pool does not currently exist, it is created.

def_data.pu_name Name of the PU (as specified on the DEFINE_LS verb) that this LU will use. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

def_data.priority LU priority when sending to the host. This is set to one of the following values:

AP_NETWORK
AP_HIGH
AP_MEDIUM
AP_LOW

def_data.lu_model Model type and number of the LU. This is set to one of the following values:

AP_3270_DISPLAY_MODEL_2
AP_3270_DISPLAY_MODEL_3
AP_3270_DISPLAY_MODEL_4
AP_3270_DISPLAY_MODEL_5
AP_RJE_WKSTN
AP_PRINTER
AP_UNKNOWN

If a value other than AP_UNKNOWN is specified and the host system supports SDDLU (Self-Defining Dependent LU), the node will generate an unsolicited PSID NMVT reply in order to dynamically define the local LU at the host.

def_data.app_spec_def_data
Application specified defined data. This field is not interpreted by Personal Communications or Communications Server , but is stored and subsequently returned on the QUERY_LU_0_TO_3 verb.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

AP_INVALID_NAU_ADDRESS
AP_INVALID_PRIORITY

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_PU_NAME

AP_INVALID_PU_TYPE
AP_PU_NOT_DEFINED
AP_LU_NAME_POOL_NAME_CLASH
AP_LU_ALREADY_DEFINED
AP_LU_NAU_ADDR_ALREADY_DEFD

If the verb does not execute because the system has not been built with Dependent LU support, the Program returns the following parameter:

primary_rc AP_INVALID_VERB

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_LU_0_TO_3_RANGE

This verb allows the definition of multiple LUs within a specified NAU range. The node operator provides a base name and an NAU range. The LU names are generated by combining the base name with the NAU addresses. This verb cannot be used to modify existing definitions.

For example, a base name of LUNME combined with an NAU range of 1 to 4 would define the LUs LUNME001, LUNME002, LUNME003, and LUNME004. A base name of less than five non-pad characters results in LU names of less than eight non-pad characters. Personal Communications or Communications Server then right-pads these to eight characters.

VCB Structure

```
typedef struct define_lu_0_to_3_range
{
        unsigned short   opcode;                  /* verb operation code          */
        unsigned  char   reserv2;                 /*  reserved                    */
        unsigned  char   format;                  /*  format                      */
        unsigned short   primary_rc;              /* primary return code          */
        unsigned long    secondary_rc;            /* secondary return code        */
        unsigned char    base_name[5];            /* base name                    */
        unsigned  char   reserv3;                 /*  reserved                    */
        unsigned  char   description[RD_LEN];
                                                  /* resource description         */
        unsigned char    min_nau;                 /* minimum NAU address          */
        unsigned char    max_nau;                 /* maximum NAU address          */
        unsigned char    pool_name[8];            /* LU pool name                 */
        unsigned char    pu_name[8];              /* PU name                      */
        unsigned char    priority;                /* LU priority                  */
        unsigned char    lu_model;                /* LU model                     */
        unsigned  char   reserv4[8];              /*  reserved                    */
        unsigned char    app_spec_def_data[16]; /* application specified data */
} DEFINE_LU_0_TO_3_RANGE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_LU_0_TO_3_RANGE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

base_name Base LU name. This is an 5-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This base name is appended with three type-A EBCDIC numeric characters, representing the decimal value of the NAU address, for each LU in the NAU range.

description Resource description (returned on QUERY_LU_0_TO_3). The length of this field should be a multiple of four bytes, and not zero.

min_nau Minimum NAU address in the range. This can be from 1 to 255 inclusive.

max_nau Maximum NAU address in the range. This can be from 1 to 255 inclusive.

pool_name Name of LU pool to which this LU belongs. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If the LU does not belong to a pool, this field is set to all binary zeros.

pu_name Name of the PU (as specified on the DEFINE_LS verb) that this LU uses. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

priority LU priority when sending to the host. This is set to one of the following values:

AP_NETWORK
AP_HIGH
AP_MEDIUM
AP_LOW

lu_model Model type and number of the LU. This is set to one of the following values:

AP_3270_DISPLAY_MODEL_2
AP_3270_DISPLAY_MODEL_3
AP_3270_DISPLAY_MODEL_4
AP_3270_DISPLAY_MODEL_5
AP_RJE_WKSTN
AP_PRINTER
AP_UNKNOWN

If a value other than AP_UNKNOWN is specified and the host system supports Self-Defining Dependent LU (SDDLU), the node will generate an unsolicited PSID NMVT reply in order to dynamically define the local LU at the host.

app_spec_def_data Application specified defined data. This field is not interpreted by Personal Communications or Communications Server , but is stored and subsequently returned on the QUERY_LU_0_TO_3 verb (the same data is returned for each LU in the range).

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

AP_INVALID_NAU_ADDRESS
AP_INVALID_PRIORITY

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc	AP_STATE_CHECK
secondary_rc	AP_PU_NOT_DEFINED
	AP_INVALID_PU_NAME AP_INVALID_PU_TYPE AP_LU_NAME_POOL_NAME_CLASH AP_LU_ALREADY_DEFINED AP_LU_NAU_ADDR_ALREADY_DEFD AP_IMPLICIT_LU_DEFINED

If the verb does not execute because the system has not been built with dependent LU support, the Program returns the following parameter:

primary_rc	AP_INVALID_VERB

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_LU_POOL

This verb is used to define an LU pool or to add LUs to an existing pool. The LUs that are to be added must already have been defined using either a DEFINE_LU_0_TO_3 verb or a DEFINE_LU_0_TO_3_RANGE verb. LUs can only belong to one LU pool at a time. If the specified LUs already belong to a pool, they are removed from the existing pool into the pool being defined. Up to 10 LUs can be added to a pool at a time, although there is no limit to the total number of LUs in a pool.

VCB Structure

```
typedef struct define_lu_pool
{
        unsigned short   opcode;                /* verb operation code          */
        unsigned  char   reserv2;               /*  reserved                    */
        unsigned  char   format;                /*  format                      */
        unsigned short   primary_rc;            /* primary return code          */
        unsigned long    secondary_rc;          /* secondary return code        */
        unsigned char    pool_name[8];          /* LU pool name                 */
        unsigned  char   description[RD_LEN];   /*  resource  description       */
        unsigned  char   reserv3[4];            /*  reserved                    */
        unsigned short   num_lus;               /* number of LUs to add         */
        unsigned char    lu_names[10][8];       /* LU names                     */
} DEFINE_LU_POOL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_LU_POOL

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pool_name Name of pool to which these LUs belong. This name is an 8-byte string, padded to the right with spaces. This can be either an EBCDIC string or a string in a locally displayable character set.

description Resource description (returned on QUERY_LU_POOL). The length of this field should be a multiple of four bytes, and not zero.

num_lus Number of LUs to add, in the range 0 to 10.

lu_names Names of the LUs that are being added to the pool. Each name is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LU_NAME
	AP_INVALID_NUM_LUS AP_INVALID_POOL_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc	AP_STATE_CHECK
secondary_rc	AP_LU_NAME_POOL_NAME_CLASH
	AP_INVALID_POOL_NAME

If the verb does not execute because the system has not been built with dependent LU support, the Program returns the following parameter:

primary_rc	AP_INVALID_VERB

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_MODE

The DEFINE_MODE verb defines a set of networking characteristics to assign to a particular mode (or group of sessions). This verb can also be used to modify any fields on a previously defined mode. If the SNASVCMG mode is redefined, its **mode_name** and **cos_name** cannot be modified. The CPSVCMG mode cannot be redefined.

The DEFINE_MODE verb can also be used to define the default COS, which unknown modes will be mapped to. This is done by setting **mode_name** to all zeros. The default COS is initially #CONNECT.

Note: It is not necessary to define all the modes you want to use locally, though they must be defined at your network node and potentially, the partner node. If an ALLOCATE is issued specifying a mode that has not been defined, the node uses the characteristics for the model default mode specified on the DEFINE_DEFAULTS verb. If no such model has been specified, the characteristics of the blank mode are used for the model.

VCB Structure

```
typedef struct define_mode
{
        unsigned short   opcode;                    /* verb operation code          */
        unsigned  char   reserv2;                   /*  reserved                    */
        unsigned  char   format;                    /*  format                      */
        unsigned short   primary_rc;                /* primary return code          */
        unsigned long    secondary_rc;              /* secondary return code        */
        unsigned char    mode_name[8];              /* mode name                    */
        unsigned  short  reserv3;                   /*  reserved                    */
        MODE_CHARS       mode_chars;                /* mode characteristics         */
} DEFINE_MODE;

typedef struct mode_chars
{
        unsigned  char   description[RD_LEN]
                                                    /* resource description         */
        unsigned short   max_ru_size_upp;           /* max RU size upper bound      */
        unsigned char    receive_pacing_win;        /* receive pacing window        */
        unsigned char    default_ru_size;           /* default RU size to maximize  */
                                                    /*  performance                 */
        unsigned short   max_neg_sess_lim;          /* max negotiable session limit */
        unsigned short   plu_mode_session_limit; /* LU-mode session limit           */
        unsigned short   min_conwin_src;            /* min source contention winner */
                                                    /*  sessions                    */
        unsigned char    cos_name[8];               /* class-of-service name        */
        unsigned  char   cryptography;              /*  cryptography                */
        unsigned  char   compression;               /*  compression                 */
        unsigned short   auto_act;                  /* initial auto-activation count*/
        unsigned  char   reserv2[6];                /*  reserved                    */
} MODE_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_MODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

mode_name Name of the mode. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this is set to all zeros, the default COS is set to **mode_chars.cos_name**, and all other **mode_chars** fields are ignored.

mode_chars.compression
specifies the use of compression for sessions activated using this mode.

AP_COMP_PROHIBITED
RLE compression is not supported on sessions for this mode.

AP_COMP_REQUESTED
RLE compression is supported and requested (but not mandated) on sessions for this mode.

mode_chars.max_ru_size_upp
Upper bound for the maximum size of RUs sent and received on sessions in this mode. The value is used when the maximum RU size is negotiated during session activation. The range is 256—16384. This field is ignored if **default_ru_size** is set to AP_YES.

mode_chars.receive_pacing_win
Session pacing window for sessions in this mode. For fixed pacing, this value specifies the receive pacing window. For adaptive pacing, this value is used as an initial receive window size. Note that Personal Communications or Communications Server will always use adaptive pacing unless the adjacent node specifies that it does not support it. The range is 1—63. The value zero is not allowed.

mode_chars.default_ru_size
Specifies whether a default upper bound for the maximum RU size will be used. If this parameter specifies AP_YES, **max_ru_size_upp** is ignored, and the upper bound for the maximum RU size is set to the link BTU size minus the size of the TH and the RH.

AP_YES
AP_NO

mode_chars.max_neg_sess_lim
Maximum number of sessions allowed on this mode between any local LU and partner LU. If a value of zero is specified then there will be no implicit CNOS exchange. The range is 0—32 767.

mode_chars.plu_mode_session_limit
Default session limit for this mode. This limits the number of sessions on this mode between any one local LU and partner

LU pair. This value is used when CNOS (Change Number of Sessions) exchange is initiated implicitly. If a value of zero is specified then there will be no implicit CNOS exchange. The range is 0—32 767.

mode_chars.min_conwin_src
Minimum number of contention winner sessions activatable by any one local LU using this mode. This value is used when CNOS (Change Number of Sessions) exchange is initiated implicitly. If a value of zero is specified then there will be no implicit CNOS exchange. The range is 0—32 767.

mode_chars.cos_name
Name of the class of service to request when activating sessions on this mode. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

mode_chars.cryptography
Specifies whether session-level cryptography must be used (AP_NONE or AP_MANDATORY).

mode_chars.auto_act
Specifies how many sessions are autoactivated for this mode. This value is used when Change Number of Sessions (CNOS) exchange is initiated implicitly.

The range is 0–32767.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_COS_NAME

AP_CPSVCMG_ALREADY_DEFD
AP_INVALID_CNOS_SLIM
AP_INVALID_COS_SNASVCMG_MODE
AP_INVALID_DEFAULT_RU_SIZE
AP_INVALID_MAX_NEGOT_SESS_LIM
AP_INVALID_MAX_RU_SIZE_UPPER
AP_INVALID_MIN_CONWINNERS
AP_INVALID_MODE_NAME
AP_INVALID_SESSION_LIMIT
AP_INVALID_RECV_PACING_WINDOW
AP_INVALID_DEFAULT_RU_SIZES
AP_INVALID_SNASVCMG_MODE_LIMIT
AP_MODE_SESS_LIM_EXCEEDS_NEG

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_PARTNER_LU

The DEFINE_PARTNER_LU verb defines the parameters of a partner LU for LU-LU sessions between a local LU and the partner LU. Alternatively, DEFINE_PARTNER_LU can be used to modify all parameters already defined for the partner LU, other than the **fqplu_name** and **plu_alias**.

VCB Structure

```
typedef struct define_partner_lu
{
          unsigned short    opcode;                 /* verb operation code              */
          unsigned  char    reserv2;                /*  reserved                        */
          unsigned  char    format;                 /*  format                          */
          unsigned short    primary_rc;             /* primary return code              */
          unsigned long     secondary_rc;           /* secondary return code            */
          PLU_CHARS         plu_chars;              /* partner LU characteristics       */
} DEFINE_PARTNER_LU;

typedef struct plu_chars
{
          unsigned char     fqplu_name[17];         /* fully qualified partner          */
                                                    /* LU name                          */
          unsigned char     plu_alias[8];           /* partner LU alias                 */
          unsigned  char    description[RD_LEN];
                                                    /* resource description             */
          unsigned char     plu_un_name[8];         /* partner LU uninterpreted name */
          unsigned char     preference              /* routing preference               */
          unsigned short    max_mc_ll_send_size; /* max MC send LL size              */
          unsigned  char    conv_security_ver;    /*  already_verified  accepted?     */
          unsigned char     parallel_sess_supp;   /* parallel sessions supported?    */
          unsigned  char    reserv2[8];             /*  reserved                        */
} PLU_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_PARTNER_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

plu_chars.fqplu_name
Fully qualified name of the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

plu_chars.plu_alias Alias of the partner LU. This is an 8-byte string in a locally displayable character set. This field may be set to all zeros for a partner LU with no alias associated to it.

plu_chars.description
Resource description (returned on QUERY_PARTNER_LU and QUERY_PARTNER_LU_DEFINITION). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

plu_chars.plu_un_name
Uninterpreted name of the partner LU. This is an 8-byte type-A EBCDIC character string.

plu_chars.max_mc_ll_send_size
Maximum size of LL records sent by and received by mapped conversation services at the partner LU. Range: 1–32767 (32767 is specified by setting this field to 0)

plu_chars.preference
The preferred routing protocol to be used for session activation to this partner LU. This field can take the following values:

AP_NATIVE
Use native (APPN) routing protocols only.

AP_NONNATIVE
Use non-native (AnyNet) protocols only.

AP_NATIVE_THEN_NONNATIVE
Try native (APPN) protocols, and if the partner LU cannot be located then retry session activation using non-native (AnyNet) protocols.

AP_NONNATIVE_THEN_NATIVE
Try non-native (AnyNet) protocols, and if the partner LU cannot be located then retry session activation using native (APPN) protocols.

AP_USE_DEFAULT_PREFERENCE
Use the default preference defined when the node was started. (This can be recalled by QUERY_NODE.)

Note: Non-native routing is only meaningful when an AnyNet DLC is available to the Node Operator Facility, and there is an AnyNet link station defined. (See Defined_LS).

plu_chars.conv_security_ver
Specifies whether the partner LU is authorized to validate **user_ids** on behalf of local LUs, that is whether the partner LU can set the already verified indicator in an Attach request (AP_YES or AP_NO).

plu_chars.parallel_sess_supp
Specifies whether the partner LU supports parallel sessions (AP_YES or AP_NO).

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_ANYNET_NOT_SUPPORTED

AP_DEF_PLU_INVALID_FQ_NAME
AP_INVALID_UNINT_PLU_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PLU_ALIAS_CANT_BE_CHANGED

AP_PLU_ALIAS_ALREADY_USED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_PORT

DEFINE_PORT defines a new port or modifies an existing one. This port belongs to a specified DLC, which must already have been defined using a DEFINE_DLC verb. The DEFINE_PORT verb provides the port name, which is unique throughout the node, along with port specific parameters and default LS characteristics for use with dynamic link stations. The port specific parameters are concatenated to the basic structure. The default LS characteristics are concatenated immediately following the port specific parameters.

DEFINE_PORT can be used to modify one or more fields on an existing port if the port is in a reset state (after STOP_PORT has been issued) and the **dlc_name** specified on the DEFINE_PORT has not changed since the previous definition of the port.

See “DLC Processes, Ports, and Link Stations” on page 16, for more information about the relationship between DLCs, ports and link stations.

VCB Structure

```
typedef struct define_port
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     port_name[8];        /* name of port                 */
        PORT_DEF_DATA     def_data;            /* port defined data            */
} DEFINE_PORT;

typedef struct port_def_data
{
        unsigned  char    description[RD_LEN]
                                               /* resource description        */
        unsigned char     dlc_name[8];         /* DLC name associated with port */
        unsigned char     port_type;           /* port type                    */
        unsigned  char    reserv3[7];          /*  reserved                    */
        unsigned long     port_number;         /* port number                  */
        unsigned short    max_rcv_btu_size;    /* max receive BTU size         */
        unsigned short    tot_link_act_lim;    /* total link activation limit  */
        unsigned short    inb_link_act_lim;    /* inbound link activation limit */
        unsigned short    out_link_act_lim;    /* outbound link activation     */
                                               /*  limit                       */
        unsigned char     ls_role;             /* initial link station role    */
        unsigned  char    reserv1[15];         /*  reserved                    */
        unsigned  char    implicit_dspu_template[8];
                                               /*  reserved                    */
        unsigned  char    reserv2[3];          /*  reserved                    */
        unsigned  char    implicit_dspu_services;
                                               /* implicit links support DSPUs */
        unsigned char     implicit_deact_timer; /* Implicit link HPR link      */
                                               /* deactivation timer           */
        unsigned  short   act_xid_exchange_limit;
                                               /* act.  XID exchange limit     */
        unsigned  short   nonact_xid_exchange_limit;
                                               /* nonact.  XID exchange limit  */
```

```
        unsigned char     ls_xmit_rcv_cap;        /* LS transmit-receive          */
                                                  /*  capability                  */
        unsigned char     max_ifrm_rcvd;          /* max number of I-frames that  */
                                                  /* can be received              */
        unsigned short    target_pacing_count;    /*  Target pacing count         */
        unsigned short    max_send_btu_size;      /* Desired max send BTU size    */
        LINK_ADDRESS      dlc_data;               /* DLC data                     */
        LINK_ADDRESS      hpr_dlc_data;           /* HPR DLC data                 */
        unsigned  char    implicit_cp_cp_sess_support;
                                                  /* Implicit links allow CP-CP   */
                                                  /*  sessions                    */
        unsigned  char    implicit_limited_resource;
                                                  /* Implicit links are limited   */
                                                  /*  resource                    */
        unsigned  char    implicit_hpr_support;
                                                  /* Implicit links support HPR   */
        unsigned  char    implicit_link_lvl_error;
                                                  /* Implicit links support HPR   */
                                                  /* link-level error recovery    */
        unsigned  char    retired1;               /*  reserved                    */
        TG_DEFINED_CHARS  default_tg_chars;
                                                  /* Default TG chars             */
        unsigned  char    discovery_supported;
                                                  /* Discovery function           */
                                                  /*  supported?                  */
        unsigned short    port_spec_data_len;     /* length of port spec data     */
        unsigned short    link_spec_data_len;     /* length of link spec data     */
} PORT_DEF_DATA;

typedef struct link_address
{
        unsigned  short   length;                 /*  length                      */
        unsigned  short   reserve1;               /*  reserved                    */
        unsigned  char    address[MAX_LINK_ADDR_LEN];
                                                  /*  address                     */
} LINK_ADDRESS;

typedef struct tg_defined_chars
{
        unsigned char     effect_cap;             /* effective capacity           */
        unsigned  char    reserve1[5];            /*  reserved                    */
        unsigned char     connect_cost;           /* connection cost              */
        unsigned char     byte_cost;              /* byte cost                    */
        unsigned  char    reserve2;               /*  reserved                    */
        unsigned  char    security;               /*  security                    */
        unsigned char     prop_delay;             /* propagation delay            */
        unsigned char     modem_class;            /* modem class                  */
        unsigned char     user_def_parm_1;        /* user-defined parameter 1     */
        unsigned char     user_def_parm_2;        /* user-defined parameter 2     */
        unsigned char     user_def_parm_3;        /* user-defined parameter 3     */
} TG_DEFINED_CHARS;

typedef struct port_spec_data
{
        unsigned  char    port_data[SIZEOF_PORT_SPEC_DATA];

}   PORT_SPEC_DATA;
```

```
typedef struct link_spec_data
{
        unsigned  char    link_data[SIZEOF_LINK_SPEC_DATA];

}  LINK_SPEC_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_PORT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

port_name Name of port being defined. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

def_data.description
Resource description (returned on QUERY_PORT). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.dlc_name Name of the associated DLC, which is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This named DLC must have already been defined by a DEFINE_DLC verb.

def_data.port_type Specifies the type of line used by the port. The value corresponds to one of the following line types:

AP_PORT_NONSWITCHED
AP_PORT_SWITCHED
AP_PORT_SATF

Note that if this field is set to AP_PORT_SATF then the **ls_role** must be set to AP_LS_NEG.

def_data.port_number
Port number.

def_data.max_rcv_btu_size
Maximum BTU size that can be received. If implicit HPR-capable links are not supported on the port then this must be set to a value greater than or equal to 99. If implicit HPR-capable links are supported on the port then this must be set to a value greater than or equal to 768. If this port is for the AnyNet DLC, you must use 65535.

def_data.tot_link_act_lim
Total link activation limit. This specifies the maximum number of link stations that can be active concurrently. This must be greater than or equal to the sum of the **inb_link_act_lim** and **out_link_act_lim** fields. If the **port_type** is set to AP_PORT_NONSWITCHED and the **ls_role** is set to AP_LS_NEG or AP_LS_SEC then this field must be set to one. If the **ls_role** is set to AP_LS_PRI then this field must be in the range greater than or equal to one to 256. If this port is for the AnyNet DLC, you must use 65535.

def_data.inb_link_act_lim
Inbound link activation limit. This specifies the number of link stations reserved for inbound activation on this port. The maximum number of outbound link stations that can be active concurrently is therefore **def_data.tot_link_act_lim** - **def_data.inb_link_act_lim**. If the **port_type** is set to AP_PORT_NONSWITCHED and the **ls_role** is set to AP_LS_NEG or AP_LS_PRI then this field must be set to zero. If the **port_type** is set to AP_PORT_NONSWITCHED and the **ls_role** is set to AP_LS_SEC then this field must be set to zero or one. If this port is for the AnyNet DLC, you must use zero.

def_data.out_link_act_lim
Outbound link activation limit. This specifies the number of link stations reserved for outbound activation on this port. The maximum number of inbound link stations that can be active concurrently is therefore **def_data.tot_link_act_lim** - **def_data.out_link_act_lim**. If the **port_type** is set to AP_PORT_NONSWITCHED and the **ls_role** is set to AP_LS_NEG then this field must be set to zero. If the **ls_role** is set to AP_LS_PRI then this field must be equal to **tot_link_act_lim**. If the **port_type** is set to AP_PORT_NONSWITCHED and the **ls_role** is set to AP_LS_SEC then this field must be set to zero or one. If this port is for the AnyNet DLC, you must use zero.

def_data.ls_role Link station role. This can be negotiable (AP_LS_NEG), primary (AP_LS_PRI), or secondary (AP_LS_SEC). The link station role determines the relationship between the values specified by the **tot_act_lim**, **inb_link_act_lim**, and **out_link_act_lim** fields as described above. Note that if the **port_type** is set to AP_PORT_SATF then the **ls_role** must be set to AP_LS_NEG.

def_data.implicit_dspu_template
Specifies the DSPU template, defined with the DEFINE_DSPU_TEMPLATE verb, that is used for definitions if the local node is to provide PU Concentration for an implicit link activated on this port. If the template specified does not exist (or is already at its instance limit) when the link is activated, activation fails. This is an 8-byte string in a locally-displayable character set. All 8 bytes are significant and must be set.

If the **def_data.implicit_dspu_services** field is not set to AP_PU_CONCENTRATION, then this field is reserved.

def_data.implicit.dspu_services
Specifies the services that the local node will provide to the downstream PU across implicit links activated on this port. This is set to one of the following values:

AP_DLUR
Local node will provide DLUR services for the downstream PU (using the default DLUS configured through the DEFINE_DLUR_DEFAULTS verb).

AP_PU_CONCENTRATION
Local node will provide PU Concentration for the downstream PU (and will put in place definitions as specified by the DSPU template specified in the field **def_data.implicit_dspu_template**).

AP_NONE
Local node will provide no services for this downstream PU.

def_data.implicit_deact_timer
Limited resource link deactivation timer (in seconds). If **implicit_limited_resource** is set to AP_YES or AP_NO_SESSIONS, then an HPR-capable implicit link is automatically deactivated if no data traverses the link for the duration of this timer, and no sessions are using the link.

If **implicit_limited_resource** is set to AP_INACTIVITY then an implicit link is automatically deactivated if no data traverses the link for the duration of this timer.

If zero is specified, the default value of 30 is used. Otherwise the minimum value is 5. (If it is set any lower, the specified value will be ignored and 5 will be used.) Note that this parameter is reserved unless **implicit_limited_resource** is set to AP_NO.

def_data.act_xid_exchange_limit
Activation XID exchange limit.

def_data.nonact_xid_exchange_limit
Non-activation XID exchange limit.

def_data.ls_xmit_rcv_cap
Specifies the link station transmit/receive capability. This is either two-way simultaneous (AP_LS_TWS) (also known as duplex or full-duplex) or two way alternating (AP_LS_TWA) (also know as half-duplex).

def_data.max_ifrm_rcvd
Maximum number of I-frames that can be received by the local link stations before an acknowledgment is sent. The range is 1—127.

def_data.target_pacing_count
Numeric value between 1 and 32767 inclusive indicating the desired pacing window size for BINDs on this TG. The number is only significant when fixed bind pacing is being performed. Note that Personal Communications or Communications Server does not currently use this value.

def_data.max_send_btu_size
Maximum BTU size that can be sent from this link station. This value is used to negotiate the maximum BTU size than can be transmitted between a link station pair. If implicit HPR-capable links are not supported on the port then this must be set to a value greater than or equal to 99. If implicit HPR-capable links are supported on the port then this must be set to a value greater than or equal to 768.

def_data.dlc_data.length
Port address length.

def_data.dlc_data.address
Port address.

def_data.hpr_dlc_data.length
HPR Port address length.

def_data.hpr_dlc_data.address
HPR Port address. This is currently used when supporting HPR links. The field specifies the information sent by Personal Communications or Communications Server in the X'80' subfield of the X'61' control vector on XID3s exchanged on link stations using this port. It is passed on the ACTIVATE_PORT issued to the DLC byPersonal Communications or Communications Server . Some DLCs can require this information to be filled in for ports supporting HPR links.

def_data.implicit_cp_cp_sess_support
Specifies whether CP-CP sessions are permitted for implicit link stations off this port (AP_YES or AP_NO).

def_data.implicit_limited_resource
Specifies whether implicit link stations off this port should be deactivated when there are no sessions using the link. This is set to one of the following values:

AP_NO
Implicit links are not limited resources and will not be deactivated automatically.

AP_YES or AP_NO_SESSIONS
Implicit links are a limited resource and will be deactivated automatically when no active sessions are using them.

AP_INACTIVITY
Implicit links are a limited resource and will be deactivated automatically when no active sessions are using them, or when no data has followed on the link for the time period specified by the **implicit_deact_timer** field.

def_data.implicit_hpr_support
Specifies whether HPR should be supported on implicit links (AP_YES or AP_NO).

def_data.implicit_link_lvl_error
Specifies whether HPR traffic should be sent on implicit links using link-level error recovery (AP_YES or AP_NO). Note that the parameter is reserved if **implicit_hpr_support** is set to AP_NO.

def_data.default_tg_chars
TG characteristics (See “DEFINE_COS” on page 37). These are used for implicit link stations off this port and also for defined link stations that specify **use_default_tg_chars**.

def_data.discovery_supported
Specifies whether Discovery functions are to be performed on this port (AP_YES or AP_NO).

def_data.port_spec_data_len
Length of data to be passed unchanged to port on ACTIVATE_PORT signal. The data should be concatenated to the basic structure.

def_data.link_spec_data_len
This field should always be set to zero.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PORT_NAME
AP_INVALID_DLC_NAME
AP_INVALID_PORT_TYPE
AP_INVALID_BTU_SIZE
AP_INVALID_LS_ROLE
AP_INVALID_LINK_ACTIVE_LIMIT
AP_INVALID_MAX_IFRM_RCVD
AP_INVALID_DSPU_SERVICES
AP_HPR_NOT_SUPPORTED
AP_DLUR_NOT_SUPPORTED
AP_INVALID_DISCOVERY_SUPPORT

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PORT_ACTIVE
AP_DUPLICATE_PORT_NUMBER

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_TP

The DEFINE_TP verb defines transaction program (TP) information for use by the Node Operator Facility TP Attach Manager when it processes incoming attaches from partner LUs. This verb can also be used to modify one or more fields on a previously defined transaction program (but cannot be used to modify Personal Communications or Communications Server defined transaction programs).

VCB Structure

```
typedef struct define_tp
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    tp_name[64];     /* TP name                      */
        TP_CHARS         tp_chars;        /*  TP  characteristics         */
} DEFINE_TP;

typedef struct tp_chars
{
        unsigned  char   description[RD_LEN]
                                          /* resource description        */
        unsigned char    conv_type;       /* conversation type            */
        unsigned char    security_rqd;    /* security support             */
        unsigned char    sync_level;      /* synchronization level support */
        unsigned char    dynamic_load;    /* dynamic load                 */
        unsigned char    enabled;         /* is the TP enabled?           */
        unsigned char    pip_allowed;     /* program initialization       */
                                          /* parameters supported        */
        unsigned char    duplex_support;  /* duplex supported             */
        unsigned  char   reserv3[9];      /*  reserved                    */
        unsigned short   tp_instance_limit; /* limit on currently active TP  */
                                          /*  instances                   */
        unsigned  short  incoming_alloc_timeout;
                                          /* incoming allocation timeout  */
        unsigned short   rcv_alloc_timeout; /* receive allocation timeout  */
        unsigned short   tp_data_len;     /* TP data length               */
        TP_SPEC_DATA     tp_data;         /* TP data                      */
} TP_CHARS;

typedef struct tp_spec_data
{
        unsigned char    pathname[256];   /* path and TP name             */
        unsigned char    parameters[64];  /* parameters for TP            */
        unsigned char    queued;          /* queued TP                    */
        unsigned char    load_type;       /* type of load-DETACHED/CONSOLE */
        unsigned char    dynamic_load     /* dynamic loading of TP enabled */
        unsigned  char   reserved[5];     /*  reserved                    */
} TP_SPEC_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_TP

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

tp_name Name of the transaction program being defined. This is a 64-byte EBCDIC string padded to the right with EBCDIC spaces. Note that Personal Communications or Communications Server does not check the character set of this field.

tp_chars.description
Resource description (returned on QUERY_TP_DEFINITION and QUERY_TP). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

tp_chars.conv_type Specifies the types of conversation supported by this transaction program.

AP_BASIC
AP_MAPPED
AP_EITHER

tp_chars.security_rqd
Specifies whether conversation security information is required to start the transaction program (AP_NO or AP_YES).

tp_chars.sync_level
Specifies the synchronization levels supported by the transaction program.

AP_NONE
The transaction program supports a synchronization level of None.

AP_CONFIRM_SYNC_LEVEL
The transaction program supports a synchronization level of Confirm.

AP_EITHER
The transaction program supports a synchronization level of None or Confirm.

AP_SYNCPT_REQUIRED
The transaction program supports a synchronization level of Sync-point.

AP_SYNCPT_NEGOTIABLE
The transaction program supports a synchronization level of None, Confirm or Sync-point.

tp_chars.dynamic_load
Specifies whether the transaction program can be dynamically loaded (AP_YES or AP_NO).

tp_chars.enabled Specifies whether the transaction program can be attached successfully (AP_YES or AP_NO). The default is AP_NO.

tp_chars.pip_allowed
Specifies whether the transaction program can receive program initialization (PIP) parameters (AP_YES or AP_NO).

tp_chars.duplex_support
Indicates whether the transaction program is full or half duplex.

AP_FULL_DUPLEX
Specifies that the transaction program is full duplex.

AP_HALF_DUPLEX
Specifies that the transaction program is half duplex.

AP_EITHER_DUPLEX
Specifies that the transaction program can be either half or full duplex

tp_chars.tp_instance_limit
Limit on the number of concurrently active transaction program instances. A value of zero means no limit.

tp_chars.incoming_alloc_timeout
Specifies the number of seconds that an incoming attach will be queued waiting for a RECEIVE_ALLOCATE. Zero implies no timeout, and so it will be held indefinitely.

tp_chars.rcv_alloc_timeout
Specifies the number of seconds that a RECEIVE_ALLOCATE verb will be queued while waiting for an Attach. Zero implies no timeout, and so it will be held indefinitely.

tp_chars.tp_data_len
Length of the implementation-dependent transaction program data.

tp_spec_data Information used by the Attach Manager when launching the transaction program. See the Attach Manager in *Personal Communications Client/Server Communications Programming* for further details of how this is used.

tp_chars.tp_data.pathname
Specifies the path and transaction program name.

tp_chars.tp_data.parameters
Specifies the parameters for the transaction program.

tp_chars.tp_data.queued
Specifies whether the transaction program will be queued.

tp_chars.tp_data.load_type
Specifies how the transaction program will be loaded.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_SYSTEM_TP_CANT_BE_CHANGED
AP_INVALID_CONV_TYPE
AP_INVALID_SYNC_LEVEL
AP_INVALID_DYNAMIC_LOAD
AP_INVALID_ENABLED
AP_INVALID_PIP_ALLOWED
AP_INVALID_DUPLEX_SUPPORT

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_ADJACENT_NODE

DELETE_ADJACENT_NODE removes entries in the node directory database that are associated with the resources on an adjacent node.

To remove the node's control point from the directory along with its LUs, set **num_of_lus** to zero. If **num_of_lus** is nonzero, this verb is used to remove node LUs from the directory, leaving the control point definition intact.

If the verb fails for any reason, no directory entries will be deleted.

VCB Structure

The DELETE_ADJACENT_NODE verb contains a variable number of ADJACENT_NODE_LU overlays. The ADJACENT_NODE_LU structures are concatenated onto the end of DELETE_ADJACENT_NODE structure.

```
typedef struct delete_adjacent_node
{
    unsigned short    opcode;          /* verb operation code          */
    unsigned  char    reserv2;         /*  reserved                    */
    unsigned  char    format;          /*  format                      */
    unsigned short    primary_rc;      /* primary return code          */
    unsigned long     secondary_rc;    /* secondary return code        */
    unsigned char     cp_name[17];     /* CP name                      */
    unsigned  char    reserv3[3];      /*  reserved                    */
    unsigned short    num_of_lus;      /* number of LUs                */
} DELETE_ADJACENT_NODE;

typedef struct adjacent_node_lu
{
    unsigned char     wildcard_lu;     /* wildcard LU name indicator */
    unsigned  char    fqlu_name[17];   /*  fully  qualified  LU  name  */
    unsigned  char    reserv1[6];      /*  reserved                    */
} ADJACENT_NODE_LU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_ADJACENT_NODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

cp_name The fully qualified name of the control point in the adjacent LEN end node. The name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

num_of_lus The number of LUs to be deleted. Set this to zero if the entire node definition is to be deleted. This number represents the number of adjacent LU overlays that follow the DELETE_ADJACENT_NODE VCB.

adjacent_node_lu.wildcard_lu
Indicates whether the specified LU name is a wildcard name (AP_YES or AP_NO).

adjacent_node_lu.fqlu_name
The LU name to be deleted. If this name is not fully qualified, the network ID of the CP name is assumed. The name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of one or two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_CP_NAME

AP_INVALID_LU_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_CP_NAME

AP_INVALID_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_CN

DELETE_CN deletes and frees the memory for a connection network control block if all the associated ports are reset. DELETE_CN can also be used to delete selected ports from a connection network. To do this, the user should set the **num_ports** field to a nonzero value and supply the port names of the ports to be deleted.

VCB Structure

```
typedef struct delete_cn
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned  long   secondary_rc;    /*  secondary  return  code     */
        unsigned char    fqcn_name[17];   /* name of connection network */
        unsigned  char   reserv1;         /*  reserved                    */
        unsigned short   num_ports;       /* number of ports to delete    */
        unsigned  char   port_name[8]  [8];
                                          /* names of ports to delete     */
} DELETE_CN;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_CN

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

fqcn_name Name of connection network (17 bytes long) to be deleted. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

num_ports The number of ports to delete on the connection network. This should be set to zero if the entire connection network is to be deleted.

port_name Names of the ports to be deleted if the **num_ports** is nonzero. Each port name is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If the **num_ports** field is zero this field is reserved.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc	AP_INVALID_CN_NAME
	AP_INVALID_NUM_PORTS_SPECIFIED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

DELETE_COS

DELETE_COS deletes a class-of-service entry unless it is one of the default classes of service defined by SNA.

VCB Structure

```
typedef struct delete_cos
{
        unsigned short   opcode;          /* verb operation code     */
        unsigned  char   reserv2;         /*  reserved                */
        unsigned  char   format;          /*  format                  */
        unsigned short   primary_rc;      /* primary return code     */
        unsigned  long   secondary_rc;    /*  secondary  return  code  */
        unsigned char    cos_name[8];     /* class-of-service name */
} DELETE_COS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_COS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

cos_name Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_COS_NAME_NOT_DEFD

AP_SNA_DEFD_COS_CANT_BE_DELETE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_DLC

DELETE_DLC deletes all ports, link stations, and connection network transmission groups (TGs) associated with the DLC if it is reset. All DLC control blocks are deleted and the memory freed. The Node Operator Facility returns a response specifying whether the DLC was deleted successfully.

Note that if a link station, which has a PU associated with it, is deleted (because it is associated with the DLC) then any LUs defined on this PU will also be deleted.

VCB Structure

```
typedef struct delete_dlc
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        unsigned char     dlc_name[8];     /* name of DLC               */

} DELETE_DLC;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_DLC

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dlc_name Name of DLC to be deleted. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLC_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_DLC_ACTIVE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_DOWNSTREAM_LU

The DELETE_DOWNSTREAM_LU verb is used to delete a specific downstream LU.

VCB Structure

```
typedef struct delete_downstream_lu
{
    unsigned short    opcode;          /* verb operation code        */
    unsigned  char    reserv2;         /*  reserved                  */
    unsigned  char    format;          /*  format                    */
    unsigned short    primary_rc;      /* primary return code        */
    unsigned long     secondary_rc;    /* secondary return code      */
    unsigned char     dslu_name[8];    /* Downstream LU name         */
} DELETE_DOWNSTREAM_LU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_DOWNSTREAM_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dslu_name Name of the downstream LU that is being deleted. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_DOWNSTREAM_LU_RANGE

The DELETE_DOWNSTREAM_LU_RANGE verb is used to delete a range of downstream LUs. The node operator provides a base name and an NAU range. The LU names in the range are generated by combining the base name with the NAU addresses.

For example, a base name of LUNME combined with an NAU range of 1 to 4 deletes the LUs LUNME001, LUNME002, LUNME003, and LUNME004. A base name of less than five non-pad characters results in LU names of less than eight non-pad characters.

This verb deletes all LUs in the range. If an LU in the range does not exist, then the verb continues with the next one that does exist. The verb only fails if no LUs exist in the specified range.

VCB Structure

```
typedef struct delete_downstream_lu_range
{
    unsigned short  opcode;              /* verb operation code          */
    unsigned  char  reserv2;             /*  reserved                    */
    unsigned  char  format;              /*  format                      */
    unsigned short  primary_rc;          /* primary return code          */
    unsigned long   secondary_rc;        /* secondary return code        */
    unsigned char   dslu_base_name[5];/* Downstream LU base name         */
    unsigned char   min_nau;             /* min NAU address in range     */
    unsigned char   max_nau;             /* max NAU address in range     */
} DELETE_DOWNSTREAM_LU_RANGE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_DOWNSTREAM_LU_RANGE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dslu_base_name Base name for downstream LU name range. This is a 5-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This base name is appended with three type-A EBCDIC numeric characters, representing the decimal value of the NAU address, for each LU in the NAU range.

min_nau Minimum NAU address in the range. This can be from 1 to 255 inclusive.

max_nau Maximum NAU address in the range. This can be from 1 to 255 inclusive.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_NAU_ADDRESS

AP_INVALID_LU_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_DSPU_TEMPLATE

This verb is used to delete a specific DSPU template.

VCB Structure

```
typedef struct delete_dspu_template
{
    unsigned short   opcode;          /* verb operation code      */
    unsigned  char   reserv2;         /*  reserved                */
    unsigned  char   format;          /*  format                  */
    unsigned short   primary_rc;      /* primary return code      */
    unsigned long    secondary_rc;    /* secondary return code    */
    unsigned char    template_name[8]; /* name of template        */

} DELETE_DSPU_TEMPLATE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_DSPU_TEMPLATE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

template_name Name of the DSPU template to be deleted. This is an 8-byte string in a locally-displayable character set. All 8 bytes are significant and must be set.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TEMPLATE_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_FOCAL_POINT

The DELETE_FOCAL_POINT verb can be used to delete focal points of a specified type and category. For more information about focal point types, see "DEFINE_FOCAL_POINT" on page 60. If an active focal point is deleted it will be revoked. To revoke the active focal point (of any type) specify a type of AP_ACTIVE. If a backup or implicit focal point is deleted (by specifying AP_BACKUP or AP_IMPLICIT) when it is not currently active, any information stored about it will simply be removed.

Note that the DEFINE_FOCAL_POINT verb can also be used to revoke currently active focal points. This duplicated function is retained for back compatibility.

VCB Structure

```
typedef struct delete_focal_point
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned  long   secondary_rc;    /*  secondary  return  code      */
        unsigned  char   reserved;        /*  reserved                    */
        unsigned char    ms_category[8]; /* management services category */
        unsigned char    type;            /* type of focal point          */
} DELETE_FOCAL_POINT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_FOCAL_POINT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

ms_category Management services category. This cab either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services categories as described in SNA management services, or an 8-byte type 1134 EBCDIC installation-defined name.

type Specifies the type of the focal point that is being deleted. Possible types are:

AP_ACTIVE
The currently active focal point (which can be of any type) is revoked.

AP_IMPLICIT
The implicit definition is removed. If the currently active focal point is an implicit focal point, then it is revoked.

AP_BACKUP
The backup definition is removed. If the currently active focal point is a backup focal point, then it is revoked.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TYPE

AP_INVALID_CATEGORY_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_INTERNAL_PU

The DELETE_INTERNAL_PU verb requests the deletion of a DLUR-served local PU. The verb will only succeed if the PU does not have an active SSCP-PU session.

Any LUs associated with the PU will be deleted.

VCB Structure

```
typedef struct delete_internal_pu
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        unsigned char     pu_name[8];      /* internal PU name          */
} DELETE_INTERNAL_PU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_INTERNAL_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pu_name Name of the internal PU that is being deleted. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PU_NAME

AP_INVALID_PU_TYPE

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PU_NOT_RESET

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_LOCAL_LU

The DELETE_LOCAL_LU verb requests deletion of the local LU definition.

VCB Structure

```
typedef struct delete_local_lu
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        unsigned char     lu_name[8];      /* local LU name             */
} DELETE_LOCAL_LU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_LOCAL_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name Name of the local LU that is being defined. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

AP_CANT_DELETE_CP_LU

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_LS

DELETE_LS checks that the link station has been previously defined and reset. It removes the link station control block and returns a response from the Node Operator Facility specifying whether the link station has been deleted successfully. Note that any LUs defined on the PU using this link station will also be deleted.

VCB Structure

```
typedef struct delete_ls
{
        unsigned short   opcode;        /* verb operation code     */
        unsigned  char   reserv2;       /*  reserved                */
        unsigned  char   format;        /*  format                  */
        unsigned short   primary_rc;    /* primary return code     */
        unsigned  long   secondary_rc;  /*  secondary  return  code */
        unsigned char    ls_name[8];    /* name of link station    */
} DELETE_LS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_LS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

ls_name Name of link station being deleted. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LINK_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_LS_ACTIVE

AP_INVALID_LINK_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_LU_0_TO_3

This verb is used to delete a specific LU.

VCB Structure

```
typedef struct delete_lu_0_to_3
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        unsigned char     lu_name[8];      /* LU name                  */
} DELETE_LU_0_TO_3;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_LU_0_TO_3

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name Name of the LU to be deleted. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

AP_CANT_DELETE_IMPLICIT_LU

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_LU_0_TO_3_RANGE

This verb is used to delete a range of LUs. The node operator provides a base name and an NAU range. The LU names are generated by combining the base name with the NAU addresses.

For example, a base name of LUNME combined with an NAU range of 1 to 4 would delete the LUs LUNME001, LUNME002, LUNME003, and LUNME004. A base name of less than five non-pad characters results in LU names of less than eight non-pad characters.

All LUs in the range are deleted. If an LU in the range does not exist, then the verb continues with the next one that does exist. The verb fails if no LUs exist in the specified range.

VCB Structure

```
typedef struct delete_lu_0_to_3_range
{
    unsigned short    opcode;          /* verb operation code      */
    unsigned  char    reserv2;         /*  reserved                */
    unsigned  char    format;          /*  format                  */
    unsigned short    primary_rc;      /* primary return code      */
    unsigned long     secondary_rc;    /* secondary return code    */
    unsigned char     base_name[5];    /* base name                */
    unsigned char     min_nau;         /* minimum NAU address      */
    unsigned char     max_nau;         /* maximum NAU address      */
    unsigned  char    reserv3;         /*  reserved                */
} DELETE_LU_0_TO_3_RANGE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_LU_0_TO_3_RANGE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

base_name Base LU name. This is an 5-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This base name is appended with three type-A EBCDIC numeric characters, representing the decimal value of the NAU address, for each LU in the NAU range.

min_nau Minimum NAU address in the range. This can be from 1 to 255 inclusive.

max_nau Maximum NAU address in the range. This can be from 1 to 255 inclusive.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_NAU_ADDRESS
	AP_INVALID_LU_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc	AP_STATE_CHECK
secondary_rc	AP_INVALID_LU_NAME
	AP_CANT_DELETE_IMPLICIT_LU

If the verb does not execute because the system has not been built with dependent LU support, the Program returns the following parameter:

primary_rc	AP_INVALID_VERB

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

DELETE_LU_POOL

This verb is used to delete an LU pool or to remove LUs from a pool. If no LU names are specified, the entire pool is removed. This verb completes successfully when the specified LUs within the LU pool, or the LU pool itself, no longer exist. The verb only fails if none of the specified LUs exist, or if there are no LUs in the specified pool.

VCB Structure

```
typedef struct delete_lu_pool
{
        unsigned short   opcode;          /* verb operation code      */
        unsigned  char   reserv2;         /*  reserved                */
        unsigned  char   format;          /*  format                  */
        unsigned short   primary_rc;      /* primary return code      */
        unsigned long    secondary_rc;    /* secondary return code    */
        unsigned char    pool_name[8];    /* LU pool name             */
        unsigned short   num_lus;         /* number of LUs to add     */
        unsigned char    lu_names[10][8]; /* LU names                 */
} DELETE_LU_POOL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_LU_POOL

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pool_name Name of the LU pool. All 8 bytes are significant and must be set. This name is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

num_lus Number of LUs specified in the **lu_names** list.

lu_names Names of the LUs to be removed. Each name is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameter

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_POOL_NAME
AP_INVALID_LU_NAME
AP_INVALID_NUM_LUS

If the verb does not execute because the system has not been built with dependent LU support, the Program returns the following parameter:

primary_rc AP_INVALID_VERB

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_MODE

The DELETE_MODE verb requests deletion of a mode definition. Default definitions for CPSVCMG, SNASVCMG, and other standard SNA modes will not be deleted.

VCB Structure

```
typedef struct delete_mode
{
        unsigned short  opcode;          /* verb operation code     */
        unsigned char   reserv2;         /* reserved                */
        unsigned char   format;          /* format                  */
        unsigned short  primary_rc;      /* primary return code     */
        unsigned long   secondary_rc;    /* secondary return code   */
        unsigned char   mode_name[8];    /* mode name               */
} DELETE_MODE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_MODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

mode_name Name of the mode. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_CP_OR_SNA_SVCMG_UNDELETABLE
AP_MODE_UNDELETABLE
AP_DEL_MODE_DEFAULT_SPCD
AP_MODE_NAME_NOT_DEFD

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_PARTNER_LU

The DELETE_PARTNER_LU requests the deletion of a partner LU definition.

VCB Structure

```
typedef struct delete_partner_lu
{
        unsigned short    opcode;          /* verb operation code        */
        unsigned  char    reserv2;         /*  reserved                  */
        unsigned  char    format;          /*  format                    */
        unsigned short    primary_rc;      /* primary return code        */
        unsigned  long    secondary_rc;    /*  secondary  return  code   */
        unsigned char     fqplu_name[17]; /* fully qualified partner */
                                           /* LU name                    */
} DELETE_PARTNER_LU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_PARTNER_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

fqplu_name Fully qualified name of the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PLU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_PORT

DELETE_PORT deletes all link stations and connection network transmission groups (TGs) associated with the port if it is reset. It then deletes the port's control block, frees the memory, and returns a response from the Node Operator Facility indicating whether the port has been deleted successfully.

Note that if a link station, which has a PU associated with it, is deleted (because it is associated with the port) then any LUs defined on this PU will also be deleted.

VCB Structure

```
typedef struct delete_port
{
          unsigned short   opcode;          /* verb operation code     */
          unsigned char    reserv2;         /* reserved                */
          unsigned char    format;          /* format                  */
          unsigned short   primary_rc;      /* primary return code     */
          unsigned long    secondary_rc;    /* secondary return code   */
          unsigned char    port_name[8];    /* name of port            */
} DELETE_PORT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_PORT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

port_name Name of port being deleted. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PORT_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PORT_ACTIVE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_TP

The DELETE_TP requests the deletion of a transaction program (TP) definition.

VCB Structure

```
typedef struct delete_tp
{
        unsigned short   opcode;          /* verb operation code     */
        unsigned  char   reserv2;         /*  reserved                */
        unsigned  char   format;          /*  format                  */
        unsigned short   primary_rc;      /* primary return code     */
        unsigned  long   secondary_rc;    /*  secondary  return  code */
        unsigned char    tp_name[64];     /* TP name                  */
} DELETE_TP;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_TP format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

tp_name Name of the transaction program. the Program does not check the character set of this field.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TP_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_TP

Chapter 5. Activation and Deactivation Verbs

This chapter describes verbs that are used to activate and deactivate:

- Data link controls (DLCs)
- Internal PUs
- Ports
- Link stations
- Sessions
- Conversation groups

This chapter also describes a verb used to request a path switch to a connection that supports High-Performance Routing (HPR).

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START_DLC

START_DLC requests the activation of a data link control (DLC). It is subsequently returned indicating whether the activation of the DLC was successful. Note that the DLC can be started even if no ports have been defined for it. See “DLC Processes, Ports, and Link Stations” on page 16, for more information about the relationship between DLCs, ports, and link stations.

VCB Structure

```
typedef struct start_dlc
{
        unsigned short   opcode;        /* verb operation code     */
        unsigned  char   reserv2;       /*  reserved               */
        unsigned  char   format;        /*  format                 */
        unsigned short   primary_rc;    /* primary return code     */
        unsigned  long   secondary_rc;  /*  secondary  return  code */
        unsigned char    dlc_name[8];   /* name of DLC              */
} START_DLC;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_START_DLC

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

dlc_name Name of Data Link Control instance that is to be started. This is an 8-byte string in a locally displayable character set, which must have already been defined by a DEFINE_DLC verb.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLC

If the verb does not execute because the DLC is deactivating , the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_DLC_DEACTIVATING

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

START_INTERNAL_PU

The START_INTERNAL_PU verb requests the dependent LU requester (DLUR) to initiate SSCP-PU session activation for a previously defined local PU that is served by DLUR.

VCB Structure

```
typedef struct start_internal_pu
{
        unsigned short    opcode;                 /* verb operation code      */
        unsigned  char    reserv2;                /*  reserved                */
        unsigned  char    format;                 /*  format                  */
        unsigned short    primary_rc;             /* primary return code      */
        unsigned long     secondary_rc;           /* secondary return code */
        unsigned char     pu_name[8];             /* internal PU name         */
        unsigned char     dlus_name[17];          /* DLUS name                */
        unsigned char     bkup_dlus_name[17]; /* Backup DLUS name         */
} START_INTERNAL_PU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_START_INTERNAL_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pu_name Name of the internal PU for which the SSCP-PU session activation flows will be solicited. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

dlus_name Name of the dependent LU server (DLUS) node that DLUR will contact to solicit SSCP-PU session activation for the given PU. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This value overrides the value specified in the DEFINE_INTERNAL_PU verb. If the field is set to all zeros, the DLUS specified in the DEFINE_INTERNAL_PU verb will be used. If no DLUS has been specified in the DEFINE_INTERNAL_PU verb, then the global default (if specified by a DEFINE_DLUR_DEFAULTS verb) will be used.

bkup_dlus_name Name of the DLUS node that DLUR will store as the backup DLUS for the given PU. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This value overrides the value specified in the DEFINE_INTERNAL_PU verb. If the field is set to all zeros, the backup DLUS name specified by a DEFINE_INTERNAL_PU verb will be retained as the backup DLUS for this PU. If no backup DLUS was

specified by the DEFINE_INTERNAL_PU verb, the global backup default DLUS (if defined by the DEFINE_DLUR_DEFAULTS verb) is retained as the backup default for this PU.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLUS_NAME

AP_INVALID_BKUP_DLUS_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_NO_DEFAULT_DLUS_DEFINED

AP_PU_NOT_DEFINED
AP_PU_ALREADY_ACTIVATING
AP_PU_ALREADY_ACTIVE

If the verb does not execute successfully, the Program returns the following parameters:

primary_rc AP_UNSUCCESSFUL

secondary_rc AP_DLUS_REJECTED

AP_DLUS_CAPS_MISMATCH
AP_PU_FAILED_ACTPU

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

START_LS

START_LS requests activation of a link. It is returned as a response specifying whether the link was successfully activated.

See “DLC Processes, Ports, and Link Stations” on page 16, for more information about the relationship between DLCs, ports and link stations.

VCB Structure

```
typedef struct start_ls
{
        unsigned short   opcode;        /* verb operation code          */
        unsigned  char   reserv2;       /*  reserved                    */
        unsigned  char   format;        /*  format                      */
        unsigned short   primary_rc;    /* primary return code          */
        unsigned  long   secondary_rc;  /*  secondary  return  code     */
        unsigned char    ls_name[8];    /* name of link station         */
        unsigned char    enable;        /* whether the link is enabled*/
        unsigned  char   reserv3[3];    /*  reserved                    */
} START_LS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_START_LS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

ls_name Name of link station to be started. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. The value of **ls_name** must match that on the DEFINE_LS verb.

enable Set this field to start the link. If this field is set to AP_ACTIVATE, then the link is started. Otherwise, the link is not started, and the following values are possible. These values can be ORed together.

AP_AUTO_ACT
The link can subsequently be activated on demand by the local node. This value is only valid if **auto_act_supp** was set to AP_YES on the DEFINE_LS verb.

AP_REMOTE_ACT
The link can subsequently be activated by the remote node. This does not alter the defined value of **disable_remote_act**.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LINK_NAME_SPECIFIED

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PORT_INACTIVE
AP_ACTIVATION_LIMITS_REACHED
AP_PARALLEL_TGS_NOT_SUPPORTED
AP_ALREADY_STARTING
AP_LINK_DEACT_IN_PROGRESS

If the verb does not execute because it was canceled by a subsequent STOP_LS or STOP_PORT before the link became active, the Program returns the following parameters:

primary_rc AP_CANCELLED

secondary_rc AP_LINK_DEACTIVATED

If the verb does not execute because the partner could not be found by the link software, the Program returns the following parameters:

primary_rc AP_LS_FAILURE

secondary_rc AP_PARTNER_NOT_FOUND

If the verb does not execute because a link error occurred while the link was being established, the Program returns the following parameters:

primary_rc AP_LS_FAILURE

secondary_rc AP_ERROR

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

START_PORT

START_PORT requests the activation of a port. It is returned indicating whether the port was successfully activated. The port can be started even if no link stations have been defined for it, but it will not be started if its parent DLC is inactive.

See “DLC Processes, Ports, and Link Stations” on page 16, for more information about the relationship between DLCs, ports and link stations.

VCB Structure

```
typedef struct start_port
{
        unsigned short  opcode;         /* verb operation code     */
        unsigned char   reserv2;        /* reserved                */
        unsigned char   format;         /* format                  */
        unsigned short  primary_rc;     /* primary return code     */
        unsigned long   secondary_rc;   /* secondary return code   */
        unsigned char   port_name[8];   /* name of port            */
} START_PORT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_START_PORT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

port_name Name of port to be started. This is an 8-byte string in a locally displayable character set and must match that on the DEFINE_PORT verb.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PORT_NAME

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_DLC_INACTIVE

AP_STOP_PORT_PENDING
AP_DUPLICATE_PORT

If the verb does not execute because it was canceled, the Program returns the following parameter:

primary_rc AP_CANCELLED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

STOP_DLC

STOP_DLC requests that a DLC be stopped. It is returned indicating whether the DLC was successfully stopped.

VCB Structure

```
typedef struct stop_dlc
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        unsigned char     stop_type;       /* stop type                */
        unsigned char     dlc_name[8];     /* name of DLC              */
} STOP_DLC;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_STOP_DLC

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

stop_type Manner in which DLC should be stopped.

AP_ORDERLY_STOP
Node should perform cleanup operations before stopping DLC.

AP_IMMEDIATE_STOP
Node should stop DLC immediately.

dlc_name Name of DLC to be stopped. This is an 8-byte string in a locally displayable character set, which must match that on the DEFINE_DLC verb.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLC

AP_UNRECOGNIZED_DEACT_TYPE

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_STOP_DLC_PENDING

If the verb does not execute because it has been canceled, the Program returns the following parameter:

primary_rc AP_CANCELLED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

STOP_INTERNAL_PU

The STOP_INTERNAL_PU verb requests the dependent LU requester (DLUR) initiate SSCP-PU session deactivation for a previously defined local PU that is served by DLUR.

VCB Structure

```
typedef struct stop_internal_pu
{
          unsigned short    opcode;          /* verb operation code       */
          unsigned  char    reserv2;         /*  reserved                 */
          unsigned  char    format;          /*  format                   */
          unsigned short    primary_rc;      /* primary return code       */
          unsigned  long    secondary_rc;    /*  secondary  return  code   */
          unsigned char     pu_name[8];      /* internal PU name           */
          unsigned char     stop_type;       /* type of stop requested */
} STOP_INTERNAL_PU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_STOP_INTERNAL_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pu_name Name of the internal PU for which the SSCP-PU session will be deactivated. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

stop_type Specifies stop type requested for the PU. An orderly stop will deactivate all underlying PLU-SLU and SSCP-LU sessions before deactivating the SSCP-PU session.

AP_ORDERLY_STOP
AP_IMMEDIATE_STOP

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_STOP_TYPE

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PU_NOT_DEFINED

AP_PU_ALREADY_DEACTIVATING
AP_PU_NOT_ACTIVE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

STOP_LS

STOP_LS requests the deactivation of a link station. It is returned specifying whether the link was stopped successfully.

VCB Structure

```
typedef struct stop_ls
{
        unsigned short   opcode;          /* verb operation code              */
        unsigned  char   reserv2;         /*  reserved                        */
        unsigned  char   format;          /*  format                          */
        unsigned short   primary_rc;      /* primary return code              */
        unsigned  long   secondary_rc;    /*  secondary  return  code         */
        unsigned char    stop_type;       /* stop type                        */
        unsigned char    ls_name[8];      /* name of link station             */
        unsigned char    disable;         /* whether the link is disabled */
        unsigned  char   reserved[3];     /*  reserved                        */
} STOP_LS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_STOP_LS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

stop_type Manner in which the link station should be stopped.

AP_ORDERLY_STOP
Node should perform cleanup operations before stopping the link station.

AP_IMMEDIATE_STOP
Node should stop the link station immediately.

ls_name Name of link station to be stopped. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. The value of **ls_name** must match that on the DEFINE_LS verb.

disable This indicates whether remote activation or activation on demand of this link station should be disabled. If set to AP_NO, then the link station is returned to the state given by the values of **auto_act_supp** and **disable_remote_act** from the DEFINE_LS verb. Otherwise, the following values are possible (and can be ORed together).

AP_AUTO_ACT
The link cannot be re-activated on demand by the local node.

AP_REMOTE_ACT
The link cannot be activated by the remote node. For a link configured with **disable_remote_act** set to AP_YES, this bit is ignored (activation by a remote node is always disabled by STOP_LS).

If the **disable** field is not set to AP_NO, then STOP_LS can be issued for a link that is not active or that is in the process of deactivating, for the purpose of setting the **disable** field.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_UNRECOGNIZED_DEACT_TYPE

AP_LINK_NOT_DEFD

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_LINK_DEACT_IN_PROGRESS

If the verb does not execute because it was canceled, the Program returns the following parameter:

primary_rc AP_CANCELLED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

STOP_PORT

STOP_PORT requests that a port be stopped. It is returned specifying whether the port was stopped successfully.

VCB Structure

```
typedef struct stop_port
{
        unsigned short   opcode;          /* verb operation code     */
        unsigned char    reserv2;         /* reserved                */
        unsigned char    format;          /* format                  */
        unsigned short   primary_rc;      /* primary return code     */
        unsigned long    secondary_rc;    /* secondary return code   */
        unsigned char    stop_type;       /* Stop Type               */
        unsigned char    port_name[8];    /* name of port            */
} STOP_PORT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_STOP_PORT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

stop_type Manner in which the port should be stopped.

AP_ORDERLY_STOP
Node should perform cleanup operations before stopping the port.

AP_IMMEDIATE_STOP
Node should stop the port immediately.

port_name Name of port to be stopped. This is an 8-byte string in a locally displayable character set, which must match that on the DEFINE_PORT verb.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PORT_NAME

AP_UNRECOGNIZED_DEACT_TYPE

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_STOP_PORT_PENDING

If the verb does not execute because it has been canceled, the Program returns the following parameter:

primary_rc AP_CANCELLED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

ACTIVATE_SESSION

The ACTIVATE_SESSION verb requests activation of a session between the local LU and a specified partner LU using the characteristic of a particular mode.

VCB Structure

```
typedef struct activate_session
{
        unsigned short  opcode;          /* verb operation code        */
        unsigned  char  reserv2;         /*  reserved                  */
        unsigned  char  format;          /*  format                    */
        unsigned short  primary_rc;      /* primary return code        */
        unsigned  long  secondary_rc;    /*  secondary  return  code   */
        unsigned char   lu_name[8];      /* local LU name              */
        unsigned char   lu_alias[8];     /* local LU alias             */
        unsigned  char  plu_alias[8];    /*  partner  LU  alias        */
        unsigned  char  mode_name[8];    /*  mode  name                */
        unsigned char   fqplu_name[17]; /* fully qualified partner */
                                         /* LU name                    */
        unsigned  char  reserv3;         /*  reserved                  */
        unsigned char   session_id[8];   /* session identifier         */
} ACTIVATE_SESSION;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_ACTIVATE_SESSION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU requested to activate a session. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias of the local LU requested to activate a session. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_alias** and the **lu_name** are set to all zeros then the verb is forwarded to the LU associated with the control point (the default LU).

plu_alias Alias by which the partner LU is known to the local LU. This name must match the name of a partner LU established during configuration. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field is used to specify the required partner LU.

mode_name Name of a set of networking characteristics defined during configuration. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

fqplu_name Fully qualified LU name for the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

secondary_rc AP_AS_SPECIFIED

AP_AS_NEGOTIATED

session_id 8-byte identifier of the activated session.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PLU_NAME

AP_LU_SESS_LIMIT_EXCEEDED
AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS
AP_INVALID_MODE_NAME

If the verb exceeds the session limit for the mode, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

Secondary_rc AP_EXCEEDS_MAX_ALLOWED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

If the verb does not execute because of other errors, the Program returns one of the following parameters:

primary_rc AP_ACTIVATION_FAIL_NO_RETRY

AP_ACTIVATION_FAIL_RETRY

DEACTIVATE_CONV_GROUP

The DEACTIVATE_CONV_GROUP verb requests the deactivation of the session corresponding to the specified conversation group. Although this verb is part of the Node Operator Facility API, it is primarily intended for use by application programmers writing transaction programs that use the Personal Communications or Communications Server APPC API. The conversation group identifier is returned by the MC_ALLOCATE, ALLOCATE, MC_GET_ATTRIBUTES, GET_ATTRIBUTES and RECEIVE_ALLOCATE verbs defined in *Personal Communications Client/Server Communications Programming.*

VCB Structure

```
typedef struct deactivate_conv_group
{
        unsigned short    opcode;          /* verb operation code          */
        unsigned  char    reserv2;         /*  reserved                    */
        unsigned  char    format;          /*  format                      */
        unsigned short    primary_rc;      /* primary return code          */
        unsigned  long    secondary_rc;    /*  secondary  return  code     */
        unsigned char     lu_name[8];      /* local LU name                */
        unsigned char     lu_alias[8];     /* local LU alias               */
        unsigned long     conv_group_id;   /* conversation group identifier */
        unsigned char     type;            /* deactivation type            */
        unsigned  char    reserv3[3];      /*  reserved                    */
        unsigned long     sense_data;      /* deactivation sense data      */
} DEACTIVATE_CONV_GROUP;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEACTIVATE_CONV_GROUP

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU requested to deactivate the conversation group. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias of the local LU requested to deactivate the conversation group. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and **lu_alias** are set to all zeros, the verb is forwarded to the LU associated with the control point (the default LU).

conv_group_id Conversation group identifier for the session to be deactivated.

type Type of deactivation.

AP_DEACT_CLEANUP
The session is terminated immediately, without waiting for a response from the partner LU.

AP_DEACT_NORMAL
The session terminates after all conversations using the session are ended.

sense_data Specifies the sense data for use in the CLEANUP type of deactivation.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_CLEANUP_TYPE

AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEACTIVATE_SESSION

The DEACTIVATE_SESSION verb requests the deactivation of a particular session, or all sessions on a particular mode.

VCB Structure

```
typedef struct deactivate_session
{
        unsigned short  opcode;          /* verb operation code        */
        unsigned  char  reserv2;         /*  reserved                  */
        unsigned  char  format;          /*  format                    */
        unsigned short  primary_rc;      /* primary return code        */
        unsigned  long  secondary_rc;    /*  secondary  return  code   */
        unsigned char   lu_name[8];      /* local LU name              */
        unsigned char   lu_alias[8];     /* local LU alias             */
        unsigned char   session_id[8];   /* session identifier         */
        unsigned  char  plu_alias[8];    /*  partner  LU  alias        */
        unsigned  char  mode_name[8];    /*  mode  name                */
        unsigned char   type;            /* deactivation type          */
        unsigned  char  reserv3[3];      /*  reserved                  */
        unsigned long   sense_data;      /* deactivation sense data */
        unsigned char   fqplu_name[17]; /* fully qualified partner */
                                         /* LU name                   */
        unsigned  char  reserv4[20];     /*  reserved                  */
} DEACTIVATE_SESSION;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEACTIVATE_SESSION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU requested to deactivate a session. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias of the local LU requested to deactivate a session. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** fields are set to all zeros then the verb is forwarded to the LU associated with the control point (the default LU).

session_id 8-byte identifier of the session to deactivate. If this field is set to all zeros, Personal Communications or Communications Server deactivates all sessions for the partner LU and mode.

plu_alias Alias by which the partner LU is known to the local LU. This name must match the name of a partner LU established during configuration. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field is used to specify the required partner LU.

mode_name Name of a set of networking characteristics defined during configuration. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

type Type of deactivation.

AP_DEACT_CLEANUP
Terminates the session immediately, without waiting for a response from the partner LU.

AP_DEACT_NORMAL
Terminates the session after all conversations using the session are ended.

sense_data Specifies the sense data to be used for the CLEANUP type of deactivation.

fqplu_name Fully qualified LU name for the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

Note that if the **session_id** cannot be matched with any existing sessions, it is assumed that this is because the session has already been deactivated. In this case the verb completes successfully.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_MODE_NAME

AP_INVALID_PLU_NAME
AP_INVALID_CLEANUP_TYPE
AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

PATH_SWITCH

The PATH_SWITCH verb requests Personal Communications or Communications Server to switch routes on a connection that supports high-performance routing (HPR). If a better path cannot be found, the connection is left unchanged.

VCB Structure

```
typedef struct path_switch
{
        unsigned short    opcode;              /* verb operation code      */
        unsigned  char    reserv2;             /*  reserved                */
        unsigned  char    format;              /*  format                  */
        unsigned short    primary_rc;          /* primary return code      */
        unsigned  long    secondary_rc;        /*  secondary  return  code  */
        unsigned  char    rtp_connection_name[8];
                                               /* RTP connection name      */
} PATH_SWITCH;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_PATH_SWITCH

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

rtp_connection_name Identifies the RTP connection to path-switch. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_RTP_CONNECTION

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_PATH_SWITCH_IN_PROGRESS

If the verb does not execute because the path switch attempt fails, the Program returns the following parameter:

primary_rc AP_UNSUCCESSFUL

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

PATH_SWITCH

Chapter 6. Query Verbs

This chapter describes verbs used to query information about node configuration and status.

Only certain parameters are supported on SNA API clients. See the *note pad* (

) for detailed information.

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QUERY_ADJACENT_NN

QUERY_ADJACENT_NN is only used at a network node and returns information about adjacent network nodes (that is, those network nodes to which CP-CP sessions are active or have been active or have been active at some time).

The adjacent node information is returned as a formatted list. To obtain information about a specific network node or to obtain the list information in several “chunks,” the **adj_nncp_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered on the **adj_nncp_name** Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). If AP_LIST_FROM_NEXT is selected the list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

VCB Structure

```
typedef struct query_adjacent_nn
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                      */
        unsigned  char    format;              /*  format                        */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     *buf_ptr;            /* pointer to buffer            */
        unsigned long     buf_size;            /* buffer size                  */
        unsigned long     total_buf_size;      /* total buffer size required   */
        unsigned short    num_entries;         /* number of entries            */
        unsigned  short   total_num_entries;   /*  total  number  of  entries  */
        unsigned char     list_options;        /* listing options              */
        unsigned  char    reserv3;             /*  reserved                      */
        unsigned char     adj_nncp_name[17];   /* CP name of adj network node  */
} QUERY_ADJACENT_NN;

typedef struct adj_nncp_data
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned char     adj_nncp_name[17];   /* CP name of adj. network node */
        unsigned char     cp_cp_sess_status;   /* CP-CP session status         */
        unsigned long     out_of_seq_tdus;     /* out of sequence TDUs         */
        unsigned long     last_frsn_sent;      /* last FRSN sent               */
        unsigned long     last_frsn_rcvd;      /* last FRSN received           */
        unsigned  char    reserva[20];         /*  reserved                      */
} ADJ_NNCP_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_ADJACENT_NN

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **adj_nncp_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

adj_nncp_name Fully-qualified, 17 byte, name of adjacent network node composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries The number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

adj_nncp_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

adj_nncp_data.adj_nncp_name
17-byte fully-qualified CP name of adjacent network node which is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

adj_nncp_data.cp_cp_sess_status
Status of the CP-CP session. This is set to one of the following:

AP-ACTIVE
AP_CONWINNER_ACTIVE
AP_CONLOSER_ACTIVE
AP_INACTIVE

adj_nncp_data.out_of_seq_tdus
Number of out_of_sequence TDUs received from this node.

adj_nncp_data.last_frsn_sent
The last flow reduction sequence number sent to this node.

adj_nncp_data.last_frsn_rcvd
The last flow reduction sequence number received from this node.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_ADJ_NNCP_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_CN

QUERY_CN returns information about adjacent Connection Networks. This information is structured as “determined data” (data gathered dynamically during execution) and “defined data” (the data supplied by the application on DEFINE_CN).

The information is returned as a formatted list. To obtain information about a specific CN, or to obtain the list information in several “chunks,” the **fqcn_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered on the **fqcn_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If AP_LIST_FROM_NEXT is selected, the list will start from the next entry according to the defined ordering (whether the specified entry exists or not).

VCB Structure

```
typedef struct query_cn
{
        unsigned short   opcode;              /* Verb operation code          */
        unsigned  char   reserv2;             /*  reserved                    */
        unsigned  char   format;              /*  format                      */
        unsigned short   primary_rc;          /* Primary return code          */
        unsigned long    secondary_rc;        /* Secondary return code        */
        unsigned char    *buf_ptr;            /* pointer to buffer            */
        unsigned long    buf_size;            /* buffer size                  */
        unsigned long    total_buf_size;      /* total buffer size required */
        unsigned short   num_entries;         /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries      */
        unsigned char    list_options;        /* listing options              */
        unsigned  char   reserv3;             /*  reserved                    */
        unsigned char    fqcn_name[17];       /* Name of connection network */
} QUERY_CN;

typedef struct cn_data
{
        unsigned short   overlay_size;        /* size of this entry           */
        unsigned char    fqcn_name[17];       /* Name of connection network */
        unsigned  char   reserv1;             /*  reserved                    */
        CN_DET_DATA      det_data;            /* Determined data              */
        CN_DEF_DATA      def_data;            /* Defined data                 */
} CN_DATA;

typedef struct cn_det_data
{
        unsigned short   num_act_ports;       /* number of active ports       */
        unsigned  char   reserva[20];         /*  reserved                    */
} CN_DET_DATA;
```

```
typedef struct cn_def_data
{
        unsigned  char     description[RD_LEN];
                                                /* resource description          */
         unsigned char     num_ports;           /* number of ports on CN         */
        unsigned  char     reserv1[16];         /*  reserved                     */
         TG_DEFINED_CHARS tg_chars;             /* TG characteristics            */
} CN_DEF_DATA;

typedef struct tg_defined_chars
{
         unsigned char     effect_cap;          /* effective capacity           */
        unsigned  char     reserve1[5];         /*  reserved                    */
         unsigned char     connect_cost;        /* connection cost              */
         unsigned char     byte_cost;           /* byte cost                    */
        unsigned  char     reserve2;            /*  reserved                    */
        unsigned  char     security;            /*  security                    */
         unsigned char     prop_delay;          /* propagation delay            */
         unsigned char     modem_class;         /* modem class                  */
         unsigned  char    user_def_parm_1;     /*  user-defined  parameter  1  */
         unsigned  char    user_def_parm_2;     /*  user-defined  parameter  2  */
         unsigned  char    user_def_parm_3;     /*  user-defined  parameter  3  */
} TG_DEFINED_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_CN

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **fqcn_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

fqcn_name Fully qualified, 17-byte, connection network name. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

cn_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

cn_data.fqcn_name Fully qualified, 17-byte, connection network name. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

cn_data.det_data.num_act_ports
Dynamic value giving number of active ports on the connection network.

cn_data.def_data.description
Resource description (as specified on DEFINE_CN). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

cn_data.def_data.num_ports
Number of ports on the connection network.

cn_data.def_data.tg_chars.effect_cap
Actual units of effective capacity. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Each unit of effective capacity is equal to 300 bits per second.

cn_data.def_data.tg_chars.connect_cost Cost per connect time.
Valid values are integer values in the range 0—255, where 0 is the lowest cost per connect time and 255 is the highest.

cn_data.def_data.tg_chars.byte_cost
Cost per byte. Valid values are integer values in the range 0—255, where 0 is the lowest cost per byte and 255 is the highest.

cn_data.def_data.tg_chars.security
Security values as described in the list below.

AP_SEC_NONSECURE
No security exists.

AP_SEC_PUBLIC_SWITCHED_NETWORK
Data transmitted over this connection network will flow over a public switched network.

AP_SEC_UNDERGROUND_CABLE
Data is transmitted over secure underground cable.

AP_SEC_SECURE_CONDUIT
The line is a secure conduit that is not guarded.

AP_SEC_GUARDED_CONDUIT
Conduit is protected against physical tapping.

AP_SEC_ENCRYPTED
Encryption over the line.

AP_SEC_GUARDED_RADIATION
Line is protected against physical and radiation tapping.

cn_data.def_data.tg_chars.prop_delay
Propagation delay representing the time it takes for a signal to travel the length of the link, in microseconds. The value is encoded as a 1-byte floating-point number, represented by the formula 0.1mmm * 2 eeeee, where the bit representation of the byte is eeeeemmm. Default values are listed below.

AP_PROP_DELAY_MINIMUM
No propagation delay.

AP_PROP_DELAY_LAN
Less than 480 microseconds delay.

AP_PROP_DELAY_TELEPHONE
Between 480 and 49 512 microseconds delay.

AP_PROP_DELAY_PKT_SWITCHED_NET
Between 49 512 and 245 760 microseconds delay.

AP_PROP_DELAY_SATELLITE
Longer than 245 760 microseconds delay.

AP_PROP_DELAY_MAXIMUM
Maximum propagation delay.

cn_data.def_data.tg_chars.modem_class
Reserved. This field should always be set to zero.

cn_data.def_data.tg_chars.user_def_parm_1
User defined parameter in the range 0—255.

cn_data.def_data.tg_chars.user_def_parm_2
User defined parameter in the range 0—255.

cn_data.def_data.tg_chars.user_def_parm_3
User defined parameter in the range 0—255.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_CN_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_CN_PORT

QUERY_CN_PORT returns information about ports defined on adjacent connection networks. The information is returned as a formatted list. To obtain information about a specific port, or to obtain the list information in several “chunks,” the **port_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. Note that the **fqcn_name** field must always be set to the name of a valid connection network.

See “Querying the Node” on page 12, for background on how the list formats are used.

VCB Structure

```
typedef struct query_cn_port
{
        unsigned short   opcode;          /* Verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* Primary return code          */
        unsigned long    secondary_rc;    /* Secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries   */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned char    fqcn_name[17];   /* Name of connection network */
        unsigned char    port_name[8];    /* port name                    */
} QUERY_CN_PORT;

typedef struct cn_port_data
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    fqcn_name[17];   /* Name of connection network */
        unsigned char    port_name[8];    /* name of port                 */
        unsigned char    tg_num;          /* transmission group number    */
        unsigned  char   reserva[20];     /*  reserved                    */
} CN_PORT_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_CN_PORT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The combination of **fqcn_name** and **port_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

fqcn_name Fully qualified, 17-byte, connection network name. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field must always be set.

port_name 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

cn_port_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

cn_port_data.fqcn_name
Fully qualified, 17-byte, connection network name. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

cn_port_data.port_name
Port name in an 8-byte, locally displayable character set. All 8 bytes are significant.

cn_port_data.tg_num
Transmission group number for specified port.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_CN_NAME AP_INVALID_PORT_NAME AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_COS

QUERY_COS returns route calculation information for a specific class of service. The information is returned as a formatted list. To obtain information about a specific COS, or to obtain the list information in several "chunks," the **cos_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used. This list is ordered on the **cos_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). If AP_LIST_FROM_NEXT is selected the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

VCB Structure

```
typedef struct query_cos
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required   */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries    */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned char    cos_name[8];     /* COS name                     */
} QUERY_COS;

typedef struct cos_data
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    cos_name[8];     /* COS name                     */
        unsigned  char   description[RD_LEN];
                                          /* resource description         */
        unsigned  char   transmission_priority;
                                          /* transmission priority        */
        unsigned  char   reserv1;         /*  reserved                    */
        unsigned  short  num_of_node_rows; /*  number of node rows         */
        unsigned short   num_of_tg_rows;  /* number of TG rows            */
        unsigned long    trees;           /* number of tree caches for COS */
        unsigned long    calcs;           /* number of route calculations */
                                          /* for this COS                 */
        unsigned long    rejs;            /* number of route rejects      */
                                          /* for COS                      */
        unsigned  char   reserva[20];     /*  reserved                    */
} COS_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_COS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **cos_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

cos_name Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

cos_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

cos_data.cos_name
Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

cos_data.description
Resource description (as specified on DEFINE_COS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

cos_data.transmission_priority
Transmission priority. This is set to one of the following values:

AP_LOW
AP_MEDIUM
AP_HIGH
AP_NETWORK

cos_data.num_of_node_rows
Number of node rows for this COS.

cos_data.num_of_tg_rows
Number of TG rows for this COS.

cos_data.trees Number of route tree caches built for this COS since the last initialization.

cos_data.calcs Number of session activation requests (and therefore route calculations) specifying this class of service.

cos_data.rejs Number of session activation requests that failed because there was no acceptable (using the specified class of service) route from this node to the named destination through the network. A route is only acceptable if it is made up entirely of active TGs and nodes that can provide the specified class of service.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_COS_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DEFAULT_PU

QUERY_DEFAULT_PU allows the user to query the default PU defined using a DEFINE_DEFAULT_PU verb.

VCB Structure

```
typedef struct query_default_pu
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        unsigned char     def_pu_name[8]; /* default PU name           */
        unsigned  char    description[RD_LEN];
                                           /* resource description    */
        unsigned char     def_pu_sess[8]; /* PU name of active         */
                                           /* default session          */
        unsigned  char    reserv3[16];     /*  reserved                */
} QUERY_DEFAULT_PU;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DEFAULT_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

def_pu_name Name of the PU specified on the most recent DEFINE_DEFAULT_PU verb. This is an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If no DEFINE_DEFAULT_PU verb has been issued then this field will be set to all zeros.

description Resource description (as specified on DEFINE_DEFAULT_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_pu_sess Name of the PU associated with the currently active default PU session. This will be different from the **def_pu_name** field if a default PU has been defined, but the session associated with it is not active. In this case, Personal Communications or Communications Server continues to use the session associated with the previous default PU until the session associated with the defined default PU becomes active. If there are no active PU sessions then this field will be set to all zeros.

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DEFAULTS

QUERY_DEFAULTS allows the user to query the defaults defined using the DEFINE_DEFAULTS verb.

VCB Structure

```
typedef struct query_defaults
{
        unsigned short    opcode;          /* verb operation code      */
        unsigned  char    reserv2;         /*  reserved                */
        unsigned  char    format;          /*  format                  */
        unsigned short    primary_rc;      /* primary return code      */
        unsigned  long    secondary_rc;    /*  secondary  return  code  */
        DEFAULT_CHARS     default_chars;   /* default information      */
} QUERY_DEFAULTS;

typedef struct default_chars
{
        unsigned  char    description[RD_LEN];
                                           /* resource description    */
        unsigned  char    mode_name[8];    /*  default  mode  name     */
        unsigned  char    reserv[248];     /*  reserved                */
} DEFAULT_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DEFAULTS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

default_chars.description
Resource description (as specified on DEFINE_DEFAULTS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

default_chars.mode_name
Name of the mode specified on the most recent DEFINE_DEFAULTS verb. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If no DEFINE_DEFAULTS verb has been issued then this field will be set to all zeros.

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DIRECTORY_LU

QUERY_DIRECTORY_LU returns a list of LUs from the directory database. The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific LU, or to obtain the list information in several “chunks,” the **lu_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **lu_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

VCB Structure

```
typedef struct query_directory_lu
{
        unsigned short   opcode;                  /* verb operation code          */
        unsigned  char   reserv2;                 /*  reserved                    */
        unsigned  char   format;                  /*  format                      */
        unsigned short   primary_rc;              /* primary return code          */
        unsigned long    secondary_rc;            /* secondary return code        */
        unsigned char    *buf_ptr;                /* pointer to buffer            */
        unsigned long    buf_size;                /* buffer size                  */
        unsigned long    total_buf_size;          /* total buffer size required   */
        unsigned short   num_entries;             /* number of entries            */
        unsigned short   total_num_entries;       /* total number of entries      */
        unsigned char    list_options;            /* listing options              */
        unsigned  char   reserv3;                 /*  reserved                    */
        unsigned char    lu_name[17];             /* network qualified LU name    */
} QUERY_DIRECTORY_LU;

typedef struct directory_lu_summary
{
        unsigned short   overlay_size;            /* size of this entry           */
        unsigned char    lu_name[17];             /* network qualified LU name    */
        unsigned char    description[RD_LEN]; /* resource description          */
} DIRECTORY_LU_SUMMARY;

typedef struct directory_lu_detail
{
        unsigned short   overlay_size;            /* size of this entry           */
        unsigned char    lu_name[17];             /* network qualified LU name    */
        unsigned char    description[RD_LEN]; /* resource description          */
        unsigned char    server_name[17];         /* network qualified            */
                                                      /* server name                 */
        unsigned  char   lu_owner_name[17];       /*  network  qualified          */
                                                      /* LU owner name               */
        unsigned char    location;                /* Resource location            */
        unsigned char    entry_type;              /* Type of the directory entry */
        unsigned char    wild_card;               /* type of wildcard entry       */
        unsigned  char   reserva[20];             /*  reserved                    */
} DIRECTORY_LU_DETAIL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DIRECTORY_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **lu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name Network qualified LU name. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of directory entries returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

directory_lu_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

directory_lu_summary.lu_name
Network qualified LU name. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

directory_lu_summary.description
Resource description (as specified on DEFINE_LOCAL_LU, or DEFINE_ADJACENT_NODE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

directory_lu_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

directory_lu_detail.lu_name
Network qualified LU name. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

directory_lu_detail.description
Resource description (as specified on DEFINE_LOCAL_LU, or DEFINE_ADJACENT_NODE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

directory_lu_detail.server_name
Network qualified name of the node serving the LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

directory_lu_detail.lu_owner_name
Network qualified name of the node owning the LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

directory_lu_detail.location
Specifies the location of the resource, which can be one of the following values:

AP_LOCAL
The resource is at the local node.

AP_DOMAIN
The resource belongs to an attached end node.

AP_CROSS_DOMAIN
The resource is not within the domain of the local node.

directory_lu_detail.entry_type
Specifies the type of the directory entry. This can be one of the following values:

AP_HOME
Local resource.

AP_CACHE
Cached entry.

AP_REGISTER
Registered resource (NN only).

directory_lu_detail.wild_card
Specifies the type of wildcard the LU will match.

AP_OTHER
Unknown type of LU entry.

AP_EXPLICIT
The full **lu_name** will be used for locating this LU.

AP_PARTIAL_WILDCARD
Only the nonspace portions of **lu_name** will be used for locating this LU.

AP_FULL_WILDCARD
All **lu_names** will be directed to this LU.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LU_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DIRECTORY_STATS

QUERY_DIRECTORY_STATS returns directory database statistics. (The statistics that refer to cache information are reserved in the case of an end node). The verb can be used to gauge the level of network locate traffic. In the case of a network node this information can be used to tune the size of the directory cache, which is configurable at node-initialization time.

VCB Structure

```
typedef struct query_directory_stats
{
        unsigned short   opcode;              /* verb operation code              */
        unsigned  char   reserv2;             /*  reserved                          */
        unsigned  char   format;              /*  format                            */
        unsigned short   primary_rc;          /* primary return code               */
        unsigned long    secondary_rc;        /* secondary return code             */
        unsigned long    max_caches;          /* max number of cache entries       */
        unsigned long    cur_caches;          /* cache entry count                 */
        unsigned long    cur_home_entries;    /* home entry count                  */
        unsigned  long   cur_reg_entries;     /*  registered  entry  count         */
        unsigned  long   cur_directory_entries;
                                              /* current number of dir entries */
        unsigned long    cache_hits;          /* count of cache finds              */
        unsigned long    cache_misses;        /* count of resources found by       */
                                              /* broadcast search (not cache)      */
        unsigned long    in_locates;          /* locates in                        */
        unsigned long    in_bcast_locates;    /* broadcast locates in              */
        unsigned long    out_locates;         /* locates out                       */
        unsigned long    out_bcast_locates; /* broadcast locates out               */
        unsigned long    not_found_locates; /* unsuccessful locates                */
        unsigned  long   not_found_bcast_locates;
                                              /* unsuccessful broadcast            */
                                              /*  locates                          */
        unsigned  long   locates_outstanding;
                                              /* total outstanding locates         */
        unsigned  char   reserva[20];         /*  reserved                         */
} QUERY_DIRECTORY_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DIRECTORY_STATS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

max_caches Reserved.

cur_caches Reserved.

cur_home_entries
Current number of home entries.

cur_reg_entries
Current number of registered entries.

cur_directory_entries
Total number of entries currently in the directory.

cache_hits Reserved.

cache_misses
Reserved.

in_locates Number of directed locates received.

in_bcast_locates
Number of broadcast locates received.

out_locates Number of directed locates sent.

out_bcast_locates
Number of broadcast locates sent.

not_found_locates
Number of directed locates returned with a “not found.”

not_found_bcast_locates
Number of broadcast locates returned with a “not found.”

locates_outstanding
Current number of outstanding locates, both directed and broadcast.

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DLC

QUERY_DLC returns a list of information about the DLCs defined at the node. This information is structured as “determined data” (data gathered dynamically during execution) and “defined data” (the data supplied by the application on DEFINE_DLC).

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific DLC, or to obtain the list information in several “chunks,” the **dlc_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **dlc_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If AP_LIST_FROM_NEXT is selected the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

VCB Structure

```
typedef struct query_dlc
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required   */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries    */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned char    dlc_name[8];     /* name of DLC                  */
} QUERY_DLC;

typedef struct dlc_summary
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    dlc_name[8];     /* name of DLC                  */
        unsigned  char   description[RD_LEN];
                                          /* resource description        */
        unsigned char    state;           /* State of the DLC             */
        unsigned char    dlc_type;        /* DLC type                     */
} DLC_SUMMARY;

typedef struct dlc_detail
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    dlc_name[8];     /* name of DLC                  */
        unsigned  char   reserv2[2];      /*  reserved                    */
        DLC_DET_DATA     det_data;        /* Determined data              */
        DLC_DEF_DATA     def_data;        /* Defined data                 */
} DLC_DETAIL;
```

```
typedef struct dlc_det_data
{
          unsigned char     state;                /* State of the DLC              */
          unsigned  char    reserv3[3];          /*  reserved                      */
          unsigned  char    reserva[20];         /*  reserved                      */
} DLC_DET_DATA;

typedef struct dlc_def_data
{
          unsigned  char    description[RD_LEN];
                                                  /* resource description         */
          unsigned char     dlc_type;             /* DLC type                      */
          unsigned char     neg_ls_supp;          /* negotiable LS support        */
          unsigned char     port_types;           /* allowable port types         */
          unsigned  char    reserv3[11];          /*  reserved                     */
          unsigned short    dlc_spec_data_len; /* Length of DLC specific data */
} DLC_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DLC

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **dlc_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

dlc_name DLC name. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

dlc_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

dlc_summary.dlc_name
DLC name. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

dlc_summary.description
Resource description (as specified on DEFINE_DLC). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

dlc_summary.state State of the DLC. This field is set to one of the following values:

AP_ACTIVE
AP_NOT_ACTIVE
AP_PENDING_INACTIVE

dlc_summary.dlc_type
Type of DLC. Personal Communications or Communications Server supports the following types:

AP_ANYNET
AP_LLC2
AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

dlc_detail.overlay_size
The number of bytes in this entry (including dlc_spec_data), and hence the offset to the next entry returned (if any).

dlc_detail.dlc_name
DLC name. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

dlc_detail.det_data.state
State of the DLC. This field is set to one of the following values:

AP_ACTIVE
AP_NOT_ACTIVE
AP_PENDING_INACTIVE

dlc_detail.def_data.description
Resource description (as specified on DEFINE_DLC). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

dlc_detail.def_data.dlc_type
Type of DLC. Personal Communications or Communications Server supports the following types:

AP_ANYNET
AP_LLC2
AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

dlc_detail.def_data.neg_ls_supp
Specifies whether the DLC supports negotiable link stations (AP_YES or AP_NO).

dlc_detail.def_data.port_types
Specifies the allowable port types for the supplied **dlc_type**. The value corresponds to one or more of the following values Ored together:

AP_PORT_NONSWITCHED
AP_PORT_SWITCHED
AP_PORT_SATF

dlc_detail.def_data.dlc_spec_data_len
Unpadded length, in bytes, of data specific to the type of DLC. The data will be concatenated to the DLC_DETAIL structure. This data will be padded to end on a 4-byte boundary. This field should always be set to zero.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_DLC_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DLUR_LU

QUERY_DLUR_LU returns a list of information about DLUR-supported LUs.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific LU, or to obtain the list information in several "chunks," the **lu_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by the **lu_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

The list of LUs returned can be filtered by **pu_name** or by whether the LU is local or downstream or by both. If filtering by PU is desired, the **pu_name** field should be set (otherwise this field should be set to all zeros). If filtering by location is desired, the **filter** field should be set to AP_INTERNAL or AP_DOWNSTREAM (otherwise, if no filtering is required, this field should be set to AP_NONE).

VCB Structure

```
typedef struct query_dlur_lu
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required   */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries    */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned char    lu_name[8];      /* name of LU                   */
        unsigned char    pu_name[8];      /* name of PU to filter on      */
        unsigned  char   filter;          /*  reserved                    */
} QUERY_DLUR_LU;

typedef struct dlur_lu_summary
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    lu_name[8];      /* name of LU                   */
} DLUR_LU_SUMMARY;

typedef struct dlur_lu_detail
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    lu_name[8];      /* name of LU                   */
        unsigned char    pu_name[8];      /* name of owning PU            */
```

```
    unsigned char    dlus_name[17];     /* DLUS name if SSCP-LU          */
                                        /* session active                */
    unsigned char    lu_location;       /* downstream or local LU        */
    unsigned char    nau_address;       /* NAU address of LU             */
    unsigned char    plu_name[17];      /* PLU name if PLU-SLU session */
                                        /*  active                       */
    unsigned  char   reserv1[27];       /*  reserved                     */
    unsigned char    rscv_len;          /* length of appended RSCV       */
} DLUR_LU_DETAIL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DLUR_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **lu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name Name of LU being queried. This is an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

pu_name PU name filter. This should be set to all zeros or an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this field is set

then only LUs associated with the specified PU are returned. This field is ignored if it is set to all zeros.

filter Location filter. Specifies whether the returned LUs should be filtered by location (AP_INTERNAL or AP_DOWNSTREAM). If no filter is required, this field should be set to AP_NONE.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

dlur_lu_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

dlur_lu_summary.lu_name
Name of LU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

dlur_lu_detail.overlay_size
The number of bytes in this entry (including appended RSCV), and hence the offset to the next entry returned (if any).

dlur_lu_detail.lu_name
Name of LU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

dlur_lu_detail.pu_name
Name of PU associated with the LU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

dlur_lu_detail.dlus_name
Name of the DLUS node if the SSCP-LU session is active. This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the SSCP-LU session is not active, this field will be set to all zeros.

dlur_lu_detail.lu_location
Location of LU. The only value returned is:

AP_INTERNAL
AP_DOWNSTREAM

dlur_lu_detail.nau_address
Network addressable unit address of the LU. This is in the range 1—255.

dlur_lu_detail.plu_name
Name of PLU if the LU has an active PLU-SLU session. This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the PLU-SLU session is not active, this field will be set to all zeros.

dlur_lu_detail.rscv_len
This value will always be zero.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LU_NAME
	AP_INVALID_FILTER_OPTION AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DLUR_PU

QUERY_DLUR_PU returns a list of information about DLUR-supported PUs.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific PU, or to obtain the list information in several "chunks," the **pu_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by the **pu_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

The list of PUs returned can be filtered either by **dlus_name** or by whether the PU is local or downstream or by both. If filtering by DLUS is desired, the **dlus_name** field should be set (otherwise this field should be set to all zeros). If filtering by PU location is desired, the **filter** field should be set to AP_INTERNAL or AP_DOWNSTREAM (otherwise, if no filtering is required, this field should be set to AP_NONE).

VCB Structure

```
typedef struct query_dlur_pu
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required   */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries    */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned char    pu_name[8];      /* name of PU                   */
        unsigned char    dlus_name[17];   /* fully qualified DLUS name    */
        unsigned char    filter;          /* local/downstream filter      */
} QUERY_DLUR_PU;

typedef struct dlur_pu_summary
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    pu_name[8];      /* name of PU                   */
        unsigned  char   description[RD_LEN];
                                          /* resource description         */
} DLUR_PU_SUMMARY;
```

```
typedef struct dlur_pu_detail
{
        unsigned short   overlay_size;          /* size of this entry              */
        unsigned char    pu_name[8];            /* name of PU                      */
        unsigned  char   description[RD_LEN];
                                                /* resource description            */
        unsigned  char   defined_dlus_name[17];
                                                /* defined DLUS name               */
        unsigned char    bkup_dlus_name[17];    /* backup DLUS name                */
        unsigned char    pu_id[4];              /* PU identifier                   */
        unsigned char    pu_location;           /* downstream or local PU          */
        unsigned  char   active_dlus_name[17];
                                                /* active DLUS name                */
        unsigned char    ans_support;           /* Auto-Network shutdown support */
        unsigned char    pu_status;             /* status of the PU                */
        unsigned char    dlus_session_status; /* status of the DLUS pipe           */
        unsigned  char   reserv3;               /*  reserved                       */
        FQPCID   fqpcid;                        /* FQPCID used on pipe             */
} DLUR_PU_DETAIL;

typedef struct fqpcid
{
        unsigned char    pcid[8];               /* proc correlator identifier      */
        unsigned char    fqcp_name[17];         /* originator's network            */
                                                /* qualified CP name               */
        unsigned  char   reserve3[3];           /*  reserved                       */
} FQPCID;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DLUR_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **pu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

pu_name Name of PU being queried. This is an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dlus_name DLUS filter. This should be set to all zeros or to a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. If this field is set then only PUs associated with an SSCP-PU session to the specified DLUS node are returned. This field is ignored if it is set to all zeros.

filter This field should be set to AP_NONE.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

dlur_pu_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

dlur_pu_summary.pu_name
Name of PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

dlur_pu_summary.description
Resource description (as specified on DEFINE_INTERNAL_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

dlur_pu_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

dlur_pu_detail.pu_name
Name of PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

dlur_pu_detail.description
Resource description (as specified on DEFINE_INTERNAL_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

dlur_pu_detail.defined_dlus_name
Name of the DLUS node defined by either a DEFINE_INTERNAL_PU verb or DEFINE_LS verb (with **dspu_services** set to AP_DLUR). This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

dlur_pu_detail.bkup_dlus_name
Name of backup DLUS node defined by either a DEFINE_INTERNAL_PU verb or DEFINE_LS verb (with **dspu_services** set to AP_DLUR). This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

dlur_pu_detail.pu_id
PU identifier defined in a DEFINE_INTERNAL_PU verb or obtained in an XID from a downstream PU. This a 4-byte hexadecimal string. Bits 0—11 are set to the Block number and bits 12—31 are set to the ID number that uniquely identifies the PU.

dlur_pu_detail.pu_location
Location of PU. The only value returned is:

AP_INTERNAL
AP_DOWNSTREAM

dlur_pu_detail.active_dlus_name
Name of the DLUS node that the PU is currently using. This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the SSCP-PU session is not active, this field will be set to all zeros.

dlur_pu_detail.ans_support
Auto Network Shutdown support. This field is reserved if the SSCP-LU session is inactive. The support setting is sent to DLUR from the DLUS at SSCP-PU activation. It specifies whether link-level contact should be continued if the subarea node initiates an auto network shutdown procedure for the SSCP controlling the PU. This can be one of the following values:

AP_CONT
AP_STOP

dlur_pu_detail.pu_status
Status of the PU (as seen by DLUR). This can be set to one of the following values:

AP_RESET
The PU is in reset state.

AP_PEND_ACTPU
The PU is waiting for an ACTPU from the host.

AP_PEND_ACTPU_RSP
Having forwarded an ACTPU to the PU, DLUR is now waiting for the PU to respond to it.

AP_ACTIVE
The PU is active.

AP_PEND_DACTPU_RSP
Having forwarded a DACTPU to the PU, DLUR is waiting for the PU to respond to it.

AP_PEND_INOP
DLUR is waiting for all necessary events to complete before it deactivates the PU.

dlur_pu_detail.dlus_session_status
Status of the DLUS pipe currently being used by the PU. This can be one of the following values:

AP_PENDING_ACTIVE
AP_ACTIVE
AP_PENDING_INACTIVE
AP_INACTIVE

dlur_pu_detail.fqpcid.pcid
Procedure correlator ID used on the pipe. This is an 8-byte hexadecimal string. If the SSCP-PU session is not active this field will be set to zeros.

dlur_pu_detail.fqpcid.fqcp_name
Fully qualified Control Point name used on the pipe. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the SSCP-PU session is not active this field will be set to zeros.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PU_NAME

AP_INVALID_FILTER_OPTION
AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DLUS

QUERY_DLUS returns a list of information about DLUS nodes known by DLUR.

The information is returned as a list. To obtain information about a specific DLUS node, or to obtain the list information in several “chunks,” the **dlus_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **dlus_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

Note that this verb returns pipe statistics.

VCB Structure

```
typedef struct query_dlus
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required   */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries    */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned char    dlus_name[17];   /* fully qualified DLUS name    */
} QUERY_DLUS;

typedef struct dlus_data
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    dlus_name[17];   /* fully qualified DLUS name    */
        unsigned char    is_default;      /* is the DLUS the default      */
        unsigned char    is_backup_default; /* is DLUS the backup default */
        unsigned char    pipe_state;      /* state of CPSVRMGR pipe       */
        unsigned short   num_active_pus;  /* num of active PUs using pipe */
        PIPE_STATS       pipe_stats;      /* pipe statistics              */
} DLUS_DATA;

typedef struct pipe_stats
{
        unsigned long    reqactpu_sent;   /* REQACTPUs sent to DLUS       */
        unsigned  long   reqactpu_rsp_received;
                                          /* RSP(REQACTPU)s received      */
                                          /* from DLUS                    */
```

```
    unsigned long   actpu_received;      /* ACTPUs received from DLUS      */
    unsigned long   actpu_rsp_sent;      /* RSP(ACTPU)s sent to DLUS       */
    unsigned long   reqdactpu_sent;      /* REQDACTPUs sent to DLUS        */
   unsigned  long   reqdactpu_rsp_received;
                                         /* RSP(REQDACTPU)s received       */
                                         /* from DLUS                      */
    unsigned long   dactpu_received;    /* DACTPUs received from DLUS     */
    unsigned long   dactpu_rsp_sent;    /* RSP(DACTPU)s sent to DLUS      */
    unsigned long   actlu_received;      /* ACTLUs received from DLUS      */
    unsigned long   actlu_rsp_sent;      /* RSP(ACTLU)s sent to DLUS       */
    unsigned long   dactlu_received;    /* DACTLUs received from DLUS     */
    unsigned long   dactlu_rsp_sent;    /* RSP(DACTLU)s sent to DLUS      */
    unsigned long   sscp_pu_mus_rcvd;   /* MUs for SSCP-PU                */
                                         /* sessions received              */
    unsigned long   sscp_pu_mus_sent;   /* MUs for SSCP-PU sessions sent */
    unsigned long   sscp_lu_mus_rcvd;   /* MUs for SSCP-LU sessions       */
                                         /* received                       */
    unsigned long   sscp_lu_mus_sent;   /* MUs for SSCP-LU sessions sent */
} PIPE_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DLUS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **dlus_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

dlus_name Name of the DLUS being queried. This should be set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

dlus_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

dlus_data.dlus_name
Name of the DLUS. This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

dlus_data.is_default
Specifies whether the DLUS node has been designated as the default by a DEFINE_DLUR_DEFAULTS verb (AP_YES or AP_NO).

dlus_data.is_backup_default
Specifies whether the DLUS node has been designated as the backup default by a DEFINE_DLUR_DEFAULTS verb (AP_YES or AP_NO).

dlus_data.pipe_state
State of the pipe to the DLUS. It can have one of the following values:

AP_ACTIVE
AP_PENDING_ACTIVE
AP_INACTIVE
AP_PENDING_INACTIVE

dlus_data.num_active_pus
Number of PUs currently using the pipe to the DLUS.

dlus_data.pipe_stats.reqactpu_sent
Number of REQACTPUs sent to DLUS over the pipe.

dlus_data.pipe_stats.reqactpu_rsp_received
Number of RSP(REQACTPU)s received from DLUS over the pipe.

dlus_data.pipe_stats.actpu_received
Number of ACTPUs received from DLUS over the pipe.

dlus_data.pipe_stats.actpu_rsp_sent
Number of RSP(ACTPU)s sent to DLUS over the pipe.

dlus_data.pipe_stats.reqdactpu_sent
Number of REQDACTPUs sent to DLUS over the pipe.

dlus_data.pipe_stats.reqdactpu_rsp_received
Number of RSP(REQDACTPU)s received from DLUS over the pipe.

dlus_data.pipe_stats.dactpu_received
Number of DACTPUs received from DLUS over the pipe.

dlus_data.pipe_stats.dactpu_rsp_sent
Number of RSP(DACTPU)s sent to DLUS over the pipe.

dlus_data.pipe_stats.actlu_received
Number of ACTLUs received from DLUS over the pipe.

dlus_data.pipe_stats.actlu_rsp_sent
Number of RSP(ACTLU)s sent to DLUS over the pipe.

dlus_data.pipe_stats.dactlu_received
Number of DACTLUs received from DLUS over the pipe.

dlus_data.pipe_stats.dactlu_rsp_sent
Number of RSP(DACTLU)s sent to DLUS over the pipe.

dlus_data.pipe_stats.sscp_pu_mus_rcvd
Number of SSCP-PU MUs received from DLUS over the pipe.

dlus_data.pipe_stats.sscp_pu_mus_sent
Number of SSCP-PU MUs sent to DLUS over the pipe.

dlus_data.pipe_stats.sscp_lu_mus_rcvd
Number of SSCP-LU MUs received from DLUS over the pipe.

dlus_data.pipe_stats.sscp_lu_mus_sent
Number of SSCP-LU MUs sent to DLUS over the pipe.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_DLUS_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DOWNSTREAM_LU

QUERY_DOWNSTREAM_LU returns information about downstream LUs served by DLUR or PU concentration or both. This information is structured as determined data (data gathered dynamically during execution) and defined data. (Defined data is supplied by the application on the DEFINE_DOWNSTREAM_LU verb. Note that for DLUR-supported LUs, implicitly defined data is put in place when the downstream LU is activated).

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific local LU or to obtain the list information in several chunks, the **dslu_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored.

The returned LUs may be filtered by the type of service the local node provides or the LU's associated downstream PU or both. If filtering by type of service is desired, the **dspu_services** field should be set to AP_PU_CONCENTRATION or AP_DLUR (otherwise, this field should be set to AP_NONE). If filtering by PU is desired, the **dspu_name** field should be set (otherwise, this field should be set to all zeros).

VCB Structure

```
typedef struct query_downstream_lu
{
        unsigned short   opcode;              /* verb operation code              */
        unsigned  char   reserv2;             /*  reserved                        */
        unsigned  char   format;              /*  format                          */
        unsigned short   primary_rc;          /* primary return code              */
        unsigned long    secondary_rc;        /* secondary return code            */
        unsigned char    *buf_ptr;            /* pointer to buffer                */
        unsigned long    buf_size;            /* buffer size                      */
        unsigned long    total_buf_size;      /* total buffer size required       */
        unsigned short   num_entries;         /* number of entries                */
        unsigned short   total_num_entries; /* total number of entries            */
        unsigned char    list_options;        /* listing options                  */
        unsigned  char   reserv3;             /*  reserved                        */
        unsigned char    dslu_name[8];        /* Downstream LU name               */
        unsigned char    dspu_name[8];        /* Downstream PU name filter        */
        unsigned char    dspu_services;       /* filter on DSPU services type     */
} QUERY_DOWNSTREAM_LU;

typedef struct downstream_lu_summary
{
        unsigned short   overlay_size;        /* size of this entry               */
        unsigned char    dslu_name[8];        /* LU name                          */
        unsigned char    dspu_name[8];        /* PU name                          */
        unsigned  char   description[RD_LEN];
                                              /* resource description             */
        unsigned char    dspu_services;       /* type of service provided to      */
                                              /* downstream node                  */
        unsigned char    nau_address;         /* NAU address                      */
        unsigned  char   lu_sscp_sess_active;
                                              /* Is LU-SSCP session active        */
```

```
        unsigned char    plu_sess_active;    /* Is PLU-SLU session active        */
} DOWNSTREAM_LU_SUMMARY

typedef struct downstream_lu_detail
{
        unsigned short   overlay_size;       /* size of this entry               */
        unsigned char    dslu_name[8];       /* LU name                          */
        unsigned char    reserv1[2];         /* reserved                         */
        DOWNSTREAM_LU_DET_DATA det_data;     /* Determined data                  */
        DOWNSTREAM_LU_DEF_DATA def_data;     /* Defined data                     */
} DOWNSTREAM_LU_DETAIL;

typedef struct downstream_lu_det_data
{
        unsigned char    lu_sscp_sess_active;
                                             /* Is LU-SSCP session active        */
        unsigned char    plu_sess_active;    /* Is PLU-SLU session active        */
        unsigned char    dspu_services;      /* type of services provided to     */
                                             /* downstream node                  */
        unsigned char    reserv1;            /* reserved                         */
        SESSION_STATS    lu_sscp_stats;      /* LU-SSCP session statistics       */
        SESSION_STATS    ds_plu_stats;       /* downstream PLU-SLU session       */
                                             /* statistics                       */
        SESSION_STATS    us_plu_stats;       /* upstream PLU_SLU sess stats      */
        unsigned char    reserva[20];        /* reserved                         */
} DOWNSTREAM_LU_DET_DATA;

typedef struct downstream_lu_def_data
{
        unsigned char    description[RD_LEN];
                                             /* resource description             */
        unsigned char    nau_address;        /* NAU address                      */
        unsigned char    dspu_name[8];       /* Downstream PU name               */
        unsigned char    host_lu_name[8];    /* host LU or pool name             */
        unsigned char    reserv2[8];         /* reserved                         */
} DOWNSTREAM_LU_DEF_DATA

typedef struct session_stats
{
        unsigned short   rcv_ru_size;        /* session receive RU size          */
        unsigned short   send_ru_size;       /* session send RU size             */
        unsigned short   max_send_btu_size; /* max send BTU size                */
        unsigned short   max_rcv_btu_size;  /* max rcv BTU size                 */
        unsigned short   max_send_pac_win;  /* max send pacing win size         */
        unsigned short   cur_send_pac_win;  /* current send pacing win size     */
        unsigned short   max_rcv_pac_win;   /* max receive pacing win size      */
        unsigned short   cur_rcv_pac_win;   /* current receive pacing           */
                                             /* window size                      */
        unsigned long    send_data_frames;  /* number of data frames sent       */
        unsigned long    send_fmd_data_frames;
                                             /* num of FMD data frames sent      */
        unsigned long    send_data_bytes;   /* number of data bytes sent        */
        unsigned long    rcv_data_frames;   /* num data frames received         */
        unsigned long    rcv_fmd_data_frames;
                                             /* num of FMD data frames recvd     */
        unsigned long    rcv_data_bytes;    /* number of data bytes received */
        unsigned char    sidh;               /* session ID high byte             */
        unsigned char    sidl;               /* session ID low byte              */
```

```
        unsigned char   odai;           /* ODAI bit set                 */
        unsigned char   ls_name[8];     /* Link station name            */
        unsigned  char  reserve;        /*  reserved                    */
} SESSION_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DOWNSTREAM_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **dslu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

dslu_name Name of the local LU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dspu_name PU name filter. This should be set to all zeros or an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this field is set, then only LUs associated with the specified PU are returned. This field is ignored if it is set to all zeros.

dspu_services DSPU services filter. If set to AP_PU_CONCENTRATION, only downstream LUs served by PU concentration are returned. If set to AP_DLUR, only DLUR-supported LUs are returned. Otherwise, if set to AP_NONE, information on all downstream LUs is returned.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

downstream_lu_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

downstream_lu_summary.dslu_name
Name of the local LU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

downstream_lu_summary.dspu_name
Name of local PU that this LU is using. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

downstream_lu_summary.description
Resource description (as specified on DEFINE_DOWNSTREAM_LU or DEFINE_DOWNSTREAM_LU_RANGE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

downstream_lu_summary.dspu_services
Specifies the services which the local node provides to the downstream LU across the link. This is set to one of the following:

AP_PU_CONCENTRATION
Local node that provides PU concentration for the downstream LU.

AP_DLUR
Local node that provides DLUR support for the downstream LU.

downstream_lu_summary.nau_address
Network addressable unit address of the LU, which is in the range 1—255.

downstream_lu_summary.lu_sscp_sess_active
Indicates whether the LU-SSCP session is active (AP_YES or AP_NO).

downstream_lu_summary.plu_sess_active
Indicates whether the PLU-SLU session is active (AP_YES or AP_NO).

downstream_lu_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

downstream_lu_detail.dslu_name
Name of the local LU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

downstream_lu_detail.det_data.lu_sscp_sess_active
Indicates whether the LU-SSCP session to the downstream LU is active (AP_YES or AP_NO).

downstream_lu_detail.det_data.plu_sess_active
Indicates whether the PLU-SLU session to the downstream LU is active (AP_YES or AP_NO).

downstream_lu_detail.det_data.dspu_services
Specifies the services that the local node provides to the downstream LU across the link. This is set to one of the following values:

AP_PU_CONCENTRATION
Local node that provides PU concentration for the downstream LU.

AP_DLUR
Local node that provides DLUR support for the downstream LU.

downstream_lu_detail.det_data.lu_sscp_stats.rcv_ru_size
Maximum receive RU size. If **downstream_lu_detail.det_data.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_lu_detail.det_data.lu_sscp_stats.send_ru_size
Maximum send RU size. If **downstream_lu_detail.det_data.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_lu_detail.det_data.lu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

downstream_lu_detail.det_data.lu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

downstream_lu_detail.det_data.lu_sscp_stats.max_send_pac_win
This field will always be set to zero.

downstream_lu_detail.det_data.lu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

downstream_lu_detail.det_data.lu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

downstream_lu_detail.det_data.lu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

downstream_lu_detail.det_data.lu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

downstream_lu_detail.det_data.lu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

downstream_lu_detail.det_data.lu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

downstream_lu_detail.det_data.lu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

downstream_lu_detail.det_data.lu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

downstream_lu_detail.det_data.lu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

downstream_lu_detail.det_data.lu_sscp_stats.sidh
Session ID high byte.

downstream_lu_detail.det_data.lu_sscp_stats.sidl
Session ID low byte.

downstream_lu_detail.det_data.lu_sscp_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to one if the BIND sender is the node containing the secondary link station.

downstream_lu_detail.det_data.lu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

downstream_lu_detail.det_data.ds_plu_stats.rcv_ru_size
Maximum receive RU size.

downstream_lu_detail.det_data.ds_plu_stats.send_ru_size
Maximum send RU size.

downstream_lu_detail.det_data.ds_plu_stats.max_send_btu_size
Maximum BTU size that can be sent.

downstream_lu_detail.det_data.ds_plu_stats.max_rcv_btu_size
Maximum BTU size that can be received.

downstream_lu_detail.det_data.ds_plu_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

downstream_lu_detail.det_data.ds_plu_stats.cur_send_pac_win
Current size of the send pacing window on this session.

downstream_lu_detail.det_data.ds_plu_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

downstream_lu_detail.det_data.ds_plu_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

downstream_lu_detail.det_data.ds_plu_stats.send_data_frames
Number of normal flow data frames sent.

downstream_lu_detail.det_data.ds_plu_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

downstream_lu_detail.det_data.ds_plu_stats.send_data_bytes
Number of normal flow data bytes sent.

downstream_lu_detail.det_data.ds_plu_stats.rcv_data_frames
Number of normal flow data frames received.

downstream_lu_detail.det_data.ds_plu_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

downstream_lu_detail.det_data.ds_plu_stats.rcv_data_bytes
Number of normal flow data bytes received.

downstream_lu_detail.det_data.ds_plu_stats.sidh
Session ID high byte.

downstream_lu_detail.det_data.ds_plu_stats.sidl
Session ID low byte.

downstream_lu_detail.det_data.ds_plu_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station.

downstream_lu_detail.det_data.ds_plu_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

downstream_lu_detail.det_data.us_plu_stats.rcv_ru_size
Maximum receive RU size.

downstream_lu_detail.det_data.us_plu_stats.send_ru_size
Maximum send RU size.

downstream_lu_detail.det_data.us_plu_stats.max_send_btu_size
Maximum BTU size that can be sent.

downstream_lu_detail.det_data.us_plu_stats.max_rcv_btu_size
Maximum BTU size that can be received.

downstream_lu_detail.det_data.us_plu_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

downstream_lu_detail.det_data.us_plu_stats.cur_send_pac_win
Current size of the send pacing window on this session.

downstream_lu_detail.det_data.us_plu_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

downstream_lu_detail.det_data.us_plu_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

downstream_lu_detail.det_data.us_plu_stats.send_data_frames
Number of normal flow data frames sent.

downstream_lu_detail.det_data.us_plu_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

downstream_lu_detail.det_data.us_plu_stats.send_data_bytes
Number of normal flow data bytes sent.

downstream_lu_detail.det_data.us_plu_stats.rcv_data_frames
Number of normal flow data frames received.

downstream_lu_detail.det_data.us_plu_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

downstream_lu_detail.det_data.us_plu_stats.rcv_data_bytes
Number of normal flow data bytes received.

downstream_lu_detail.det_data.us_plu_stats.sidh
Session ID high byte. If **downstream_lu_detail.det_data_.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_lu_detail.det_data.us_plu_stats.sidl
Session ID low byte. If **downstream_lu_detail.det_data_.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_lu_detail.det_data.us_plu_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station. If **downstream_lu_detail.det_data_.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_lu_detail.det_data.us_plu_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. If **downstream_lu_detail.det_data_.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_lu_detail.def_data.description
Resource description (as specified on DEFINE_DOWNSTREAM_LU or DEFINE_DOWNSTREAM_LU_RANGE).

downstream_lu_detail.def_data.nau_address
Network addressable unit address of the LU, which is in the range 1—255.

downstream_lu_detail.def_data.dspu_name
Name of PU associated with the LU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

downstream_lu_detail.def_data.host_lu_name
Name of the host LU or host LU pool that the downstream LU is mapped to. In the case of an LU, this is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. In the case of an LU pool, Personal Communications or Communications Server does not specify a character set for this field. This field is reserved for DLUR-served downstream LUs.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LU_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DOWNSTREAM_PU

QUERY_DOWNSTREAM_PU returns information about downstream PUs (defined using a DEFINE_LS verb).

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific local PU or to obtain the list information in several chunks, the **dspu_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field is ignored.

The list of PUs can be filtered by the type of service the local node provides for the downstream PU. To do this, the **dspu_services** field should be set to AP_PU_CONCENTRATION or AP_DLUR.

VCB Structure

```
typedef struct query_downstream_pu
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     *buf_ptr;            /* pointer to buffer            */
        unsigned long     buf_size;            /* buffer size                  */
        unsigned long     total_buf_size;      /* total buffer size required   */
        unsigned short    num_entries;         /* number of entries            */
        unsigned short    total_num_entries; /* total number of entries        */
        unsigned char     list_options;        /* listing options              */
        unsigned  char    reserv3;             /*  reserved                    */
        unsigned char     dspu_name[8];        /* Downstream PU name           */
        unsigned char     dspu_services;       /* filter on DSPU services type */
} QUERY_DOWNSTREAM_PU;

typedef struct downstream_pu_data
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned char     dspu_name[8];        /* PU name                      */
        unsigned  char    description[RD_LEN];
                                               /* resource description         */
        unsigned char     ls_name[8];          /* Link name                    */
        unsigned  char    pu_sscp_sess_active;
                                               /* Is PU-SSCP session active    */
        unsigned char     dspu_services;       /* DSPU service type            */
        SESSION _STATS    pu_sscp_stats;       /* SSCP-PU session stats        */
        unsigned  char    reserva[20];         /*  reserved                    */
} DOWNSTREAM_PU_DATA

typedef struct session_stats
{
        unsigned short    rcv_ru_size;         /* session receive RU size      */
        unsigned short    send_ru_size;        /* session send RU size         */
        unsigned short    max_send_btu_size; /* max send BTU size              */
        unsigned  short   max_rcv_btu_size;  /*  max  rcv  BTU  size           */
        unsigned  short   max_send_pac_win;  /*  max  send  pacing  win  size  */
        unsigned  short   cur_send_pac_win;  /*  current  send  pacing  win  size  */
```

```
    unsigned short   max_rcv_pac_win;    /* max receive pacing win size     */
    unsigned short   cur_rcv_pac_win;    /* current receive pacing          */
                                         /* window size                     */
    unsigned long    send_data_frames;   /* number of data frames sent      */
    unsigned long    send_fmd_data_frames;
                                         /* num of FMD data frames sent     */
    unsigned long    send_data_bytes;    /* number of data bytes sent       */
    unsigned long    rcv_data_frames;    /* num data frames received        */
    unsigned long    rcv_fmd_data_frames;
                                         /* num of FMD data frames recvd    */
    unsigned long    rcv_data_bytes;     /* number of data bytes received */
    unsigned char    sidh;               /* session ID high byte            */
    unsigned char    sidl;               /* session ID low byte             */
    unsigned char    odai;               /* ODAI bit set                    */
    unsigned char    ls_name[8];         /* Link station name               */
    unsigned char    reserve;            /* reserved                        */
} SESSION_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DOWNSTREAM_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **dslu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

dspu_name Name of the downstream PU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dspu_services DSPU services filter. If set to AP_PU_CONCENTRATION, only downstream LUs served by PU concentration are returned. If set to AP_DLUR, only DLUR-supported LUs are returned. Otherwise, if set to AP_NONE, information on all downstream LUs is returned.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

downstream_pu_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

downstream_pu_data.dspu_name
Name of the downstream PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

downstream_pu_data.description
Resource description (as specified on DEFINE_LS).

downstream_pu_data.ls_name
Name of link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

downstream_pu_data.pu_sscp_sess_active
Indicates whether the PU_SSCP session to the downstream PU is active. Set to either AP_YES or AP_NO.

downstream_pu_data.dspu_services
Specifies the services that the local node provides to the downstream PU across the link. This is set to one of the following values:

AP_PU_CONCENTRATION
Local node that provides PU concentration for the downstream LU.

AP_DLUR
Local node that provides DLUR support for the downstream LU.

downstream_pu_data.pu_sscp_stats.rcv_ru_size
Maximum receive RU size. If **downstream_lu_detail.det_data.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_pu_data.pu_sscp_stats.send_ru_size
Maximum send RU size. If **downstream_lu_detail.det_data.dspu_services** is set to AP_PU_CONCENTRATION, then this field is reserved.

downstream_pu_data.pu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

downstream_pu_data.pu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

downstream_pu_data.pu_sscp_stats.max_send_pac_win
This field will always be set to zero.

downstream_pu_data.pu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

downstream_pu_data.pu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

downstream_pu_data.pu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

downstream_pu_data.pu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

downstream_pu_data.pu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

downstream_pu_data.pu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

downstream_pu_data.pu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

downstream_pu_data.pu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

downstream_pu_data.pu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

downstream_pu_data.pu_sscp_stats.sidh
Session ID high byte.

downstream_pu_data.pu_sscp_stats.sidl
Session ID low byte.

downstream_pu_data.pu_sscp_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station.

downstream_pu_data.pu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_PU_NAME
	AP_INVALID_PU_TYPE AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_DSPU_TEMPLATE

QUERY_DSPU_TEMPLATE returns information about defined downstream PU templates used for PU concentration over implicit links. This information is returned as a list. To obtain information about a specific downstream PU template or to obtain the list information in several *chunks*, the **template_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field is ignored.

VCB Structure

```
typedef struct query_dspu_template
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     *buf_ptr;            /* pointer to buffer            */
        unsigned long     buf_size;            /* buffer size                  */
        unsigned long     total_buf_size;      /* total buffer size required   */
        unsigned short    num_entries;         /* number of entries            */
        unsigned short    total_num_entries; /* total number of entries        */
        unsigned char     list_options;        /* listing options              */
        unsigned  char    reserv3;             /*  reserved                    */
        unsigned char     template_name[8];    /* name of DSPU template        */
} QUERY_DSPU_TEMPLATE;

typedef struct dspu_template_data
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned char     template_name[8];    /* name of DSPU template        */
        unsigned  char    description[RD_LEN];
                                               /* resource description         */
        unsigned  char    reserv1[12];         /*  reserved                    */
        unsigned short    max_instance;        /* max active template instances */
        unsigned short    active instance;     /* current active instances     */
        unsigned  short   num_of_dslu_templates;
                                               /* number of DSLU templates     */
} DSPU_TEMPLATE_DATA;
```

Each **dspu_template_data** is followed by **num_of_dslu_templates** downstream LU templates. Each downstream LU template has the following format.

```
typedef struct dslu_template_data
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned  char    reserv1[2];          /*  reserved                    */
        DSLU_TEMPLATE     dslu_template;       /* downstream LU template       */
} DSLU_TEMPLATE_DATA;

typedef struct dslu_template
{
        unsigned char     min_nau;             /* min NAU address in range     */
        unsigned char     max_nau;             /* max NAU address in range     */
        unsigned  char    reserv1[10];         /*  reserved                    */
```

```
        unsigned char   host_lu[8];         /* host LU or pool name         */
} DSLU_TEMPLATE;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_DSPU_TEMPLATE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

The **template_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

template_name Name of the DSPU template. This is an 8_byte string in a locally-displayable character set. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

dspu_template_data.overlay_size
The number of bytes in this entry (including any downstream LU templates, and hence the offset to the next entry returned, if any).

dspu_template_data.template_name
Name of the DSPU template. This is an 8_byte string in a locally-displayable character set.

dspu_template_data.description
Resource description (as specified on QUERY_DSPU_TEMPLATE).

dspu_template_data.max_instance
This is the maximum number of instances of the template which can be active concurrently.

dspu_template_data.active_instance
This is the number of instances of the template which are currently active.

dspu_template_data.num_of_dslu_templates
Number of downstream LU templates for this downstream PU template. Following this field are **num_of_dslu_templates_application_id** entries, one for each application registered for the focal point category.

dslu_template_data.overlay_size
The number of bytes in this entry (and hence the offset to the next entry returned, if any).

dslu_template_data.dslu_template.min_nau
Minimum NAU address in the range.

dslu_template_data.dslu_template.max_nau
Maximum NAU address in the range.

dslu_template_data.dslu_template.host_lu_name
Name of the host LU or host LU pool that all the downstream LUs within the range will be mapped onto. This is an 8-byte alphanumeric type A-EBCDIC string (starting with a letter), padded to the right with EBCDIC Spaces.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TEMPLATE_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameters:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_FOCAL_POINT

QUERY_FOCAL_POINT returns information about focal points that Personal Communications or Communications Server knows about.

This information is returned as a list. To obtain information about a specific focal point category or to obtain the list information in several “chunks,” the **ms_category** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

VCB Structure

```
typedef struct query_focal_point
{
          unsigned short   opcode;              /* verb operation code          */
          unsigned  char   reserv2;             /*  reserved                    */
          unsigned  char   format;              /*  format                      */
          unsigned short   primary_rc;          /* primary return code          */
          unsigned long    secondary_rc;        /* secondary return code        */
          unsigned char    *buf_ptr;            /* pointer to buffer            */
          unsigned long    buf_size;            /* buffer size                  */
          unsigned long    total_buf_size;      /* total buffer size required   */
          unsigned short   num_entries;         /* number of entries            */
          unsigned short   total_num_entries; /* total number of entries        */
          unsigned char    list_options;        /* listing options             */
          unsigned  char   reserv3;             /*  reserved                    */
          unsigned char    ms_category[8];      /* name of MS category          */
} QUERY_FOCAL_POINT;

typedef struct fp_data
{
          unsigned short   overlay_size;        /* size of this entry          */
          unsigned  char   ms_appl_name[8];     /*  focal point application name */
          unsigned char    ms_category[8];      /* focal point category         */
          unsigned  char   description[RD_LEN];
                                                /* resource description        */
          unsigned char    fp_fqcp_name[17];    /* focal pt fully qual CP name  */
          unsigned char    bkup_appl_name[8]; /* backup focal pt appl name      */
          unsigned  char   bkup_fp_fqcp_name[17];
                                                /* backup FP fully qualified    */
                                                /* CP name                      */
          unsigned  char   implicit_appl_name[8];
                                                /* implicit FP appl name        */
          unsigned  char   implicit_fp_fqcp_name[17];
                                                /* implicit FP fully            */
                                                /* qualified CP name            */
          unsigned char    fp_type;             /* focal point type             */
          unsigned char    fp_status;           /* focal point status           */
          unsigned char    fp_routing;          /* type of MDS routing to use   */
          unsigned  char   reserva[20];         /*  reserved                    */
          unsigned short   number_of_appls;     /* number of applications       */
} FP_DATA;
```

Each **fp_data** is followed by **number_of_appls** application names. Each application name has the following format:

```
typedef struct application_id
{
        unsigned char    appl_name[8];    /* application name                */
} APPLICATION_ID;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_FOCAL_POINT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **ms_category** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

ms_category Management services category. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services categories as described in SNA management services, or an 8-byte type 1134 EBCDIC installation defined name. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries The number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

fp_data.overlay_size
The number of bytes in this entry (including any application names, and hence the offset to the next entry returned (if any)).

fp_data.ms_appl_name
Name of the currently active focal point application. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services applications as described in SNA management services, or an 8-byte type 1134 EBCDIC installation defined name.

fp_data.ms_category
Management services category. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services categories as described in SNA management services, or an 8-byte type 1134 EBCDIC installation defined name.

fp_data.description Resource description (as specified on DEFINE_FOCAL_POINT). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

fp_data.fp_fqcp_name
Currently active focal point's fully qualified control point name. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

fp_data.bkup_appl_name
Name of backup focal point application. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services applications as described in SNA management services, or an 8-byte type 1134 EBCDIC installation defined name.

fp_data.bkup_fp_fqcp_name
Backup focal point's fully qualified control point name. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

fp_data.implicit_appl_name
Name of implicit focal point application (specified using the DEFINE_FOCAL_POINT verb). This can either be one of the four byte architecturally defined values (right-padded with EBCDIC spaces) for management services applications as described in SNA management services, or an 8-byte type 1134 EBCDIC installation defined name. This field will be the

same as the **ms_appl_name** if the implicit focal point is the currently active focal point.

fp_data.bkup_fp_fqcp_name
Implicit focal point's fully qualified control point name (as specified using the DEFINE_FOCAL_POINT verb). This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field will be the same as the **fp_fqcp_name** if the implicit focal point is the currently active focal point.

fp_data.fp_type Type of focal point. Refer to *SNA Management Services* for further detail. This will be one of the following values:

AP_EXPLICIT_PRIMARY_FP
AP_BACKUP_FP
AP_DEFAULT_PRIMARY_FP
AP_IMPLICIT_PRIMARY_FP
AP_DOMAIN_FP
AP_HOST_FP
AP_NO_FP

fp_data.fp_status Status of the focal point. This can be one of the following values:

AP_NOT_ACTIVE
The focal point is currently not active.

AP_ACTIVE
The focal point is currently active.

AP_PENDING
The focal point is pending active. This occurs after an implicit request has been sent to the focal point and before the response has been received.

AP_NEVER_ACTIVE
No focal point information is available for the specified category although application registrations for the category have been accepted.

fp_data.fp_routing Type of routing that applications should specify when using MDS transport to send data to the focal point.

AP_DEFAULT
Default routing is used to deliver the MDS_MU to the focal point.

AP_DIRECT
The MDS_MU will be routed on a session directly to the focal point.

fp_data.number_of_appls
Number of applications registered for this focal point category. Following this field will be **number_of_appls application_id entries**, one for each application registered for the focal point category.

appl_name Name of application registered for focal point category. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services applications as described in SNA management services, or an 8-byte type 1134 EBCDIC installation defined name.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_MS_CATEGORY

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_ISR_SESSION

QUERY_ISR_SESSION is only used at a Network Node and returns list information about sessions for which the network node is providing intermediate session routing.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific session, or to obtain the list information in several "chunks," the fields in the **fqpcid** structure should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), the fields in this structure is ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by **fqpcid.pcid** first and then by EBCDIC lexicographical ordering on **fqpcid.fqcp_name**. If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

The format of the **fqpcid** structure is an 8-byte Procedure Correlator Identifier (PCID) and the network qualified CP name of the session originator.

VCB Structure

```
typedef struct query_isr_session
{
    unsigned short   opcode;              /* verb operation code              */
    unsigned  char   reserv2;             /*  reserved                        */
    unsigned  char   format;              /*  format                          */
    unsigned short   primary_rc;          /* primary return code              */
    unsigned long    secondary_rc;        /* secondary return code            */
    unsigned char    *buf_ptr;            /* pointer to buffer                */
    unsigned long    buf_size;            /* buffer size                      */
    unsigned long    total_buf_size;      /* total buffer size required       */
    unsigned short   num_entries;         /* number of entries                */
    unsigned short   total_num_entries; /* total number of entries            */
    unsigned char    list_options;        /* listing options                  */
    unsigned  char   reserv3;             /*  reserved                        */
    FQPCID           fqpcid;              /* fully qualified procedure        */
                                          /* correlator ID                    */
} QUERY_ISR_SESSION;

typedef struct isr_session_summary
{
    unsigned short   overlay_size;        /* size of this entry               */
    FQPCID           fqpcid;              /* fully qualified procedure        */
                                          /* correlator ID                    */
} ISR_SESSION_SUMMARY;

typedef struct isr_session_detail
{
    unsigned short   overlay_size;        /* size of this entry               */
    FQPCID           fqpcid;              /* fully qualified procedure        */
                                          /* correlator ID                    */
    unsigned char    trans_pri;           /* Transmission priority:           */
    unsigned char    cos_name[8];         /* Class-of-service name            */
```

```
    unsigned char     ltd_res;                /* Session spans a limited          */
                                                  /*  resource                        */
   SESSION_STATS    pri_sess_stats;      /*  primary  hop  session  stats      */
   SESSION_STATS    sec_sess_stats;      /*  secondary  hop  session           */
                                                  /*  statistics                      */
   unsigned  char    reserv3[3];           /*  reserved                          */
   unsigned  char    reserva[20];          /*  reserved                          */
    unsigned char     rscv_len;              /* Length of following RSCV         */
} ISR_SESSION_DETAIL;

typedef struct fqpcid
{
    unsigned char     pcid[8];               /* pro correlator identifier       */
    unsigned char     fqcp_name[17];         /* orig's network qualified        */
                                                  /* CP name                         */
   unsigned  char    reserve3[3];          /*  reserved                          */
} FQPCID;

typedef struct session_stats
{
    unsigned short    rcv_ru_size;          /* session receive RU size          */
    unsigned short    send_ru_size;         /* session send RU size             */
    unsigned short    max_send_btu_size; /* Maximum send BTU size             */
    unsigned  short   max_rcv_btu_size;  /*  Maximum  rcv  BTU  size           */
    unsigned  short   max_send_pac_win;  /*  Max  send  pacing  window  size  */
    unsigned  short   cur_send_pac_win;  /*  Curr  send  pacing  window  size */
    unsigned short    max_rcv_pac_win;     /* Max receive pacing win size    */
    unsigned short    cur_rcv_pac_win;     /* Curr rec pacing window size    */
    unsigned long     send_data_frames;    /* Number of data frames sent     */
   unsigned  long    send_fmd_data_frames;
                                                  /* num of FMD data frames sent    */
   unsigned  long    send_data_bytes;    /*  Number  of  data  bytes  sent      */
   unsigned  long    rcv_data_frames;    /*  Num  data  frames  received       */
   unsigned  long    rcv_fmd_data_frames;
                                                  /* num of FMD data frames recvd */
    unsigned long     rcv_data_bytes;      /* Num data bytes received          */
    unsigned char     sidh;                  /* Session ID high byte             */
    unsigned char     sidl;                  /* Session ID low byte              */
    unsigned char     odai;                  /* ODAI bit set                     */
    unsigned char     ls_name[8];            /* Link station name                */
   unsigned  char    reserve;               /*  reserved                          */
} SESSION_STATS;
```

Supplied parameters

The application supplies the following parameters:

opcode AP_QUERY_ISR_SESSION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information.

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **fqpcid** specified (see the following parameter) represent an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

fqpcid.pcid Procedure Correlator ID. This is an 8-byte hexadecimal string. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

fqpcid.pcid_name Fully qualified Control Point name. This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

isr_session_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

isr_session_summary.fqpcid.pcid
Procedure Correlator ID.

isr_session_summary.fqpcid.fqcp_name
Fully qualified Control Point name. This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

isr_session_detail.overlay_size
The number of bytes in this entry (including any appended RSCV), and hence the offset to the next entry returned (if any).

isr_session_detail.fqpcid.pcid
Procedure Correlator ID.

isr_session_detail.fqpcid.fqcp_name
Fully qualified Control Point name. This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

session_detail.trans_pri
Transmission priority. This is set to one of the following values:

AP_LOW
AP_MEDIUM
AP_HIGH
AP_NETWORK

session_detail.cos_name
Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

session_detail.ltd_res
Specifies whether the session uses a limited resource link (AP_YES or AP_NO).

isr_session_detail.pri_sess_stats.rcv_ru_size
Maximum receive RU size.

isr_session_detail.pri_sess_stats.send_ru_size
Maximum send RU size.

isr_session_detail.pri_sess_stats.max_send_btu_size
Maximum BTU size that can be sent on primary session hop.

isr_session_detail.pri_sess_stats.max_rcv_btu_size
Maximum BTU size that can be received on the primary session hop.

isr_session_detail.pri_sess_stats.max_send_pac_win
Maximum size of the send pacing window on the primary session hop.

isr_session_detail.pri_sess_stats.cur_send_pac_win
Current size of the send pacing window on the primary session hop.

isr_session_detail.pri_sess_stats.max_rcv_pac_win
Maximum size of the receive pacing window on the primary session hop.

isr_session_detail.pri_sess_stats.cur_rcv_pac_win
Current size of the receive pacing window on the primary session hop.

isr_session_detail.pri_sess_stats.send_data_frames
Number of normal flow data frames sent on the primary session hop.

isr_session_detail.pri_sess_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent on the primary session hop.

isr_session_detail.pri_sess_stats.send_data_bytes
Number of normal flow data bytes sent on the primary session hop.

isr_session_detail.pri_sess_stats.rcv_data_frames
Number of normal flow data frames received on the primary session hop.

isr_session_detail.pri_sess_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received on the primary session hop.

isr_session_detail.pri_sess_stats.rcv_data_bytes
Number of normal flow data bytes received on the primary session hop.

isr_session_detail.pri_sess_stats.sidh
Session ID high byte.

isr_session_detail.pri_sess_stats.sidl
Session ID low byte.

isr_session_detail.pri_sess_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station. It sets it to one if the BIND sender is the node containing the secondary link station.

isr_session_detail.pri_sess_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate the session statistics with the link over which session data flows.

isr_session_detail.sec_sess_stats.rcv_ru_size
Maximum receive RU size.

isr_session_detail.sec_sess_stats.send_ru_size
Maximum send RU size.

isr_session_detail.sec_sess_stats.max_send_btu_size
Maximum BTU size that can be sent on secondary session hop.

isr_session_detail.sec_sess_stats.max_rcv_btu_size
Maximum BTU size that can be received on the secondary session hop.

isr_session_detail.sec_sess_stats.max_send_pac_win
Maximum size of the send pacing window on the secondary session hop.

isr_session_detail.sec_sess_stats.cur_send_pac_win
Current size of the send pacing window on the secondary session hop.

isr_session_detail.sec_sess_stats.max_rcv_pac_win
Maximum size of the receive pacing window on the secondary session hop.

isr_session_detail.sec_sess_stats.cur_rcv_pac_win
Current size of the receive pacing window on the secondary session hop.

isr_session_detail.sec_sess_stats.send_data_frames
Number of normal flow data frames sent on the secondary session hop.

isr_session_detail.sec_sess_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent on the secondary session hop.

isr_session_detail.sec_sess_stats.send_data_bytes
Number of normal flow data bytes sent on the secondary session hop.

isr_session_detail.sec_sess_stats.rcv_data_frames
Number of normal flow data frames received on the secondary session hop.

isr_session_detail.sec_sess_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received on the secondary session hop.

isr_session_detail.sec_sess_stats.rcv_data_bytes
Number of normal flow data bytes received on the secondary session hop.

isr_session_detail.sec_sess_stats.sidh
Session ID high byte.

isr_session_detail.sec_sess_stats.sidl
Session ID low byte (from LFSID).

isr_session_detail.sec_sess_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station. It sets it to one if the BIND sender is the node containing the secondary link station.

isr_session_detail.sec_sess_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are

significant. This field can be used to correlate the intermediate session statistics with a particular link station.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_FQPCID

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_LOCAL_LU

QUERY_LOCAL_LU returns information about local LUs. QUERY_LOCAL_LU can be issued to retrieve information about the Personal Communications or Communications Server control point LU.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific local LU, or to obtain the list information in several “chunks,” the **lu_name** or **lu_alias** field should be set. If the **lu_name** field is nonzero it will be used to determine the index. If the **lu_name** field is set to all zeros, the **lu_alias** will be used to determine the index. If both the **lu_name** and the **lu_alias** fields are set to all zeros then the LU associated with the control point (the default LU) will be used. If the **list_options** field is set to AP_FIRST_IN_LIST then both of these fields will be ignored. (In this case, the returned list will be ordered by LU alias if the AP_LIST_BY_ALIAS **list_options** is set, otherwise it will be ordered by LU name). See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered on either **lu_alias** or **lu_name** according to the options specified. The field is ordered by EBCDIC lexicographical ordering.

The list of local LUs returned can be filtered by the name of the PU that they are associated with. In this case, the **pu_name** field should be set (otherwise this field should be set to all zeros).

VCB Structure

```
typedef struct query_local_lu
{
        unsigned short   opcode;              /* verb operation code              */
        unsigned  char   reserv2;             /*  reserved                        */
        unsigned  char   format;              /*  format                          */
        unsigned short   primary_rc;          /* primary return code              */
        unsigned long    secondary_rc;        /* secondary return code            */
        unsigned char    *buf_ptr;            /* pointer to buffer                */
        unsigned long    buf_size;            /* buffer size                      */
        unsigned long    total_buf_size;      /* total buffer size required       */
        unsigned short   num_entries;         /* number of entries                */
        unsigned short   total_num_entries; /* total number of entries          */
        unsigned char    list_options;        /* listing options                  */
        unsigned  char   reserv3;             /*  reserved                        */
        unsigned char    lu_name[8];          /* LU name                          */
        unsigned char    lu_alias[8];         /* LU alias                         */
        unsigned char    pu_name[8];          /* PU name filter                   */
} QUERY_LOCAL_LU;

typedef struct local_lu_summary
{
        unsigned short   overlay_size;        /* size of this entry               */
        unsigned char    lu_name[8];          /* LU name                          */
        unsigned char    lu_alias[8];         /* LU alias                         */
        unsigned  char   description[RD_LEN];
                                              /* resource description             */
} LOCAL_LU_SUMMARY;
```

```
typedef struct local_lu_detail
{
        unsigned short    overlay_size;        /* size of this entry                */
        unsigned char     lu_name[8];          /* LU name                           */
        LOCAL_LU_DEF_DATA def_data;            /* defined data                      */
        LOCAL_LU_DEF_DATA det_data;            /* determined data                   */
} LOCAL_LU_DETAIL;

typedef struct local_lu_def_data
{
        unsigned  char    description[RD_LEN];
                                               /* resource description              */
        unsigned char     lu_alias[8];         /* local LU alias                    */
        unsigned char     nau_address;         /* NAU address                       */
        unsigned  char    syncpt_support;      /*  Reserved                         */
        unsigned  short   lu_session_limit;    /*  LU  session  limit               */
        unsigned char     default_pool;        /* member of default_lu_pool         */
        unsigned  char    reserv2;             /*  reserved                         */
        unsigned char     pu_name[8];          /* PU name                           */
        unsigned  char    reserv3[8];          /*  reserved                         */
        unsigned  char    attach_routing_data[128];
                                               /* routing data for                  */
                                               /* incoming attaches                 */
} LOCAL_LU_DEF_DATA;

typedef struct local_lu_det_data
{
        unsigned  char    lu_sscp_sess_active;
                                               /* Is LU-SSCP session active         */
        unsigned char     appl_conn_active; /* Is LU-SSCP session active           */
        unsigned  char    reserv1[2];          /*  reserved                         */
        SESSION_STATS     lu_sscp_stats;       /* LU-SSCP session statistics        */
} LOCAL_LU_DET_DATA;

typedef struct session_stats
{
        unsigned short    rcv_ru_size;         /* session receive RU size           */
        unsigned short    send_ru_size;        /* session send RU size              */
        unsigned short    max_send_btu_size; /* max send BTU size                   */
        unsigned  short   max_rcv_btu_size;    /*  max  rcv  BTU  size              */
        unsigned  short   max_send_pac_win;    /*  max  send  pacing  win  size     */
        unsigned  short   cur_send_pac_win;    /*  current  send  pacing  win  size */
        unsigned short    max_rcv_pac_win;     /* max receive pacing win size       */
        unsigned short    cur_rcv_pac_win;     /* current receive pacing            */
                                               /* window size                       */
        unsigned long     send_data_frames;    /* number of data frames sent        */
        unsigned  long    send_fmd_data_frames;
                                               /* num of FMD data frames sent       */
        unsigned  long    send_data_bytes;     /*  number  of  data  bytes  sent    */
        unsigned  long    rcv_data_frames;     /*  num  data  frames  received      */
        unsigned  long    rcv_fmd_data_frames;
                                               /* num of FMD data frames recvd      */
        unsigned long     rcv_data_bytes;      /* number of data bytes received     */
        unsigned char     sidh;                /* session ID high byte              */
        unsigned char     sidl;                /* session ID low byte               */
        unsigned char     odai;                /* ODAI bit set                      */
        unsigned char     ls_name[8];          /* Link station name                 */
```

```
        unsigned char   reserve;            /* reserved                 */
} SESSION_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_LOCAL_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **lu_name** (or **lu_alias** if the **lu_name** is set to all zeros) specified represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

AP_LIST_BY_ALIAS
The returned list is ordered by **lu_alias**. This option is only valid when AP_FIRST_IN_LIST is specified. If AP_LIST_FROM_NEXT or AP_LIST_INCLUSIVE is specified, the list ordering will depend on whether an **lu_name** or **lu_alias** has been supplied as a starting point.

lu_name LU name. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the index. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** field are set to all zeros, the LU associated with the control point (the default

LU) is used. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

pu_name PU name filter. This should be set to all zeros or an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this field is set then only Local LUs associated with this PU are returned. This field is ignored if it is set to all zeros.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

local_lu_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

local_lu_summary.lu_name
LU name. This name is an 8-byte type-A EBCDIC character string.

local_lu_summary.lu_alias
Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

local_lu_summary.description
Resource description (as specified on DEFINE_LOCAL_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

local_lu_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

local_lu_detail.lu_name
LU name. This name is an 8-byte type-A EBCDIC character string.

local_lu_detail.def_data.description
Resource description (as specified on DEFINE_LOCAL_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

local_lu_detail.def_data.lu_alias
Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

local_lu_detail.def_data.nau_address
Network addressable unit address of the LU, which is in the range 0—255. A nonzero value implies the LU is a dependent LU. Zero implies the LU is an independent LU.

local_lu_detail.def_data.syncpt_support
Reserved.

local_lu_detail.def_data.lu_session_limit
Maximum number of sessions for the local LU. A value of zero indicates that there is no limit.

local_lu_detail.def_data.default_pool
AP_YES if the LU is a member of the dependent LU 6.2 default pool. Always AP_NO for independent LUs.

local_lu_detail.def_data.pu_name
Name of the PU that this LU will use. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is only used by dependent LUs, and will be set to all binary zeros for independent LUs.

local_lu_detail.def_data.attach_routing_data
Reserved.

local_lu_detail.det_data.lu_sscp_session_active
Specifies whether the LU-SSCP session is active (AP_YES or AP_NO). If the **def_data.nau_address** is zero, then this field is reserved.

local_lu_detail.det_data.appl_conn_active
Specifies whether an application is using the LU (AP_YES or AP_NO). If the **def_data.nau_address** is zero, then this field is reserved.

local_lu_detail.det_data.lu_sscp_stats.rcv_ru_size
This field is always reserved.

local_lu_detail.det_data.lu_sscp_stats.send_ru_size
This field is always reserved.

local_lu_detail.det_data.lu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

local_lu_detail.det_data.lu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

local_lu_detail.det_data.lu_sscp_stats.max_send_pac_win
This field will always be set to zero.

local_lu_detail.det_data.lu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

local_lu_detail.det_data.lu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

local_lu_detail.det_data.lu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

local_lu_detail.det_data.lu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

local_lu_detail.det_data.lu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

local_lu_detail.det_data.lu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

local_lu_detail.det_data.lu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

local_lu_detail.det_data.lu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

local_lu_detail.det_data.lu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

local_lu_detail.det_data.lu_sscp_stats.sidh
Session ID high byte.

local_lu_detail.det_data.lu_sscp_stats.sidl
Session ID low byte.

local_lu_detail.det_data.lu_sscp_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the ACTLU sets this field to zero if the local node contains the primary link station, and sets it to one if the ACTLU sender is the node containing the secondary link station.

local_lu_detail.det_data.lu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate this session with the link over which the session flows.

Note: The LU-SSCP statistics (**local_lu_detail.det_data.lu_sscp_stats**) are valid only when **nau_address** is not zero. Otherwise the fields are reserved.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LU_ALIAS AP_INVALID_LU_NAME AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_LOCAL_TOPOLOGY

All APPN nodes maintain a local topology database that holds information about the transmission groups (TGs) to all adjacent nodes.

QUERY_LOCAL_TOPOLOGY allows information about these TGs to be returned.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific local TG, or to obtain the list information in several "chunks," the **dest**, **dest_type**, and **tg_num** fields should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), these fields will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used. This list is ordered on **dest** first, then on **dest_type** and finally on **tg_num**. The **dest** name is ordered by name length first, then by lexicographical ordering for names of the same length. The **dest_type** field follows the order: AP_LEN_NODE, AP_NETWORK_NODE, AP_END_NODE, AP_VRN. The **tg_num** is ordered numerically.

If AP_LIST_INCLUSIVE is selected, the returned list starts from the first valid record of that name.

If AP_LIST_FROM_NEXT is selected, the list will begin from the first valid record with a name following the one specified.

VCB Structure

```
typedef struct query_local_topology
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     *buf_ptr;            /* pointer to buffer            */
        unsigned long     buf_size;            /* buffer size                  */
        unsigned long     total_buf_size;      /* total buffer size required */
        unsigned short    num_entries;         /* number of entries            */
        unsigned short    total_num_entries; /* total number of entries      */
        unsigned char     list_options;        /* listing options              */
        unsigned  char    reserv3;             /*  reserved                    */
        unsigned char     dest[17];            /* TG destination node          */
        unsigned char     dest_type;           /* TG destination node type     */
        unsigned char     tg_num;              /* TG number                    */
} QUERY_LOCAL_TOPOLOGY;

typedef struct local_topology_summary
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned char     dest[17];            /* TG destination node          */
        unsigned char     dest_type;           /* TG destination node type     */
        unsigned char     tg_num;              /* TG number                    */
} LOCAL_TOPOLOGY_SUMMARY;
```

```
typedef struct local_topology_detail
{
        unsigned short    overlay_size;       /* size of this entry              */
        unsigned char     dest[17];           /* TG destination node             */
        unsigned char     dest_type;          /* TG destination node type        */
        unsigned char     tg_num;             /* TG number                       */
        unsigned  char    reserv1;            /* reserved                        */
        LINK_ADDRESS      dlc_data;           /* DLC signalling data             */
        unsigned long     rsn;                /* resource sequence number        */


        unsigned char     status;             /* TG status                       */
        TG_DEFINED_CHARS tg_chars;            /* TG characteristics              */
        unsigned  char    reserva[16];        /* reserved                        */
} LOCAL_TOPOLOGY_DETAIL;

typedef struct link_address
{
        unsigned  short   length;             /* length                          */
        unsigned  short   reserve1;           /* reserved                        */
        unsigned  char    address[MAX_LINK_ADDR_LEN];
                                              /* address                         */
} LINK_ADDRESS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_LOCAL_TOPOLOGY

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of the **dest**, **dest_type** and **tg_num** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

dest Fully qualified destination node name for the TG. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dest_type Node type of the destination node for this TG. This can be one of the following values:

AP_NETWORK_NODE
AP_VRN
AP_END_NODE
AP_LEARN_NODE

If the **dest_type** is unknown, AP_LEARN_NODE must be specified. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

tg_num Number associated with the TG. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

local_topology_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

local_topology_summary.dest
Fully qualified destination node name for the TG. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

local_topology_summary.dest_type
Type of the destination node for this TG. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN
AP_END_NODE

Note that if **dest_type** is set to AP_END_NODE, this specifies that the TG destination is either to a LEN node or to an end node.

local_topology_summary.tg_num
Number associated with the TG.

local_topology_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

local_topology_detail.dest
Fully qualified destination node name for the TG. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

local_topology_detail.dest_type
Type of the destination node for this TG. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN
AP_END_NODE

Note that if **dest_type** is set to AP_END_NODE, this specifies that the TG destination is either to a LEN node or to an end node.

local_topology_detail.tg_num
Number associated with the TG.

local_topology_detail.dlc_data.length
Length of DLC address of connection to a VRN (set to zero if **dest_type** is not AP_VRN).

local_topology_detail.dlc_data.address
DLC address of connection to VRN.

local_topology_detail.rsn
Resource Sequence Number. This is assigned by the network node that owns this resource.

local_topology_detail.status
Specifies the status of the TG. This can be one or more of the following values ORed together:

AP_TG_OPERATIVE
AP_TG_CP_CP_SESSIONS
AP_TG_QUIESCING
AP_TG_HPR
AP_TG_RTP
AP_NONE

local_topology_detail.tg_chars
TG characteristics (See “DEFINE_CN” on page 33).

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_TG
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_LS

QUERY_LS returns a list of information about the link stations defined at the node. This information is structured as “determined data” (data gathered dynamically during execution) and “defined data” (the data supplied by the application on DEFINE_LS).

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific LS, or to obtain the list information in several “chunks,” the **ls_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **ls_name**. Ordering is according to name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

The list of link stations returned can be filtered by the name of the port that they belong to. In this case, the **port_name** field should be set (otherwise this field should be set to all zeros).

VCB Structure

```
typedef struct query_ls
{
        unsigned short   opcode;                /* verb operation code                */
        unsigned  char   reserv2;               /*  reserved                          */
        unsigned  char   format;                /*  format                            */
        unsigned short   primary_rc;            /* Primary return code                */
        unsigned long    secondary_rc;          /* Secondary return code              */
        unsigned char    *buf_ptr;              /* pointer to buffer                  */
        unsigned long    buf_size;              /* buffer size                        */
        unsigned long    total_buf_size;        /* total buffer size required         */
        unsigned short   num_entries;           /* number of entries                  */
        unsigned  short  total_num_entries;     /*  total  number  of  entries        */
        unsigned char    list_options;          /* listing options                    */
        unsigned  char   reserv3;               /*  reserved                          */
        unsigned char    ls_name[8];            /* name of link station               */
        unsigned char    port_name[8];          /* name of link station               */
} QUERY_LS;

typedef struct ls_summary
{
        unsigned short   overlay_size;          /* size of this entry                 */
        unsigned char    ls_name[8];            /* link station name                  */
        unsigned  char   description[RD_LEN];
                                                /* resource description               */
        unsigned char    dlc_type;              /* DLC type                           */
        unsigned char    state;                 /* link station state                 */
        unsigned short   act_sess_count;        /* currently active sess count        */
        unsigned  char   det_adj_cp_name[17];
```

```
                                                    /* determined adj CP name          */
        unsigned char   det_adj_cp_type;    /* determined adj node type        */
        unsigned char   port_name[8];       /* port name                       */
        unsigned char   adj_cp_name[17];    /* adjacent CP name                */
        unsigned char   adj_cp_type;        /* adjacent node type              */
} LS_SUMMARY;

typedef struct ls_detail
{
        unsigned short  overlay_size;       /* size of this entry              */
        unsigned char   ls_name[8];         /* link stations name              */
        LS_DET_DATA     det_data;           /* determined data                 */
        LS_DEF_DATA     def_data;           /* defined data                    */
} LS_DETAIL;

typedef struct ls_det_data
{
        unsigned short  act_sess_count;     /* curr active sessions count      */
        unsigned char   dlc_type;           /* DLC type                        */
        unsigned char   state;              /* link station state              */
        unsigned char   sub_state;          /* link station sub state          */
        unsigned  char  det_adj_cp_name[17];
                                            /* adjacent CP name                */
        unsigned char   det_adj_cp_type;    /* adjacent node type              */
        unsigned char   dlc_name[8];        /* name of DLC                     */
        unsigned char   dynamic;            /* is LS is dynamic ?              */
        unsigned char   migration;          /* supports migration partners     */
        unsigned char   tg_num;             /* TG number                       */
        LS_STATS        ls_stats;           /* link station statistics         */
        unsigned long   start_time;         /* time LS started                 */
        unsigned long   stop_time;          /* time LS stopped                 */
        unsigned long   up_time;            /* total time LS active            */
        unsigned long   current_state_time; /* time in current state           */
        unsigned char   deact_cause;        /* deactivation cause              */
        unsigned char   hpr_support;        /* TG HPR support                  */
        unsigned char   anr_label[2];       /* local ANR label                 */
        unsigned char   hpr_link_lvl_error; /* HPR link-level error            */
        unsigned char   auto_act;           /* auto activate                   */
        unsigned char   ls_role;            /* link station role               */
        unsigned  char  reserva;            /* reserved                        */
        unsigned char   node_id[4];         /* determined node id              */
        unsigned  char  reservb[32];        /* reserved                        */
} LS_DET_DATA;

typedef struct ls_def_data
{
        unsigned  char  description[RD_LEN];
                                            /* resource description            */
        unsigned char   port_name[8];       /* name of associated port         */
        unsigned char   adj_cp_name[17];    /* adjacent CP name                */
        unsigned char   adj_cp_type;        /* adjacent node type              */
        LINK_ADDRESS    dest_address;       /* destination address             */
        unsigned char   auto_act_supp;      /* auto-activate supported         */
        unsigned char   tg_number;          /* Pre-assigned TG number          */
        unsigned  char  limited_resource;   /* limited resource                */
        unsigned  char  solicit_sscp_sessions;
                                            /* solicit SSCP sessions           */
        unsigned char   pu_name[8];         /* Local PU name (reserved if      */
```

```
                                                /* solicit_sscp_sessions is set     */
                                                /* to AP_NO)                        */
        unsigned char   disable_remote_act; /* disable remote activation flag */
        unsigned char   dspu_services;          /* Services provided for            */
                                                /* downstream PU                    */
        unsigned char   dspu_name[8];           /* Downstream PU name (reserved     */
                                                /* if dspu_services is set to       */
                                                /* AP_NONE or AP_DLUR)              */
        unsigned char   dlus_name[17];          /* DLUS name if dspu_services       */
                                                /* is set to AP_DLUR                */
        unsigned char   bkup_dlus_name[17]; /* Backup DLUS name if              */
                                                /* dspu_services is set             */
                                                /* to AP_DLUR                       */
        unsigned char   hpr_supported;          /* does the link support HPR?       */
        unsigned char   hpr_link_lvl_error; /* does the link support HPR        */
                                                /* link-level error recovery?       */
        unsigned short  link_deact_timer;   /* HPR link deactivation timer      */
        unsigned  char  reserv1;                /*  reserved                        */
        unsigned char   default_nn_server;  /* Use as default LS to NN server */
        unsigned  char  ls_attributes[4];   /*  LS  attributes                  */
        unsigned char   adj_node_id[4];         /* adjacent node ID                 */
        unsigned  char  local_node_id[4];   /*  local  node  ID                 */
        unsigned char   cp_cp_sess_support; /* CP-CP session support            */
        unsigned  char  use_default_tg_chars;
                                                /* Use default tg_chars             */
        TG_DEFINED_CHARS tg_chars;              /* TG characteristics               */
        unsigned  short target_pacing_count;
                                                /* target pacing count              */
        unsigned  short max_send_btu_size;  /*  max  send  BTU  size            */
        unsigned char   ls_role;                /* link station role to use         */
                                                /* on this link                     */
        unsigned char   max_ifrm_rcvd;          /* max number of I-frames rcvd      */
        unsigned  char  reserv3[34];            /*  reserved                        */
        unsigned short  link_spec_data_len; /* length of link specific data     */
} LS_DEF_DATA;

typedef struct link_address
{
        unsigned  short length;                 /*  length                          */
        unsigned  short reserve1;               /*  reserved                        */
        unsigned  char  address[MAX_LINK_ADDR_LEN];
                                                /*  address                         */
} LINK_ADDRESS;

typedef struct link_spec_data
{
      unsigned  char    link_data[SIZEOF_LINK_SPEC_DATA];

}   LINK_SPEC_DATA;

typedef struct tg_defined_chars
{
        unsigned char   effect_cap;             /* Effective capacity           */
        unsigned  char  reserve1[5];            /*  Reserved                        */
        unsigned char   connect_cost;           /* Connection Cost                  */
        unsigned char   byte_cost;              /* Byte cost                        */
        unsigned  char  reserve2;               /*  Reserved                        */
        unsigned  char  security;               /*  Security                        */
```

```
        unsigned char    prop_delay;          /* Propagation delay                */
        unsigned char    modem_class;          /* Modem class                      */
        unsigned char    user_def_parm_1;     /* User-defined parameter 1         */
        unsigned char    user_def_parm_2;     /* User-defined parameter 2         */
        unsigned char    user_def_parm_3;     /* User-defined parameter 3         */
} TG_DEFINED_CHARS;

typedef struct ls_stats
{
        unsigned long    in_xid_bytes;        /* number of XID bytes received     */
        unsigned long    in_msg_bytes;         /* num message bytes received      */
        unsigned long    in_xid_frames;       /* num XID frames received          */
        unsigned long    in_msg_frames;        /* num message frames received     */
        unsigned long    out_xid_bytes;       /* num XID bytes sent               */
        unsigned long    out_msg_bytes;        /* num message bytes sent          */
        unsigned long    out_xid_frames;      /* num XID frames sent              */
        unsigned long    out_msg_frames;       /* num message frames sent         */
       unsigned  long    in_invalid_sna_frames;
                                              /* num invalid frames received     */
       unsigned  long    in_session_control_frames;
                                              /* num control frames received     */
       unsigned  long    out_session_control_frames;
                                              /* num control frames sent         */
        unsigned long    echo_rsps;           /* response from adj LS count       */
        unsigned long    current_delay;       /* time taken for last test sig     */
        unsigned long    max_delay;            /* max delay by test signal        */
        unsigned long    min_delay;           /* min delay by test signal         */
        unsigned long    max_delay_time;      /* time since longest delay         */
        unsigned long    good_xids;           /* successful XID on LS count       */
        unsigned long    bad_xids;            /* unsuccessful XID on LS count     */
} LS_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_LS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **ls_name** specified (see the following parameter)

represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

ls_name Link station name. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

port_name Port name filter. This should be set to all zeros or an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this field is set then only link stations belonging to this port are returned. This field is ignored if it is set to all zeros.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

ls_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

ls_summary.ls_name
Name of link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

ls_summary.description
Resource description (as specified on DEFINE_LS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

ls_summary.dlc_type
Type of DLC. Personal Communications or Communications Server supports the following types:

AP_ANYNET
AP_LLC2

AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

ls_summary.state State of this link station. This field is set to one of the following values:

AP_NOT_ACTIVE
AP_PENDING_ACTIVE
AP_ACTIVE
AP_PENDING_INACTIVE

ls_summary.act_sess_count
The total number of active sessions (both endpoint and intermediate) using the link.

ls_summary.det_adj_cp_name
Fully qualified, 17-byte, adjacent CP name determined during link activation. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This will be null if the LS is inactive.

If **ls_summary.adj_cp_type** is not one of AP_NETWORK_NODE, AP_END_NODE, AP_APPN_NODE, or AP_BACK_LEVEL_LEN_NODE, then this field is reserved.

ls_summary.det_adj_cp_type
Type of the adjacent node determined during link activation. It is one of the following values:

AP_END_NODE
AP_NETWORK_NODE
AP_LEARN_NODE
AP_VRN

This will be AP_LEARN_NODE if the LS is inactive.

If **ls_summary.adj_cp_type** is not one of AP_NETWORK_NODE, AP_END_NODE, AP_APPN_NODE, or AP_BACK_LEVEL_LEN_NODE, then this field is reserved.

ls_summary.port_name
Name of port associated with this link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

ls_summary.adj_cp_name
Fully qualified, 17-byte, adjacent control point name composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This will be null for an implicit link.

ls_summary.adj_cp_type
Type of the adjacent node. It is one of the following values:

AP_END_NODE

AP_NETWORK_NODE
AP_APPN_NODE
AP_BACK_LEVEL_LEN__NODE
AP_HOST_XID3
AP_HOST_XID0
AP_DSPU_XID
AP_DSPU_NOXID

ls_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

ls_detail.ls_name Name of link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

ls_detail.det_data.act_sess_count
Total number of active sessions (both endpoint and intermediate) using the link.

ls_detail.det_data.dlc_type
Type of DLC. Personal Communications or Communications Server supports the following types:

AP_ANYNET
AP_LLC2
AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

Additional DLC types can be defined by specifying the new type on the DEFINE_DLC verb. See “DEFINE_DLC” on page 47, for more information.

ls_detail.det_data.state
State of this link station. This field is set to one of the following values:

AP_NOT_ACTIVE
AP_PENDING_ACTIVE
AP_ACTIVE
AP_PENDING_INACTIVE

ls_detail.det_data.sub_state
This field provides more detailed information about the state of this link station. This field is set to one of the following values:

AP_SENT_CONNECT_OUT
AP_PENDING_XID_EXCHANGE
AP_SENT_ACTIVATE_AS
AP_SENT_SET_MODE
AP_ACTIVE
AP_SENT_DEACTIVATE_AS_ORDERLY
AP_SENT_DISCONNECT
AP_WAITING_STATS
AP_RESET

ls_detail.det_data.det_adj_cp_name
Fully qualified, 17-byte, adjacent control point name determined during link activation. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

If **ls_summary.adj_cp_type** is not one of AP_NETWORK_NODE, AP_END_NODE, AP_APPN_NODE, or AP_BACK_LEVEL_LEN_NODE, then this field is reserved.

ls_detail.det_data.det_adj_cp_type
Type of the adjacent node determined during link activation. It is one of the following values:

AP_END_NODE
AP_NETWORK_NODE
AP_LEARN_NODE
AP_VRN

If **ls_summary.adj_cp_type** is not one of AP_NETWORK_NODE, AP_END_NODE, AP_APPN_NODE, or AP_BACK_LEVEL_LEN_NODE, then this field is reserved.

ls_detail.det_data.dlc_name
Name of the DLC. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

ls_detail.det_data.dynamic
Specifies whether the link was defined explicitly (by a DEFINE_LS command), or implicitly or dynamically (either in response to a connection request from the adjacent node, or to connect dynamically to another node across a connection network). This can be AP_YES or AP_NO.

ls_detail.det_data.migration
Specifies whether the adjacent node is a migration level node (such as a low entry networking (LEN) node), or a full APPN network node or end node (AP_YES, AP_NO, or AP_UNKNOWN).

ls_detail.det_data.tg_num
Number associated with the TG.

ls_detail.det_data.ls_stats.in_xid_bytes
Total number of XID (Exchange Identification) bytes received on this link station.

ls_detail.det_data.ls_stats.in_msg_bytes
Total number of data bytes received on this link station.

ls_detail.det_data.ls_stats.in_xid_frames
Total number of XID (Exchange Identification) frames received on this link station.

ls_detail.det_data.ls_stats.in_msg_frames
Total number of data frames received on this link station.

ls_detail.det_data.ls_stats.out_xid_bytes
Total number of XID (Exchange Identification) bytes sent on this link station.

ls_detail.det_data.ls_stats.out_msg_bytes
Total number of data bytes sent on this link station.

ls_detail.det_data.ls_stats.out_xid_frames
Total number of XID (Exchange Identification) frames sent on this link station.

ls_detail.det_data.ls_stats.out_msg_frames
Total number of data frames sent on this link station.

ls_detail.det_data.ls_stats.in_invalid_sna_frames
Total number of SNA incorrect frames received on this link station.

ls_detail.det_data.ls_stats.in_session_control_frames
Total number of session control frames received on this link station.

ls_detail.det_data.ls_stats.out_session_control_frames
Total number of session control frames sent on this link station.

ls_detail.det_data.ls_stats.echo_rsps
Number of echo responses received from the adjacent node. Echo requests are sent periodically to gauge the propagation delay to the adjacent node.

ls_detail.det_data.ls_stats.current_delay
Time (in milliseconds) that it took for the last test signal to be sent and returned from this link station to the adjacent link station.

ls_detail.det_data.ls_stats.max_delay
Longest time taken (in milliseconds) for a test signal to be sent and returned from this link station to the adjacent link station.

ls_detail.det_data.ls_stats.min_delay
Shortest time taken (in milliseconds) for a test signal to be sent and returned from this link station to the adjacent link station.

ls_detail.det_data.ls_stats.max_delay_time
Time since system startup (in hundredths of a second) when the longest delay occurred.

ls_detail.det_data.ls_stats.good_xids
Total number of successful XID exchanges that have occurred on this link station since it was started.

ls_detail.det_data.ls_stats.bad_xids
Total number of unsuccessful XID exchanges that have occurred on this link station since it was started.

ls_detail.det_data.start_time
Time since system startup (in hundredths of a second) when the link station was last activated (that is, the mode setting commands completed).

ls_detail.det_data.stop_time
Time since system startup (in hundredths of a second) when the link station was last deactivated.

ls_detail.det_data.up_time
The total time (in hundredths of a second) that this link station has been active since system startup.

ls_detail.det_data.current_state_time
The total time (in hundredths of a second) that this link station has been in the current state.

ls_detail.det_data.deact_cause
The cause of the last deactivation of the link station. The field is set to one of the following values:

AP_NONE
The link station has never been deactivated.

AP_DEACT_OPER_ORDERLY
The link station was deactivated as a result of an orderly STOP command from an operator.

AP_DEACT_OPER_IMMEDIATE
The link station was deactivated as a result of an immediate STOP command from an operator.

AP_DEACT_AUTOMATIC
The link station was deactivated automatically, for example because there were no more sessions using the link station.

AP_DEACT_FAILURE
The link station was deactivated because of a failure.

ls_detail.det_data.hpr_support
The level of high-performance routing (HPR) supported on this TG (AP_NONE, AP_BASE or AP_RTP), taking account of the capabilities of the local and adjacent nodes.

ls_detail.det_data.anr_label
The HPR automatic network routing (ANR) label allocated to the local link.

ls_detail.det_data.hpr_link_lvl_error
Specifies whether link-level error recovery is being used for HPR traffic on the link.

ls_detail.det_data.ls_role
Specifies the link station role that this link station has assumed after negotiation with the partner link station.

ls_detail.det_data.node_id
Node ID received from adjacent node during XID exchange. This a 4-byte hexadecimal string.

ls_detail.def_data.description
Resource description (as specified on DEFINE_LS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

ls_detail.def_data.port_name
Name of port associated with this link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. If the link is to a VRN, this field specifies the name of the actual port used to connect to the VRN (as specified in the DEFINE_CN verb).

ls_detail.def_data.adj_cp_name
Fully qualified 17-byte adjacent control point name, which is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This is defined if **back_lvl_len_end_node** is not set to AP_NO, or if the port associated with the link station is defined to be switched.

ls_detail.def_data.adj_cp_type
Adjacent node type.

AP_NETWORK_NODE
Specifies that the node is an APPN network node.

AP_END_NODE
Specifies that the node is an APPN end node or an up-level LEN node.

AP_APPN_NODE
Specifies that the node is an APPN network node, an APPN end node, or an up-level LEN node. The node type will be learned during XID exchange.

AP_BACK_LEVEL_LEN_NODE
Specifies that the node is a back-level LEN node.

AP_HOST_XID3
Specifies that the node is a host and that the Node Operator Facility responds to a polling XID from the node with a format 3 XID.

AP_HOST_XID0
Specifies that the node is a host and that the Node Operator Facility responds to a polling XID from the node with a format 0 XID.

AP_DSPU_XID
Specifies that the node is a downstream PU and that the Node Operator Facility includes XID exchange in link activation.

AP_DSPU_NOXID
Specifies that the node is a downstream PU and that the Node Operator Facility does not include XID exchange in link activation.

Note: A link station to a VRN is always dynamic and is therefore not defined.

ls_detail.def_data.dest_address.length
Length of destination link station's address on adjacent node.

ls_detail.def_data.dest_address.address
Link station's destination address on adjacent node.

ls_detail.def_data.auto_act_supp
Specifies whether the link will be activated automatically after it has been started by a START_LS verb, and stopped by a STOP_LS. (AP_YES or AP_NO).

ls_detail.def_data.tg_number
Pre-assigned TG number (in the range one to 20). This number is used to represent the link when the link is activated. Zero indicates that the TG number is not pre-assigned but is negotiated when the link is activated.

ls_detail.def_data.limited_resource
Specifies whether this link station is to be deactivated when there are no sessions using the link. This is set to one of the following values:

AP_NO
The link is not a limited resource and will not be deactivated automatically.

AP_YES or AP_NO_SESSIONS
The link is a limited resource and will be deactivated automatically when no active sessions are using it.

AP_INACTIVITY
The link is a limited resource and will be deactivated automatically when no active sessions are using it, or when no data has flowed on the link for the time period specified by the **link_deact_timer** field.

ls_detail.def_data.solicit_sscp_sessions
AP_YES requests the host to initiate sessions between the SSCP and the local control point and dependent LUs. AP_NO requests no sessions with the SSCP on this link.

ls_detail.def_data.pu_name
Name of the local PU that is going to use this link if **solicit_sscp_sessions** is set to AP_YES. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If **solicit_sscp_sessions** is set to AP_NO, this field is reserved.

ls_detail.def_data.disable_remote.act
Specifies whether remote activation of this link is supported (AP_YES or AP_NO).

ls_detail.def_data.dspu_services
Specifies the services that the local node provides to the downstream PU across this link if **solicit_sscp_sessions** is set to AP_NO. This is set to one of the following:

AP_PU_CONCENTRATION
Local node will provide PU concentration for the downstream PU.

AP_DLUR
Local node will provide DLUR services for the downstream PU.

AP_NONE
Local node will provide no services for this downstream PU.

If **solicit_sscp_sessions** is set to AP_YES, this field is reserved.

ls_detail.def_data.dspu_name
Name of the downstream PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This is only valid if **solicit_sscp_sessions** is set to AP_NO.

ls_detail.def_data.dlus_name
Name of DLUS node which DLUR solicits SSCP services from when the link to the downstream node is activated. This is either set to all zeros or a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the field is set to all zeros, then the global default DLUS (if defined by the DEFINE_DLUR_DEFAULTS verb) is solicited when the link is activated. If the **dlus_name** is set to zeros and there is no global default DLUS, then DLUR will not initiate SSCP contact when the link is activated. This field is reserved if **dspu_services** is not set to AP_DLUR.

ls_detail.def_data.bkup_dlus_name
Name of DLUS node which serves as the backup for the downstream PU. This is either set to all zeros or to a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) If the field is set to all zeros, then the global backup default DLUS (if defined by the DEFINE_DLUR_DEFAULTS verb) is used as the backup for this PU. This field is reserved if **dspu_services** is not set to AP_DLUR.

ls_detail.def_data.hpr_supported
Specifies whether HPR is supported on this link (AP_YES or AP_NO).

ls_detail.def_data.hpr_link_lvl_error
Specifies whether the HPR link-level error recovery tower is supported on this link (AP_YES or AP_NO). Note that the parameter is reserved if **hpr_supported** is set to AP_NO.

ls_detail.def_data.link_deact_timer
Limited resource link deactivation timer (in seconds).

If **limited_resource** is set to AP_INACTIVITY then a link is automatically deactivated if no data traverses the link for the duration of this timer.

ls_detail.def_data.default_nn_server
Specifies whether a link can be automatically activated by an end node to support CP-CP sessions to a network node server. (AP_YES or AP_NO). The link must be defined to support CP-CP sessions for this field to take effect.

ls_detail.def_data.ls_attributes
Specifies further information about the adjacent node.

ls_detail.def_data.ls_attributes[0]
Host type.

AP_SNA
Standard SNA host.

AP_FNA
FNA (VTAM-F) host.

AP_HNA
HNA host.

ls_detail.def_data.ls_attributes[1]
Network Name CV suppression option for a link to a back-level LEN node. (This field is ignored unless **adj_cp_type** is set to AP_BACK_LEVEL_LEN_NODE or AP_HOST_XID3).

AP_NO
Include Network Name CV in XID3.

AP_SUPPRESS_CP_NAME
Do not include Network Name CV in XID3.

ls_detail.def_data.adj_node_id
Defined node ID of adjacent node.

ls_detail.def_data.local_node_id
Node ID sent in XIDs on this link station. This is a 4-byte hexadecimal string. If this field is set to zero, the **node_id** is used in XID exchanges. If this field is nonzero, it replaces the value for XID exchanges on this LS.

ls_detail.def_data.cp_cp_sess_support
Specifies whether CP-CP sessions are supported (AP_YES or AP_NO).

ls_detail_def_data.use_default_tg_chars
Specifies whether the TG characteristics supplied on the DEFINE_LS were discarded in favor of the default characteristics supplied on the DEFINE_PORT (AP_YES or AP_NO). This field does not apply to implicit links.

ls_detail.def_data.tg_chars
TG characteristics (See “DEFINE_CN” on page 33).

ls_detail.def_data.target_pacing_count
Numeric value between 1 and 32 767 inclusive indicating the desired pacing window size for BINDs on this TG. The number is only significant when fixed bind pacing is being performed. Note that Personal Communications or Communications Server does not currently use this value.

ls_detail.def_data.max_send_btu_size
Maximum BTU size that can be sent.

ls_detail.def_data.ls_role
The link station role that this link station should assume. This can be any one of AP_LS_NEG, AP_LS_PRI or AP_LS_SEC to select a role of negotiable, primary or secondary. The field can also be set to AP_USE_PORT_DEFAULTS to select the value configured on the DEFINE_PORT verb.

ls_detail.def_data.max_ifrm_rcvd
The maximum number of I-Frames that can be received by the XID sender before acknowledgment. Set to zero if the default value from DEFINE_PORT should be used.

ls_detail.def_data.link_spec_data_len
Unpadded length, in bytes, of data passed unchanged to link station component during initialization. The data is concatenated to the LS_DETAIL structure. This data will be padded to end on a 4-byte boundary.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LINK_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_LU_0_TO_3

QUERY_LU_0_TO_3 returns information about local LUs of type 0, 1, 2, or 3. This information is structured as “determined data” (data gathered dynamically during execution) and “defined data” (the data supplied by the application on DEFINE_LU_0_TO_3).

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific local LU, or to obtain the list information in several “chunks,” the **lu_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored.

Only certain parameters are supported on SNA API clients. See the *note pad* (

) for specific details.

VCB Structure

```
typedef struct query_lu_0_to_3
{
        unsigned short   opcode;              /* verb operation code          */
        unsigned  char   reserv2;             /*  reserved                    */
        unsigned  char   format;              /*  format                      */
        unsigned short   primary_rc;          /* primary return code          */
        unsigned long    secondary_rc;        /* secondary return code        */
        unsigned char    *buf_ptr;            /* pointer to buffer            */
        unsigned long    buf_size;            /* buffer size                  */
        unsigned long    total_buf_size;      /* total buffer size required   */
        unsigned short   num_entries;         /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries        */
        unsigned char    list_options;        /* listing options             */
        unsigned  char   reserv3;             /*  reserved                    */
        unsigned char    pu_name[8];          /* PU name filter               */
        unsigned char    lu_name[8];          /* LU name                      */
        unsigned  char   host_attachment;     /*  Host  attachment  filter    */
} QUERY_LU_0_TO_3;

typedef struct lu_0_to_3_summary
{
        unsigned short   overlay_size;        /* size of this entry          */
        unsigned char    pu_name[8];          /* PU name                     */
        unsigned char    lu_name[8];          /* LU name                     */
        unsigned  char   description[RD_LEN];
                                              /* resource description        */
        unsigned char    nau_address;         /* NAU address                 */
        unsigned  char   lu_sscp_sess_active;
                                              /* Is LU-SSCP session active   */
        unsigned char    appl_conn_active;    /* Is connection to appl active? */
        unsigned  char   plu_sess_active;     /*  Is  PLU-SLU  session  active */
        unsigned  char   host_attachment;     /*  LU's  host  attachment      */
} LU_0_TO_3_SUMMARY;
```

```
typedef struct lu_0_to_3_detail
{
        unsigned short   overlay_size;        /* size of this entry              */
        unsigned char    lu_name[8];          /* LU name                         */
        unsigned char    reserv1[2];          /* reserved                        */
        LU_0_TO_3_DET_DATA det_data;          /* Determined data                 */
        LU_0_TO_3_DEF_DATA def_data;          /* Defined data                    */
} LU_0_TO_3_DETAIL;

typedef struct lu_0_to_3_det_data
{
        unsigned char    lu_sscp_sess_active;
                                              /* Is LU-SSCP session active       */
        unsigned char    appl_conn_active;    /* Application is using LU         */
        unsigned char    plu_sess_active;     /* Is PLU-SLU session active       */
        unsigned char    host_attachment;     /* Host attachment                 */
        SESSION_STATS    lu_sscp_stats;       /* LU-SSCP session statistics      */
        SESSION_STATS    plu_stats;           /* PLU-SLU session statistics      */
        unsigned char    plu_name[8];         /* PLU name                        */
        unsigned char    session_id[8];       /* Internal ID of PLU-SLU sess     */
        unsigned char    app_spec_det_data[256];
                                              /* Application Specified Data      */
        unsigned char    app_type;            /* Application type                */
        unsigned char    reserva[19];         /* reserved                        */
} LU_0_TO_3_DET_DATA;

typedef struct session_stats
{
        unsigned short   rcv_ru_size;         /* session receive RU size         */
        unsigned short   send_ru_size;        /* session send RU size            */
        unsigned short   max_send_btu_size; /* max send BTU size                 */
        unsigned short   max_rcv_btu_size;    /* max rcv BTU size                */
        unsigned short   max_send_pac_win;    /* max send pacing win size        */
        unsigned short   cur_send_pac_win;    /* current send pacing win size    */
        unsigned short   max_rcv_pac_win;     /* max receive pacing win size     */
        unsigned short   cur_rcv_pac_win;     /* current receive pacing          */
                                              /* window size                     */
        unsigned long    send_data_frames;    /* number of data frames sent      */
        unsigned long    send_fmd_data_frames;
                                              /* num of FMD data frames sent     */
        unsigned long    send_data_bytes;     /* number of data bytes sent       */
        unsigned long    rcv_data_frames;     /* num data frames received        */
        unsigned long    rcv_fmd_data_frames;
                                              /* num of FMD data frames recvd    */
        unsigned long    rcv_data_bytes;      /* number of data bytes received */
        unsigned char    sidh;                /* session ID high byte            */
        unsigned char    sidl;                /* session ID low byte             */
        unsigned char    odai;                /* ODAI bit set                    */
        unsigned char    ls_name[8];          /* Link station name               */
        unsigned char    reserve;             /* reserved                        */
} SESSION_STATS;

typedef struct lu_0_to_3_def_data
{
        unsigned char    description[RD_LEN];
                                              /* resource description            */
        unsigned char    nau_address;         /* LU NAU address                  */
        unsigned char    pool_name[8];        /* LU Pool name                    */
```

```
    unsigned char    pu_name[8];          /* PU name                          */
    unsigned char    priority;            /* LU priority                      */
    unsigned char    lu_model;            /* LU model                         */
    unsigned  char   reserv2[8];          /*  reserved                        */
    unsigned  char   app_spec_def_data[16];
                                          /* Application Specified Data       */
} LU_0_TO_3_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_LU_0_TO_3

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information.

AP_SUMMARY
Returns summary information only.

AP_SUMMARY value is also supported for SNA API clients.

AP_DETAIL
Returns detailed information.

The **lu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list

AP_FIRST_IN_LIST value is also supported for SNA API clients.

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AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name Name of the local LU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

The list_options value is ignored for SNA API clients.

pu_name PU name. Only LUs that use this PU will be returned. If a list of all LUs is required then this field should be set to all binary zeros.

The pu_name value is ignored for SNA API clients.

host_attachment Filter for host attachment.

AP_NONE
Return information about all LUs.

AP_NONE is the only value supported for SNA API clients.

AP_DLUR_ATTACHED
Return information about all LUs that are supported by DLUR.

AP_DIRECT_ATTACHED
Return information about only those LUs that are directly attached to the host system.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

lu_0_to_3_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

lu_0_to_3_summary.pu_name
Name of local PU that this LU is using. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

The lu_0_to_3_summary.pu_name value is not returned on SNA API clients.

lu_0_to_3_summary.lu_name
Name of the local LU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

lu_0_to_3_summary.description
Resource description (as specified on DEFINE_LU_0_TO_3). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

The lu_0_to_3_summary.description value is not returned on SNA API clients.

lu_0_to_3_summary.nau_address
Network addressable unit address of the LU, which is in the range 1—255.

The lu_0_to_3_summary.nau_address value is not returned on SNA API clients.

lu_0_to_3_summary.lu_sscp_sess_active
Specifies whether the LU-SSCP session is active (AP_YES or AP_NO).

The lu_0_to_3_summary.lu_sscp_sess_active value is not returned on SNA API clients.

lu_0_to_3_summary.appl_conn_active
Specifies whether an application is using the LU (AP_YES or AP_NO).

The lu_0_to_3_summary.appl_conn_active value is not returned on SNA API clients.

lu_0_to_3_summary.plu_sess_active
Specifies whether the PLU-SLU session is active (AP_YES or AP_NO).

The lu_0_to_3_summary.plu_sess_active value is not returned on SNA API clients.

lu_0_to_3_summary.host_attachment
LU host attachment type:

AP_DLUR_ATTACHED
LU is attached to host system using DLUR.

AP_DIRECT_ATTACHED
LU is directly attached to host system.

lu_0_to_3_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

lu_0_to_3_detail.lu_name
Name of the local LU that is being queried. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

lu_0_to_3_detail.det_data.lu_sscp_sess_active
Specifies whether the LU-SSCP session is active (AP_YES or AP_NO).

lu_0_to_3_detail.det_data.appl_conn_active
Specifies whether this LU is currently being used by an application (AP_YES or AP_NO).

lu_0_to_3_detail.det_data.plu_sess_active
Specifies whether the PLU-SLU session is active (AP_YES or AP_NO).

lu_0_to_3_detail.det_data.host_attachment
LU host attachment type:

AP_DLUR_ATTACHED
LU is attached to host system using DLUR.

AP_DIRECT_ATTACHED
LU is directly attached to host system.

lu_0_to_3_detail.det_data.lu_sscp_stats.rcv_ru_size
This field is always reserved.

lu_0_to_3_detail.det_data.lu_sscp_stats.send_ru_size
This field is always reserved.

lu_0_to_3_detail.det_data.lu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

lu_0_to_3_detail.det_data.lu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

lu_0_to_3_detail.det_data.lu_sscp_stats.max_send_pac_win
This field will always be set to zero.

lu_0_to_3_detail.det_data.lu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

lu_0_to_3_detail.det_data.lu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

lu_0_to_3_detail.det_data.lu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

lu_0_to_3_detail.det_data.lu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

lu_0_to_3_detail.det_data.lu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

lu_0_to_3_detail.det_data.lu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

lu _0_to_3_detail.det_data.lu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

lu_0_to_3_detail.det_data.lu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

lu_0_to_3_detail.det_data.lu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

lu_0_to_3_detail.det_data.lu_sscp_stats.sidh
Session ID high byte.

lu_0_to_3_detail.det_data.lu_sscp_stats.sidl
Session ID low byte.

lu_0_to_3_detail.det_data.lu_sscp_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the ACTLU sets this field to zero if the local node contains the primary link station, and sets it to one if the ACTLU sender is the node containing the secondary link station.

lu_0_to_3_detail.det_data.lu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate this session with the link over which the session flows.

lu_0_to_3_detail.det_data.plu_stats.rcv_ru_size
Maximum receive RU size.

lu_0_to_3_detail.det_data.plu_stats.send_ru_size
Maximum send RU size.

lu_0_to_3_detail.det_data.plu_stats.max_send_btu_size
Maximum BTU size that can be sent.

lu_0_to_3_detail.det_data.plu_stats.max_rcv_btu_size
Maximum BTU size that can be received.

lu_0_to_3_detail.det_data.plu_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

lu_0_to_3_detail.det_data.plu_stats.cur_send_pac_win
Current size of the send pacing window on this session.

lu_0_to_3_detail.det_data.plu_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

lu_0_to_3_detail.det_data.plu_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

lu_0_to_3_detail.det_data.plu_stats.send_data_frames
Number of normal flow data frames sent.

lu_0_to_3_detail.det_data.plu_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

lu_0_to_3_detail.det_data.plu_stats.send_data_bytes
Number of normal flow data bytes sent.

lu_0_to_3_detail.det_data.plu_stats.rcv_data_frames
Number of normal flow data frames received.

lu_0_to_3_detail.det_data.plu_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

lu_0_to_3_detail.det_data.plu_stats.rcv_data_bytes
Number of normal flow data bytes received.

lu_0_to_3_detail.det_data.plu_stats.sidh
Session ID high byte.

lu_0_to_3_detail.det_data.plu_stats.sidl
Session ID low byte.

lu_0_to_3_detail.det_data.plu_stats.odai
Origin Destination Address Indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to one if the BIND sender is the node containing the secondary link station.

lu_0_to_3_detail.det_data.plu_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

lu_0_to_3_detail.det_data.plu_name
Primary LU name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. (If the PLU-SLU session is inactive this field is reserved).

lu_0_to_3_detail.det_data.session_id
Eight byte internal identifier of the PLU-SLU session.

lu_0_to_3_detail.det_data.app_spec_det_data
Reserved.

lu_0_to_3_detail.det_data.app_type
Reserved.

lu_0_to_3_detail.def_data.description
Resource description (as specified on DEFINE_LU_0_TO_3). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

lu_0_to_3_detail.def_data.nau_address
Network addressable unit address of the LU, which is in the range 1—255.

lu_0_to_3_detail.def_data.pool_name
Name of pool to which this LU belongs. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If the LU does not belong to a pool, this field is set to all binary zeros.

lu_0_to_3_detail.def_data.pu_name
Name of the PU (as specified on the DEFINE_LS verb) that this LU will use. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

lu_0_to_3_detail.def_data.priority
LU priority when sending to the host. This is set to one of the following values:

AP_NETWORK
AP_HIGH
AP_MEDIUM
AP_LOW

lu_0_to_3_detail.def_data.lu_model
Model type and number of the LU. This is set to one of the following values:

AP_3270_DISPLAY_MODEL_2
AP_3270_DISPLAY_MODEL_3
AP_3270_DISPLAY_MODEL_4
AP_3270_DISPLAY_MODEL_5
AP_RJE_WKSTN
AP_PRINTER
AP_UNKNOWN

lu_0_to_3_detail.def_data.app_spec_def_data
Application-specified data from DEFINE_LU_0_TO_3. the Program does not interpret this field, it is simply stored and returned on the QUERY_LU_0_TO_3 verb.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_LU_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_LU_POOL

QUERY_LU_POOL returns a list of pools and the LUs that belong to them.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific LU pool or to obtain the list information in several "chunks," the **pool_name** and **lu_name** fields should be set. If the **lu_name** field is set to all zeros, then the information returned starts from the first LU in the specified pool. If the **list_options** field is set to AP_FIRST_IN_LIST, then both of these fields are ignored.

VCB Structure

```
typedef struct query_lu_pool
{
        unsigned short   opcode;              /* verb operation code          */
        unsigned  char   reserv2;             /*  reserved                    */
        unsigned  char   format;              /*  format                      */
        unsigned short   primary_rc;          /* primary return code          */
        unsigned long    secondary_rc;        /* secondary return code        */
        unsigned char    *buf_ptr;            /* pointer to buffer            */
        unsigned long    buf_size;            /* buffer size                  */
        unsigned long    total_buf_size;      /* total buffer size required   */
        unsigned short   num_entries;         /* number of entries            */
        unsigned short   total_num_entries;   /* total number of entries      */
        unsigned char    list_options;        /* listing options              */
        unsigned  char   reserv3;             /*  reserved                    */
        unsigned char    pool_name[8];        /* pool name                    */
        unsigned char    lu_name[8];          /* LU name                      */
} QUERY_LU_POOL;

typedef struct lu_pool_summary
{
        unsigned short   overlay_size;        /* size of this entry           */
        unsigned char    pool_name[8];        /* pool name                    */
        unsigned char    description[RD_LEN]; /* resource description         */
        unsigned short   num_active_lus;      /* num of currently active LUs */
} LU_POOL_SUMMARY;

typedef struct lu_pool_detail
{
        unsigned short   overlay_size;        /* size of this entry           */
        unsigned char    pool_name[8];        /* pool name                    */
        unsigned char    description[RD_LEN]; /* resource description         */
        unsigned char    lu_name[8];          /* LU name                      */
        unsigned char    lu_sscp_sess_active; /* Is LU-SSCP session active    */
        unsigned char    appl_conn_active;    /* Is SSCP connection open      */
        unsigned char    plu_sess_active;     /* Is PLU-SLU session active    */
} LU_POOL_DETAIL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_LU_POOL

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of the **pool_name** and **lu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

pool_name Name of LU pool. This name is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

lu_name LU name. This name is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this is set to all binary zeros, the LUs belonging to the specified pool are listed from the beginning of the pool. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of directory entries returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

lu_pool_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

lu_pool_summary.pool_name
Name of LU pool to which the specified LU belongs. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. (Note that if this field is specified on the request and the **lu_name** field is set to all binary zeros, then only LUs in the pool are returned.)

lu_pool_summary.description
LU pool description (as specified on DEFINE_LU_POOL).

lu_pool_detail.num_active_lus
The number of LUs in the specified pool that have active LU-SSCP sessions.

lu_pool_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

lu_pool_detail.pool_name
Name of LU pool to which the specified LU belongs. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. (Note that if this field is specified on the request and the **lu_name** field is set to all binary zeros, then only LUs in the pool are returned.)

lu_pool_detail.description
LU description (as specified on DEFINE_LU_0_TO_3).

lu_pool_detail.lu_name
LU name of LU belonging to the pool. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this name is set to all zeros then, this indicates that the specified pool is empty.

lu_pool_detail.lu_sscp_sess_active
Specifies whether the LU-SSCP session is active (AP_YES or AP_NO).

lu_pool_detail.appl_conn_active
Specifies whether the LU session is currently being used by an application (AP_YES or AP_NO).

lu_pool_detail.plu_sess_active
Specifies whether the PLU-SLU session is active (AP_YES or AP_NO).

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LIST_OPTION

AP_INVALID_POOL_NAME
AP_INVALID_LU_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_MDS_APPLICATION

QUERY_MDS_APPLICATION returns a list of applications that have registered for MDS level messages.

Applications register by issuing the REGISTER_MS_APPLICATION verb described in Chapter 14, “Management Services Verbs” on page 477.

To obtain information about a specific application, or to obtain the list information in several “chunks,” the **application** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

VCB Structure

```
typedef struct query_mds_application
{
        unsigned short   opcode;          /* verb operation code          */
        unsigned  char   reserv2;         /*  reserved                    */
        unsigned  char   format;          /*  format                      */
        unsigned short   primary_rc;      /* primary return code          */
        unsigned long    secondary_rc;    /* secondary return code        */
        unsigned char    *buf_ptr;        /* pointer to buffer            */
        unsigned long    buf_size;        /* buffer size                  */
        unsigned long    total_buf_size;  /* total buffer size required */
        unsigned short   num_entries;     /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries   */
        unsigned char    list_options;    /* listing options              */
        unsigned  char   reserv3;         /*  reserved                    */
        unsigned  char   application[8];  /*  application                 */
} QUERY_MDS_APPLICATION;

typedef struct mds_application_data
{
        unsigned short   overlay_size;    /* size of this entry           */
        unsigned char    application[8];  /* application name             */
        unsigned short   max_rcv_size;    /* max data size application    */
                                          /* can receive                  */
        unsigned  char   reserva[20];     /*  reserved                    */
} MDS_APPLICATION_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_MDS_APPLICATION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **application** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

application Application name. The name is an 8-byte alphanumeric type-A EBCDIC character string. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries The number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

mds_application_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

mds_application_data.application
Name of registered application. The name is an 8-byte alphanumeric type-A EBCDIC character string.

mds_application_data.max_rcv_size
The maximum number of bytes that the application can receive in one chunk (this is specified when an application registers with MDS). For more information about MDS-level application registration refer to Chapter 14, Management Services Verbs.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_APPLICATION_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_MDS_STATISTICS

QUERY_MDS_STATISTICS returns management services statistics. This verb can be used to gauge the level of MDS routing traffic.

VCB Structure

```
typedef struct query_mds_statistics
{
        unsigned short   opcode;                  /* verb operation code              */
        unsigned  char   reserv2;                 /*  reserved                        */
        unsigned  char   format;                  /*  format                          */
        unsigned short   primary_rc;              /* primary return code              */
        unsigned long    secondary_rc;            /* secondary return code            */
        unsigned long    alerts_sent;             /* number of alert sends            */
        unsigned long    alert_errors_rcvd;   /* error messages received          */
                                                  /* for alert sends                  */
        unsigned  long   uncorrelated_alert_errors;
                                                  /* uncorrelated alert               */
                                                  /* errors received                  */
        unsigned long    mds_mus_rcvd_local; /* number of MDS_MUs received    */
                                                  /* from local applications          */
        unsigned  long   mds_mus_rcvd_remote;
                                                  /* number of MDS_MUs received    */
                                                  /* from remote applications         */
        unsigned  long   mds_mus_delivered_local;
                                                  /* num of MDS_MUs delivered         */
                                                  /* to local applications            */
        unsigned  long   mds_mus_delivered_remote;
                                                  /* num of MDS_MUs                   */
                                                  /* delivered to remote appls        */
        unsigned long    parse_errors;            /* number of MDS_MUs received    */
                                                  /* with parse errors                */
        unsigned long    failed_deliveries;   /* number of MDS_MUs where          */
                                                  /* delivery failed                  */
        unsigned  long   ds_searches_performed;
                                                  /* number of DS searches done    */
        unsigned long    unverified_errors;   /* number of unverified errors */
        unsigned  char   reserva[20];             /*  reserved                        */
} QUERY_MDS_STATISTICS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_MDS_STATISTICS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

alerts_sent Number of locally originated alerts sent using the MDS transport system.

alert_errors_rcvd Number of error messages received by MDS indicating a delivery failure for a message containing an alert.

uncorrelated_errors_rcvd
Number of error messages received by MDS indicating a delivery failure for a message containing an alert. Delivery failure occurs when the error message could not be correlated to an alert on the MDS send alert queue. MDS maintains a fixed-size queue where it caches alerts sent to the problem determination focal point. Once the queue reaches maximum size, the oldest alert will be discarded and replaced by the new alert. If a delivery error message is received, MDS attempts to correlate the error message to a cached alert so that the alert can be held until the problem determination focal point is restored.

Note: The two counts, **alert_errors_rcvd** and **uncorrelated_errors_rcvd** are maintained such that the size of the send alert queue can be tuned. An increasing **uncorrelated_errors_rcvd** over time indicates that the send alert queue size is too small.

mds_mus_rcvd_local
Number of MDS_MUs received from local applications.

mds_mus_rcvd_remote
Number of MDS_MUs received from remote nodes using the MDS_RECEIVE and MSU_HANDLER transaction programs.

mds_mus_delivered_local
Number of MDS_MUs successfully delivered to local applications.

mds_mus_delivered_remote
Number of MDS_MUs successfully delivered to a remote node using the MDS_SEND transaction program.

parse_errors Number of MDS_MUs received that contained header format errors.

failed_deliveries Number of MDS_MUs this node failed to deliver.

ds_searches_performed
Reserved.

unverified_errors Reserved.

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_MODE

QUERY_MODE returns information about modes that have been used by a local LU with a particular partner LU. The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific mode, or to obtain the list information in several "chunks," the **mode_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. Note that the **lu_name** (or **lu_alias**) and **plu_alias** (or **fqplu_name**) fields must always be set. The **lu_name**, if nonzero, will be used in preference to the **lu_alias**. See "Querying the Node" on page 12, for background on how the list formats are used.

The list only includes information for the local LU specified by the **lu_name** (or **lu_alias**). This list is ordered by the **fqplu_name** followed by the **mode_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If **plu_alias** is set to all zeros, the **fqplu_name** value will be used, otherwise the **plu_alias** is always used and the **fqplu_name** is ignored.

The list of modes returned can be filtered according to whether they currently have any active sessions. If filtering is desired, the **active_sessions** field should be set to AP_YES (otherwise this field should be set to AP_NO). This verb returns information that is determined once the mode begins to be used by a local LU with a partner LU. The QUERY_MODE_DEFINITION verb returns definition information only.

VCB Structure

```
typedef struct query_mode
{
        unsigned short  opcode;              /* verb operation code          */
        unsigned  char  reserv2;             /*  reserved                    */
        unsigned  char  format;              /*  format                      */
        unsigned short  primary_rc;          /* primary return code          */
        unsigned long   secondary_rc;        /* secondary return code        */
        unsigned char   *buf_ptr;            /* pointer to buffer            */
        unsigned long   buf_size;            /* buffer size                  */
        unsigned long   total_buf_size;      /* total buffer size required   */
        unsigned short  num_entries;         /* number of entries            */
        unsigned  short total_num_entries;   /*  total  number  of  entries  */
        unsigned char   list_options;        /* listing options              */
        unsigned  char  reserv3;             /*  reserved                    */
        unsigned char   lu_name[8];          /* LU name                      */
        unsigned char   lu_alias[8];         /* LU alias                     */
        unsigned char   plu_alias[8];        /* partner LU alias             */
        unsigned char   fqplu_name[17];      /* fully qualified partner      */
                                             /* LU name                      */
        unsigned char   mode_name[8];        /* mode name                    */
        unsigned char   active_sessions;     /* active sessions only filter  */
} QUERY_MODE;
```

```
typedef struct mode_summary
{
        unsigned short   overlay_size;          /* size of this entry              */
        unsigned char    mode_name[8];          /* mode name                       */
        unsigned  char   description[RD_LEN];
                                                /* resource description            */
        unsigned short   sess_limit;            /* current session limit           */
        unsigned short   act_sess_count;        /* curr active sessions count      */
        unsigned char    fqplu_name[17];        /* partner LU name                 */
        unsigned  char   reserv1[3];            /*  reserved                       */
} MODE_SUMMARY;

typedef struct mode_detail
{
        unsigned short   overlay_size;          /* size of this entry              */
        unsigned char    mode_name[8];          /* mode name                       */
        unsigned  char   description[RD_LEN];
                                                /* resource description            */
        unsigned short   sess_limit;            /* session limit                   */
        unsigned short   act_sess_count;        /* currently active sess count     */
        unsigned char    fqplu_name[17];        /* partner LU name                 */
        unsigned  char   reserv1[3];            /*  reserved                       */
        unsigned  short  min_conwinners_source;
                                                /* min conwinner sess limit        */
        unsigned  short  min_conwinners_target;
                                                /* min conloser limit              */
        unsigned char    drain_source;          /* drain source?                   */
        unsigned char    drain_partner;         /* drain partner?                  */
        unsigned short   auto_act;              /* auto activated conwinner        */
                                                /* session limit                   */
        unsigned short   act_cw_count;          /* active conwinner sess count     */
        unsigned short   act_cl_count;          /* active conloser sess count      */
        unsigned char    sync_level;            /* synchronization level           */
        unsigned char    default_ru_size;       /* default RU size to maximize     */
                                                /*  performance                    */
        unsigned short   max_neg_sess_limit; /* max negotiated session limit */
        unsigned short   max_rcv_ru_size;       /* max receive RU size             */
        unsigned  short  pending_session_count;
                                                /* pending sess count for mode     */
        unsigned  short  termination_count;  /*  termination  count  for  mode     */
        unsigned char    implicit;              /* implicit or explicit entry      */
        unsigned  char   reserva[15];           /*  reserved                       */
} MODE_DETAIL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_MODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of **lu_name** (or **lu_alias** if the **lu_name** is set to all zeros), **plu_alias** (or **fqplu_name** if the **plu_alias** is set to all zeros) and **mode_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned. When a partner LU index is specified, information about other partner LUs is included in the list, if possible.

AP_FIRST_IN_LIST
If **plu_alias** and **fqplu_name** are set to all zeros, the returned list starts from the first partner LU in the list, and the **mode_name** index is ignored. If either **plu_alias** or **fqplu_name** is specified, the list starts at this index, but the **mode_name** index value is ignored, and the returned list starts from the first mode entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name LU name. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the index.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** are set to all zeros then the LU associated with the control point (the default LU) is used.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field will be used for determining the index.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

mode_name Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with

EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

active_sessions Active session filter. Specifies whether the returned modes should be filtered according to whether they currently have any active sessions (AP_YES or AP_NO).

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

mode_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

mode_summary.mode_name
Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

mode_summary.description
Resource description (as specified on DEFINE_MODE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

mode_summary.sess_limit
Current session limit.

mode_summary.act_sess_count
Total number of active sessions using the mode. If the **active_sessions** filter has been set to AP_YES, then this field will always be greater than zero.

mode_summary.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

mode_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

mode_detail.mode_name
Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A

EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

mode_detail.description
Resource description (as specified on DEFINE_MODE).

mode_detail.sess_limit
Current session limit.

mode_detail.act_sess_count
Total number of active sessions using the mode. If the **active_sessions** filter has been set to AP_YES, then this field will always be greater than zero.

mode_detail.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

mode_detail.min_conwinners_source
Specifies the minimum number of sessions on which the local LU is the contention winner (or “first speaker”).

mode_detail.min_conwinners_target
Specifies the minimum number of sessions on which the local LU is the contention loser (or “bidder”).

mode_detail.drain_source
Specifies whether the local LU satisfies waiting session requests before deactivating a session when session limits are changed or reset (AP_NO or AP_YES).

mode_detail.drain_partner
Specifies whether the partner LU satisfies waiting session requests before deactivating a session when session limits are changed or reset (AP_NO or AP_YES).

mode_detail.auto_act
Number of contention winner sessions that are automatically activated following the Change Number of Sessions exchange with the partner LU.

mode_detail.act_cw_count
Number of active, contention winner (or “first speaker”) sessions using this mode. (The local LU does not need to bid before using one of these sessions.)

mode_detail.act_cl_count
Number of active, contention loser (or “bidder”) sessions using this mode. (The local LU must bid before using one of these sessions.)

mode_detail.sync_level
Specifies the synchronization levels supported by the mode (AP_NONE, AP_CONFIRM, or AP_SYNCPT).

mode_detail.default_ru_size
Specifies whether a default upper bound for the maximum RU size will be used. If this parameter has a value of

AP_YES, the **mode_chars.max_ru_size_upp** field specified on **define_mode** is ignored, and the upper bound for the maximum RU size is set to the link BTU size minus the size of the TH and the RH.

AP_YES
AP_NO

mode_detail.max_neg_sess_limit
Maximum negotiable session limit. Specifies the maximum session limit for the mode name that a local LU can use during its CNOS processing as the target LU.

mode_detail.max_rcv_ru_size
Maximum received RU size.

mode_detail.pending_session_count
Specifies the number of sessions pending (waiting for session activation to complete).

mode_detail.termination_count
If a previous CNOS verb has caused the mode session limit to be reset to zero, there might have been conversations using, or waiting to use these sessions. This field is a count of how many of these sessions have not yet been deactivated.

mode_detail.implicit
Specifies whether the entry was put in place because of an implicit (AP_YES) or explicit (AP_NO) definition.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_MODE_NAME

AP_INVALID_PLU_NAME
AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS
AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_MODE_DEFINITION

QUERY_MODE_DEFINITION returns both information previously passed in on a DEFINE_MODE verb and information about SNA-defined default modes.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific mode, or to obtain the list information in several "chunks," the **mode_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by the **mode_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering).

If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

This verb returns definition information only. The QUERY_MODE verb returns information that is determined once the mode starts to be used by a local LU with a partner LU.

VCB Structure

```
typedef struct query_mode_definition
{
        unsigned short    opcode;              /* verb operation code          */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    format;              /*  format                      */
        unsigned short    primary_rc;          /* primary return code          */
        unsigned long     secondary_rc;        /* secondary return code        */
        unsigned char     *buf_ptr;            /* pointer to buffer            */
        unsigned long     buf_size;            /* buffer size                  */
        unsigned long     total_buf_size;      /* total buffer size required   */
        unsigned short    num_entries;         /* number of entries            */
        unsigned  short   total_num_entries;   /*  total  number  of  entries  */
        unsigned char     list_options;        /* listing options              */
        unsigned  char    reserv3;             /*  reserved                    */
        unsigned char     mode_name[8];        /* mode name                    */
} QUERY_MODE_DEFINITION;

typedef struct mode_def_summary
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned char     mode_name[8];        /* mode name                    */
        unsigned  char    description[RD_LEN];
                                               /* resource description         */
} MODE_DEF_SUMMARY;

typedef struct mode_def_detail
{
        unsigned short    overlay_size;        /* size of this entry           */
        unsigned char     mode_name[8];        /* mode name                    */
        MODE_CHARS        mode_chars;          /* mode characteristics         */
} MODE_DEF_DETAIL;
```

```
typedef struct mode_chars
{
        unsigned  char     description[RD_LEN];
                                                    /* resource description              */
        unsigned short    max_ru_size_upp;      /* max RU size upper bound          */
        unsigned char     receive_pacing_win; /* receive pacing window            */
        unsigned char     default_ru_size;      /* default RU size to maximize    */
                                                    /*  performance                      */
        unsigned short    max_neg_sess_lim;     /* max negotiable session limit */
        unsigned  short    plu_mode_session_limit;
                                                    /* LU-mode session limit            */
        unsigned short    min_conwin_src;       /* min source contention winner */
                                                    /*  sessions                         */
        unsigned char     cos_name[8];          /* class-of-service name            */
        unsigned  char     cryptography;         /*  cryptography                    */
        unsigned  char     compression;          /*  compression                     */
        unsigned short    auto_act;             /* initial auto-activation count*/
        unsigned  char     reserv2[6];           /*  reserved                        */
} MODE_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_MODE_DEFINITION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **mode_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

mode_name Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

mode_def_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

mode_def_summary.mode_name
8-byte mode name, which designates the network properties for a group of sessions.

mode_def_summary.description
Resource description (as specified on DEFINE_MODE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

mode_def_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

mode_def_detail.mode_name
Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

mode_def_detail.mode_chars.description
Resource description (as specified on DEFINE_MODE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

mode_def_detail.mode_chars.max_ru_size_upp
Upper boundary for the maximum RU size to be used on sessions with this mode name.

mode_def_detail.mode_chars.receive_pacing_win
Specifies the session pacing window for the sessions when fixed pacing is used.

mode_def_detail.mode_chars.default_ru_size
Specifies whether a default upper bound for the maximum RU size will be used. If this parameter specifies AP_YES, **max_ru_size_upp** is ignored.

AP_YES
AP_NO

mode_def_detail.mode_chars.max_neg_sess_lim
Maximum negotiable session limit. Value used to negotiate the maximum number of sessions permissible between the local LU and the partner LU for the designated mode name.

mode_def_detail.mode_chars.plu_mode_session_limit
Session limit to negotiate initially on this mode. This value indicates a preferred session limit and is used for implicit CNOS.

Range: 0—32 767

mode_def_detail.mode_chars.min_conwin_src
Minimum number of contention winner sessions activatable by local LU using this mode.

Range: 0—32 767

mode_def_detail.mode_chars.cos_name
Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

mode_def_detail.mode_chars.cryptography
Reserved.

mode_def_detail.mode_chars.compression
Specifies the use of compression for sessions activated using this mode.

AP_COMP_PROHIBITED
RLE compression is not supported on sessions for this mode.

AP_COMP_REQUESTED
RLE compression is supported and requested (but not mandated) on sessions for this mode.

mode_def_detail.mode_chars.auto_act
Specifies the number of session to be auto-activated for this mode. The value is used for implicit CNOS. The range is 0–32767.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_MODE_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_MODE_TO_COS_MAPPING

QUERY_MODE_TO_COS_MAPPING returns information about the mode to COS mapping.

The information is returned as a formatted list. To obtain information about a specific mode, or to obtain the list information in several “chunks,” the **mode_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **mode_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

If the default COS (which unknown modes are mapped to) has been overridden using DEFINE_MODE, QUERY_MODE_TO_COS_MAPPING also returns an entry with null **mode_name** (all zeros) and the default COS. This entry is first in the ordering.

VCB Structure

```
typedef struct query_mode_to_cos_mapping
{
        unsigned short   opcode;                /* verb operation code          */
        unsigned  char   reserv2;               /*  reserved                    */
        unsigned  char   format;                /*  format                      */
        unsigned short   primary_rc;            /* primary return code          */
        unsigned long    secondary_rc;          /* secondary return code        */
        unsigned char    *buf_ptr;              /* pointer to buffer            */
        unsigned long    buf_size;              /* buffer size                  */
        unsigned long    total_buf_size;        /* total buffer size required */
        unsigned short   num_entries;           /* number of entries            */
        unsigned short   total_num_entries; /* total number of entries      */
        unsigned char    list_options;          /* listing options              */
        unsigned  char   reserv3;               /*  reserved                    */
        unsigned char    mode_name[8];          /* mode name                    */
} QUERY_MODE_TO_COS_MAPPING;

typedef struct mode_to_cos_mapping_data
{
        unsigned short   overlay_size;          /* size of this entry           */
        unsigned char    mode_name[8];          /* mode name                    */
        unsigned char    cos_name[8];           /* COS name                     */
        unsigned  char   reserva[20];           /*  reserved                    */
} MODE_TO_COS_MAPPING_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_MODE_TO_COS_MAPPING

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **mode_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

mode_name Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST. This can be set to all zeros to indicate the entry for the default COS.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

mode_to_cos_mapping_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

mode_to_cos_mapping_data.mode_name
8-byte mode name, which designates the network properties for a group of sessions. If this is set to all zeros, it indicates the entry for the default COS.

mode_to_cos_mapping_data.cos_name
Class-of-service name associated with the mode name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_MODE_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_NMVT_APPLICATION

QUERY_NMVT_APPLICATION returns a list of applications that have registered for network management vector transport (NMVT) level messages by previously issuing the REGISTER_NMVT_APPLICATION verb (see Chapter 14, “Management Services Verbs” on page 477 for more details).

The information is returned as a list. To obtain information about a specific application, or to obtain the list information in several “chunks,” the **application** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

VCB Structure

```
typedef struct query_nmvt_application
{
        unsigned short   opcode;              /* verb operation code          */
        unsigned  char   reserv2;             /*  reserved                    */
        unsigned  char   format;              /*  format                      */
        unsigned short   primary_rc;          /* primary return code          */
        unsigned long    secondary_rc;        /* secondary return code        */
        unsigned char    *buf_ptr;            /* pointer to buffer            */
        unsigned long    buf_size;            /* buffer size                  */
        unsigned long    total_buf_size;      /* total buffer size required   */
        unsigned short   num_entries;         /* number of entries            */
        unsigned  short  total_num_entries;   /*  total  number  of  entries  */
        unsigned char    list_options;        /* listing options              */
        unsigned  char   reserv3;             /*  reserved                    */
        unsigned  char   application[8];      /*  application                 */
} QUERY_NMVT_APPLICATION;

typedef struct nmvt_application_data
{
        unsigned short   overlay_size;        /* size of this entry           */
        unsigned char    application[8];      /* application name             */
        unsigned short   ms_vector_key_type; /* MS vector key accepted       */
                                              /* by appl                      */
        unsigned  char   conversion_required;
                                              /* conversion to MDS_MU required */
        unsigned  char   reserv[5];           /*  reserved                    */
        unsigned  char   reserva[20];         /*  reserved                    */
} NMVT_APPLICATION_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_NMVT_APPLICATION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The **application** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

application Application name. The name is an 8-byte alphanumeric type-A EBCDIC character string or all EBCDIC zeros. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries The number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

nmvt_application_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

nmvt_application_data.application
Name of registered application. The name is an 8-byte alphanumeric type-A EBCDIC character string.

nmvt_application_data.ms_vector_key_type
Management services vector key accepted by the application. When the application registers for NMVT messages, it specifies which management services vector keys it will accept. For more information on NMVT application registration see Chapter 14, “Management Services Verbs” on page 477.

nmvt_application_data.conversion_required
Specifies whether the registered application requires messages to be converted from NMVT to MDS_MU format (AP_YES or AP_NO). When the application registers for NMVT messages, it will specify whether this conversion is required. For more information on NMVT application registration, see Chapter 14, “Management Services Verbs” on page 477.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_APPLICATION_NAME
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_NN_TOPOLOGY_NODE

Each network node maintains a network topology database that holds information about the network nodes, VRNs and network-node-to-network-node TGs in the network.

QUERY_NN_TOPOLOGY_NODE returns information about the network node and VRN entries in this database.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific node or to obtain the list information in several “chunks,” the **node_name**, **node_type** and **frsn** fields should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), these fields are ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is by **node_name**, **node_type**, and **frsn**. The **node_name** is ordered by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). The **node_type** field follows the order: AP_NETWORK_NODE, AP_VRN. The **frsn** is ordered numerically.

If AP_LIST_INCLUSIVE is selected, the returned list starts from the first valid record of that name.

If AP_LIST_FROM_NEXT is selected, the list will begin from the first valid record with a name following the one specified.

If the **frsn** field (flow reduction sequence number) is set to a nonzero value, then only database entries with FRSNs higher than this are returned. This allows a consistent topology database to be returned in a number of “chunks” by first getting the node's current FRSN. This would work as follows:

1. Issue QUERY_NODE, which returns node's current FRSN.
2. Issue as many QUERY_NN_TOPOLOGY_NODE (with FRSN set to zero) as necessary to get all the database entries in “chunks.”
3. Issue QUERY_NODE again and compare the new FRSN with the one returned in step 1.
4. If the two FRSNs are different, then the database has changed, so issue a QUERY_NN_TOPOLOGY_NODE with the FRSN set to 1 greater than the FRSN supplied in step 1.

VCB Structure

```
typedef struct query_nn_topology_node
{
    unsigned short   opcode;          /* verb operation code          */
    unsigned char    reserv2;         /* reserved                     */
    unsigned char    format;          /* format                       */
    unsigned short   primary_rc;      /* primary return code          */
    unsigned long    secondary_rc;    /* secondary return code        */
    unsigned char    *buf_ptr;        /* pointer to buffer            */
    unsigned long    buf_size;        /* buffer size                  */
```

```
        unsigned long     total_buf_size;      /* total buffer size required     */
        unsigned short    num_entries;          /* number of entries             */
        unsigned short    total_num_entries; /* total number of entries         */
        unsigned char     list_options;        /* listing options               */
        unsigned  char    reserv3;              /*  reserved                     */
        unsigned char     node_name[17];        /* network qualified node name   */
        unsigned char     node_type;            /* node type                     */
        unsigned long     frsn;                 /* flow reduction sequence num  */
} QUERY_NN_TOPOLOGY_NODE;
```

Note: If the **frsn** field is set to a nonzero value, then only node entries with FRSNs greater than the one specified are returned. If it is set to zero, then all node entries are returned.

```
typedef struct nn_topology_node_summary
{
        unsigned short    overlay_size;       /* size of this entry            */
        unsigned char     node_name[17];       /* network qualified node name  */
        unsigned char     node_type;           /* node type                    */
} NN_TOPOLOGY_NODE_SUMMARY;

typedef struct nn_topology_node_detail
{
        unsigned short    overlay_size;       /* size of this entry            */
        unsigned char     node_name[17];       /* network qualified node name  */
        unsigned char     node_type;           /* node type                    */
        unsigned short    days_left;          /* days left until entry purged */
        unsigned  char    reserv1[2];         /*  reserved                    */
        unsigned long     frsn;                /* flow reduction sequence num  */
        unsigned long     rsn;                 /* resource sequence number     */
        unsigned char     rar;                 /* route additional resistance  */
        unsigned char     status;              /* node status                  */
        unsigned char     function_support;   /* function support              */
        unsigned  char    reserv2;             /*  reserved                    */
        unsigned  char    reserva[20];         /*  reserved                    */
} NN_TOPOLOGY_NODE_DETAIL;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_NN_TOPOLOGY_NODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of the **node_name**, **node_type**, and **frsn** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

node_name Network qualified node name from network topology database. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

node_type Type of the node. This can be one of the following values:

AP_NETWORK_NODE
AP_VRN

If the **node_type** is unknown, AP_LEARN_NODE must be specified.

frsn Flow Reduction Sequence Number. If this is nonzero, then only nodes with a FRSN greater than or equal to this value are returned.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

nn_topology_node_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

nn_topology_node_summary.node_name
Network qualified node name from network topology database. This name is 17 bytes long and is composed of

two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

nn_topology_node_summary.node_type
Type of the node. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN

nn_topology_node_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

nn_topology_node_detail.node_name
Network qualified node name from network topology database. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

nn_topology_node_detail.node_type
Type of the node. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN

nn_topology_node_detail.days_left
Number of days before deletion of this node entry from the topology database. This will be set to zero for the local node entry (this entry is never deleted).

nn_topology_node_detail.frsn
Flow Reduction Sequence Number. It indicates the last time that this resource was updated at the local node.

nn_topology_node_detail.rsn
Resource Sequence Number. This is assigned by the network node that owns this resource.

nn_topology_node_detail.rar
The node's route additional resistance.

nn_topology_node_detail.status
Specifies the status of the node. This can be AP_UNCONGESTED or one or more of the following values ORed together:

AP_CONGESTED
The number of ISR sessions is greater than the **isr_sessions_upper_threshold**.

AP_ERR_DEPLETED
The number of end-point sessions has reached the maximum specified.

AP_IRR_DEPLETED
The number of ISR sessions has reached the maximum.

AP_QUIESCING
A STOP_NODE or type AP_QUIESCE or AP_QUIESCE_ISR has been issued

nn_topology_node_detail.function_support
Specifies which functions are supported. This can be one or more of the following values:

AP_BORDER_NODE
Border node function is supported.

AP_CDS
Node supports central directory server function.

AP_GATEWAY
Node is a gateway Node. (This function is not yet architecturally defined.)

AP_ISR
Node supports intermediate session routing.

AP_HPR
Node supports the base functions of High-Performance Routing.

AP_RTP_TOWER
Node supports the RTP tower of HPR.

AP_CONTROL_OVER_RTP_TOWER
Node supports the control flows over the RTP tower.

Note: The AP_CONTROL_OVER_RTP_TOWER corresponds to the setting of both AP_HPR and AP_RTP_TOWER.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_NODE

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_NN_TOPOLOGY_STATS

QUERY_NN_TOPOLOGY_STATS returns statistical information about the topology database and is only issued at a network node.

VCB Structure

```
typedef struct query_nn_topology_stats
{
        unsigned short   opcode;              /* verb operation code              */
        unsigned  char   reserv2;             /*  reserved                        */
        unsigned  char   format;              /*  format                          */
        unsigned short   primary_rc;          /* primary return code              */
        unsigned long    secondary_rc;        /* secondary return code            */
        unsigned long    max_nodes;           /* max num of nodes in database     */
        unsigned long    cur_num_nodes;       /* current number of nodes in       */
                                              /*  database                        */
        unsigned long    node_in_tdus;        /* number of TDUs received          */
        unsigned long    node_out_tdus;       /* number of TDUs sent              */
        unsigned long    node_low_rsns;       /* node updates received with       */
                                              /* low RSNs                         */
        unsigned long    node_equal_rsns;     /* node updates in with             */
                                              /* equal RSNs                       */
        unsigned  long   node_good_high_rsns;
                                              /* node updates in with             */
                                              /* high RSNs                        */
        unsigned  long   node_bad_high_rsns;
                                              /* node updates in with             */
                                              /* high and odd RSNs                */
        unsigned long    node_state_updates; /* number of node updates sent      */
        unsigned long    node_errors;         /* number of node entry             */
                                              /* errors found                     */
        unsigned long    node_timer_updates; /* number of node records built     */
                                              /* due to timer updates             */
        unsigned long    node_purges;         /* num node records purged          */
        unsigned long    tg_low_rsns;         /* TG updates received with         */
                                              /* low RSNs                         */
        unsigned long    tg_equal_rsns;       /* TG updates in with equal RSNs */
        unsigned long    tg_good_high_rsns;   /* TG updates in with high RSNs     */
        unsigned  long   tg_bad_high_rsns;    /*  TG  updates  in  with  high     */
                                              /* and odd RSNs                     */
        unsigned  long   tg_state_updates;    /*  number  of  TG  updates  sent   */
        unsigned long    tg_errors;           /* number of TG entry errors        */
                                              /*  found                           */
        unsigned  long   tg_timer_updates;    /*  number  of  node  records       */
                                              /* built due to timer updates       */
        unsigned long    tg_purges;           /* num node records purged          */
        unsigned long    total_route_calcs;   /* num routes calculated for COS */
        unsigned  long   total_route_rejs;    /*  num  failed  route  calculations */
        unsigned  long   total_tree_cache_hits;
                                              /* total num of tree cache hits     */
        unsigned  long   total_tree_cache_misses;
                                              /* total num of tree cache          */
                                              /*  misses                          */
        unsigned  char   reserva[20];         /*  reserved                        */
} QUERY_NN_TOPOLOGY_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_NN_TOPOLOGY_STATS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

max_nodes Maximum number of node records in the topology database (zero means unlimited).

cur_num_nodes Current number of nodes in this node's topology database. If this value exceeds the maximum number of nodes allowed, an Alert is issued.

node_in_tdus Total number of topology database updates (TDUs) received by this node.

node_out_tdus Total number of topology database updates (TDUs) built by this node to be sent to all adjacent network nodes since the last initialization.

node_low_rsns Total number of topology node updates received by this node with an RSN less than the current RSN. Both even and odd RSNs are included in this count. (These TDUs are not errors, but result when TDUs are broadcast to all adjacent network nodes. No update to this node's topology database occurs, but this node sends a TDU with its higher RSN to the adjacent node that sent this low RSN.)

node_equal_rsns Total number of topology node updates received by this node with an RSN equal to the current RSN. Both even and odd RSNS are included in this count. (These TDUs are not errors, but result when TDUs are broadcast to all adjacent network nodes. No update to this node's topology database occurs.)

node_good_high_rsns
Total number of topology node updates received by this node with an RSN greater than the current RSN. The node updates its topology and broadcasts a TDU to all adjacent network nodes. It is not required to send a TDU to the sender of this update, because that node already has the update.

node_bad_high_rsns
Total number of topology node updates received by this node with an odd RSN greater than the current RSN. These updates represent a topology inconsistency detected by one of the APPN network nodes. The node updates its topology and broadcasts a TDU to all adjacent network nodes.

QUERY_NN_TOPOLOGY_STATS

node_state_updates
Total number of topology node updates built as a result of internally detected node state changes that affect APPN topology and routing. Updates are sent by TDUs to all adjacent network nodes.

node_errors Total number of topology node update inconsistencies detected by this node. This occurs when this node attempts to update its topology database and detects a data inconsistency. This node creates a TDU with the current RSN incremented to the next odd number and broadcasts it to all adjacent network nodes.

node_timer_updates
Total number of topology node updates built for this node's resource due to timer updates. Updates are sent by TDUs to all adjacent network nodes. These updates ensure that other network nodes do not delete this node's resource from their topology database.

node_purges Total number of topology node records purged from this node's topology database. This occurs when a node record has not been updated in a specified amount of time. The owning node is responsible for broadcasting updates for its resource that it wants kept in the network topology.

tg_low_rsns Total number of topology TG updates received by this node with an RSN less than the current RSN. Both even and odd RSNs are included in this count. (These TDUs are not errors, but result when TDUs are broadcast to all adjacent network nodes. No update to this node's topology database occurs, but this node sends a TDU with its higher RSN to the adjacent node that sent this low RSN.)

tg_equal_rsns Total number of topology TG updates received by this node with an RSN equal to the current RSN. Both even and odd RSNs are included in this count. (These TDUs are not errors, but result when TDUs are broadcast to all adjacent network nodes. No update to this node's topology database occurs.)

tg_good_high_rsns Total number of topology TG updates received by this node with an RSN greater than the current RSN. The node updates its topology and broadcasts a TDU to all adjacent network nodes.

tg_bad_high_rsns Total number of topology TG updates received by this node with an odd RSN greater than the current RSN. These updates represent a topology inconsistency detected by one of the APPN Network Nodes. The node updates its topology and broadcasts a TDU to all adjacent network nodes.

tg_state_updates Total number of topology TG updates built as a result of internally detected node state changes that affect APPN topology and routing. Updates are sent by TDUs to all adjacent network nodes.

tg_errors Total number of topology TG update inconsistencies detected by this node. This occurs when this node attempts to update its topology database and detects a data inconsistency. This node creates a TDU with the current RSN incremented to the next odd number and broadcasts it to all adjacent network nodes.

tg_timer_updates Total number of topology TG updates built for this node's resource due to timer updates. Updates are sent by TDUs to all adjacent network nodes. These updates ensure that other network nodes do not delete this node's resource from their topology database.

tg_purges Total number of topology TG records purged from this node's topology database. This occurs when a node record has not been updated in a specified amount of time. The owning node is responsible for broadcasting updates for its resource that it wants kept in the network topology.

total_route_calcs Number of routes calculated for all classes of service since the last.

total_route_rejs Number of route requests for all classes of service that could not be calculated since the last initialization.

total_tree_cache_hits
Number of route computations that were satisfied by a cached routing tree. Note that this number may be greater than the total number of computed routes, because each route may require inspection of several trees.

total_tree_cache_misses
Number of route computations that were not satisfied by a cached routing tree, so that a new routing tree had to be built.

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_NN_TOPOLOGY_TG

Each network node maintains a network topology database which holds information about the network nodes, VRNs and network-node-to-network-node TGs in the network. QUERY_NN_TOPOLOGY_TG returns information about the TG entries in this database.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific node or to obtain the list information in several "chunks," the **owner**, **owner_type**, **dest**, **dest_type**, **tg_num**, and **frsn** fields should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), these fields are ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is by **owner**, **owner_type**, **dest**, **dest_type**, **tg_num**, and **frsn**. The **owner** name and **dest** name are ordered by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). The **owner_type** and **dest_type** follow the order: AP_NETWORK_NODE, AP_VRN. The **tg_num** and **frsn** are ordered numerically.

If AP_LIST_INCLUSIVE is selected, the returned list starts from the first valid record of that name.

If AP_LIST_FROM_NEXT is selected, the list will begin from the first valid record with a name following the one specified.

If the **frsn** field (flow reduction sequence number) is set to a nonzero value, then only database entries with FRSNs higher than this are returned. This allows a consistent topology database to be returned in a number of "chunks" by first getting the node's current FRSN. This works as follows:

1. Issue QUERY_NODE, which returns the node's current FRSN.
2. Issue as many QUERY_NN_TOPOLOGY_TG (with FRSN set to zero) as necessary to get all the database entries in "chunks."
3. Issue QUERY_NODE again and compare the new FRSN with the one returned in step 1.
4. If the two FRSNs are different, then the database has changed, so issue a QUERY_NN_TOPOLOGY_TG with the FRSN set to 1 greater than the FRSN supplied in step 1.

VCB Structure

```
typedef struct query_nn_topology_tg
{
        unsigned short    opcode;           /* verb operation code          */
        unsigned  char    reserv2;          /*  reserved                    */
        unsigned  char    format;           /*  format                      */
        unsigned short    primary_rc;       /* primary return code          */
        unsigned long     secondary_rc;     /* secondary return code        */
        unsigned char     *buf_ptr;         /* pointer to buffer            */
        unsigned long     buf_size;         /* buffer size                  */
        unsigned long     total_buf_size;   /* total buffer size required   */
        unsigned short    num_entries;      /* number of entries            */
```

```
        unsigned short    total_num_entries; /* total number of entries          */
        unsigned char     list_options;      /* listing options                  */
        unsigned  char    reserv3;           /*  reserved                        */
        unsigned char     owner[17];         /* node that owns the TG            */
        unsigned char     owner_type;        /* type of node that owns the TG*/
        unsigned char     dest[17];          /* TG destination node              */
        unsigned char     dest_type;         /* TG destination node type         */
        unsigned char     tg_num;            /* TG number                        */
        unsigned  char    reserv1;           /*  reserved                        */
        unsigned long     frsn;              /* flow reduction sequence num      */
} QUERY_NN_TOPOLOGY_TG;

typedef struct topology_tg_summary
{
        unsigned short    overlay_size;      /* size of this entry               */
        unsigned char     owner[17];         /* node that owns the TG            */
        unsigned char     owner_type;        /* type of node that owns the TG*/
        unsigned char     dest[17];          /* TG destination node              */
        unsigned char     dest_type;         /* TG destination node type         */
        unsigned char     tg_num;            /* TG number                        */
        unsigned  char    reserv3[1];        /*  reserved                        */
        unsigned long     frsn;              /* flow reduction sequence num      */
} TOPOLOGY_TG_SUMMARY;

typedef struct topology_tg_detail
{
        unsigned short    overlay_size;      /* size of this entry               */
        unsigned char     owner[17];         /* node that owns the TG            */
        unsigned char     owner_type;        /* type of node that owns the TG*/
        unsigned char     dest[17];          /* TG destination node              */
        unsigned char     dest_type;         /* TG destination node type         */
        unsigned char     tg_num;            /* TG number                        */
        unsigned  char    reserv3[1];        /*  reserved                        */
        unsigned long     frsn;              /* flow reduction sequence num      */
        unsigned short    days_left;         /* days left until entry purged */
        LINK_ADDRESS      dlc_data           /* DLC signalling data              */
        unsigned long     rsn;               /* resource sequence number         */
        unsigned char     status;            /* node status                      */
        TG_DEFINED_CHARS tg_chars;           /* TG characteristics               */
        unsigned  char    reserva[20];       /*  reserved                        */
} TOPOLOGY_TG_DETAIL;

typedef struct link_address
{
        unsigned  short   length;            /*  length                          */
        unsigned short reserve1;             /* reserved                         */
        unsigned  char    address[MAX_LINK_ADDR_LEN];
                                             /*  address                         */
} LINK_ADDRESS;
```

Note: If the **frsn** field is set to a nonzero value, then only node entries with that FRSN are returned. If it is set to zero, then all node entries are returned.

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_NN_TOPOLOGY_TG

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of the **owner**, **owner_type**, **dest**, **dest_type**, **tg_num**, and **frsn** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

owner Name of the TG's originating node. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

owner_type Type of the node that owns the TG. This can be one of the following values:

AP_NETWORK_NODE
AP_VRN

If the **owner_type** is unknown, AP_LEARN_NODE must be specified. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dest Fully qualified destination node name for the TG. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dest_type Type of the destination node for this TG. This can be one of the following values:

AP_NETWORK_NODE
AP_VRN

If the **dest_type** is unknown, AP_LEARN_NODE must be specified. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

tg_num Number associated with the TG. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

frsn Flow Reduction Sequence Number. If this is nonzero, then only nodes with a FRSN greater than or equal to this value are returned.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

topology_tg_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

topology_tg_summary.owner
Name of the TG's originating node. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

topology_tg_summary.owner_type
Type of the node that owns the TG. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN

topology_tg_summary.dest
Fully qualified destination node name for the TG. This name is 17 bytes long and is composed of two type-A EBCDIC

character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

topology_tg_summary.dest_type
Type of the destination node for this TG. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN

topology_tg_summary.tg_num
Number associated with the TG.

topology_tg_summary.frsn
Flow Reduction Sequence Number. It indicates the last time that this resource was updated at the local node.

topology_tg_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

topology_tg_detail.owner
Name of the TG's originating node. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

topology_tg_detail.owner_type
Type of the node that owns the TG. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN

topology_tg_detail.dest
Fully qualified destination node name for the TG. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot and is right padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

topology_tg_detail.dest_type
Type of the destination node for this TG. This is set to one of the following values:

AP_NETWORK_NODE
AP_VRN

topology_tg_detail.tg_num
Number associated with the TG.

topology_tg_detail.frsn
Flow Reduction Sequence Number. It indicates the last time that this resource was updated at the local node.

topology_node_detail.days_left
Number of days before deletion of this node entry from the topology database.

topology_tg_detail.dlc_data.length
Length of DLC address of connection to a VRN (set to zero if **dest_type** is not AP_VRN). .

topology_tg_detail.dlc_data.address
DLC address of connection to VRN. This is set to zero if **dest_type** is not AP_VRN. .

topology_tg_detail.rsn
Resource Sequence Number. This is assigned by the network node that owns this resource.

topology_tg_detail.status
Specifies the status of the TG. This can be one or more of the following values ORed together:

AP_TG_OPERATIVE
AP_TG_QUIESCING
AP_TG_CP_CP_SESSIONS
AP_TG_HPR
AP_TG_RTP
AP_TG_NONE

topology_tg_detail.tg_chars
TG characteristics.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TG

AP_INVALID_ORIGIN_NODE
AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_NODE

QUERY_NODE returns node specific information and statistics. In addition to returning information determined dynamically during execution, QUERY_NODE also returns parameters which are set during node initialization.

VCB Structure

```
typedef struct query_node
{
        unsigned short   opcode;                  /* verb operation code                  */
        unsigned  char   reserv2;                 /*  reserved                           */
        unsigned  char   format;                  /*  format                             */
        unsigned short   primary_rc;              /* primary return code                 */
        unsigned long    secondary_rc;            /* secondary return code               */
        CP_CREATE_PARMS cp_create_parms;          /* create parameters                   */
        unsigned long    up_time;                 /* time since node started             */
        unsigned long    mem_size;                /* size of memory available            */
        unsigned long    mem_used;                /* size of memory used                 */
        unsigned  long   mem_warning_threshold;
                                                  /* memory constrained                  */
                                                  /*  threshold                          */
        unsigned  long   mem_critical_threshold;
                                                  /* memory critical threshold           */
        unsigned  char   nn_functions_supported;
                                                  /* NN functions supported              */
        unsigned  char   functions_supported;
                                                  /* functions supported                 */
        unsigned  char   en_functions_supported;
                                                  /* EN functions supported              */
        unsigned char    nn_status;               /* node status.   One or more of */
        unsigned long    nn_frsn;                 /* NN flow reduction                   */
                                                  /* sequence number                     */
        unsigned long    nn_rsn;                  /* Resource sequence number            */
        unsigned short   def_ls_good_xids;        /* Good XIDs for defined               */
                                                  /* link stations                       */
        unsigned short   def_ls_bad_xids;         /* Bad XIDs for defined                */
                                                  /* link stations                       */
        unsigned short   dyn_ls_good_xids;        /* Good XIDs for dynamic               */
                                                  /* link stations                       */
        unsigned short   dyn_ls_bad_xids;         /* Bad XIDs for dynamic                */
                                                  /* link stations                       */
        unsigned char    dlur_release_level; /* Current DLUR release level          */
        unsigned  char   reserva[19];             /*  reserved                           */
} QUERY_NODE;

typedef struct cp_create_parms
{
        unsigned short   crt_parms_len;           /* length of CP_CREATE_PARMS           */
        unsigned  char   description[RD_LEN];
                                                  /* resource description                */
        unsigned char    node_type;               /* node type                           */
        unsigned char    fqcp_name[17];           /* fully qualified CP name             */
        unsigned char    cp_alias[8];             /* CP alias                            */


        unsigned  char   mode_to_cos_map_supp;
                                                  /* mode to COS mapping support         */
```

```
    unsigned char     mds_supported;          /* MDS and MS capabilities          */
    unsigned char     node_id[4];             /* node ID                          */
    unsigned short    max_locates;            /* max locates node can process */
    unsigned short    dir_cache_size;         /* directory cache size             */
                                              /* (reserved) if not NN)            */
    unsigned short    max_dir_entries;        /* max directory entries            */
    unsigned short    locate_timeout;         /* locate timeout in seconds        */
    unsigned char     reg_with_nn;            /* register resources with NNS    */
    unsigned char     reg_with_cds;           /* resource registration with     */
                                              /*  CDS                                */
   unsigned  short    mds_send_alert_q_size;
                                              /* size of MDS send alert queue */
    unsigned short    cos_cache_size;         /* number of COS definitions        */
    unsigned short    tree_cache_size;        /* Topology Database routing        */
                                              /* tree cache size                  */
   unsigned  short    tree_cache_use_limit;
                                              /* num times tree can be used       */
    unsigned short    max_tdm_nodes;          /* max num nodes that can be        */
                                              /* stored in Topology Database    */
    unsigned short    max_tdm_tgs;            /* max num TGs that can be          */
                                              /* stored in Topology Database    */
    unsigned  long    max_isr_sessions;     /*  max  ISR  sessions                */
   unsigned  long     isr_sessions_upper_threshold;
                                              /* upper threshold for ISR sess */
   unsigned  long     isr_sessions_lower_threshold;
                                              /* lower threshold for ISR sess */
    unsigned short    isr_max_ru_size;        /* max RU size for ISR              */
    unsigned short    isr_rcv_pac_window; /* ISR rcv pacing window size      */
    unsigned char     store_endpt_rscvs;    /* endpoint RSCV storage            */
    unsigned char     store_isr_rscvs;      /* ISR RSCV storage                 */
    unsigned  char    store_dlur_rscvs;     /*  DLUR  RSCV  storage                */
    unsigned char     dlur_support;           /* is DLUR supported?               */
    unsigned char     pu_conc_support;        /* is PU conc supported?            */
    unsigned char     nn_rar;                 /* Route additional resistance    */
    unsigned char     hpr_support;            /* level of HPR support             */
    unsigned char     mobile;                 /* HPR path-switch controller?    */
    unsigned char     discovery_support;    /* Discovery function utilized    */
   unsigned  char     discovery_group_name[8];
                                              /* Group name for Discovery         */
   unsigned  char     implicit_lu_0_to_3;
                                              /* Implicit LU 0 to 3 support       */
   unsigned  char     default_preference;
                                              /* Default routing preference       */
   unsigned  char     anynet_supported;
                                              /* Support for non-native           */
                                              /* (AnyNet) routing                   */
   unsigned  char     reserv2[4];             /*  reserved                        */
    unsigned  char    max_compress_lvl;     /*  maximum  compression  level    */
    unsigned char     node_spec_data_len; /* length of node specific data */
    unsigned char     ptf[64];                /* program temporary fix array    */
} CP_CREATE_PARMS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_NODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

cp_create_parms.crt_parms_len
Length of create parameters structure.

cp_create_parms.description
Resource description. This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

cp_create_parms.node_type
It is always

AP_END_NODE

cp_create_parms.fqcp_name
Node's 17-byte fully qualified control point name. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name has a maximum length of 8 bytes with no embedded spaces.)

cp_create_parms.cp_alias
Locally used control point alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

cp_create_parms.mode_to_cos_map_supp
Specifies whether mode to COS mapping is supported by the node (AP_YES or AP_NO). If this is set to AP_YES then the COS specified on a DEFINE_MODE verb must either be an SNA defined COS or have been defined by issuing a DEFINE_COS verb.

cp_create_parms.mds_supported
Specifies whether management services supports Multiple Domain Support and Management Services Capabilities (AP_YES or AP_NO).

cp_create_parms.node_id
Node identifier used in XID exchange. This a 4-byte hexadecimal string.

cp_create_parms.max_locates
Maximum number of locates that the node can process.

cp_create_parms.dir_cache_size
Network node only: Size of the directory cache.

cp_create_parms.max_dir_entries
Maximum number of directory entries. This is unlimited if this field is set to zero.

cp_create_parms.locate_timeout
Specifies the time in seconds before a network search will timeout. A value of zero indicates that the search has no timeout.

cp_create_parms.reg_with_nn
Specifies whether resources will be registered with the network node server (AP_YES or AP_NO). If this field is set to AP_YES then the end node's network node server will only forward directed locates to it. If it is not set, the network node server will forward all broadcast searches to the end node. Registration failure does not affect successful completion of node initialization. See "REGISTRATION_FAILURE" on page 424 for details.

cp_create_parms.reg_with_cds
Specifies whether the Network node server is allowed to register end node resources with a central directory server (AP_YES or AP_NO). (This field is ignored if **reg_with_nn** is set to AP_NO.) Network node: Specifies whether local or domain resources can be optionally registered with Central Directory Server (AP_YES or AP_NO). Registration failure does not affect successful completion of node initialization.

cp_create_parms.mds_send_alert_q_size
Size of the MDS send alert queue. When this limit is reached, the MDS component deletes the oldest entry on the queue.

cp_create_parms.cos_cache_size
Size of the COS Database weights cache.

cp_create_parms.tree_cache_size
Size of the topology database routing tree cache size.

cp_create_parms.tree_cache_use_limit
Maximum number of uses of a cached tree. Once this number is exceeded, the tree is discarded and recomputed. This allows the node to balance sessions among equal weight routes. A low value provides better load balancing at the expense of increased activation latency.

cp_create_parms.max_tdm_nodes
Maximum number of nodes that can be stored in topology database (zero means unlimited).

cp_create_parms.max_tdm_tgs
Maximum number of TGs that can be stored in topology database (zero means unlimited).

cp_create_parms.max_isr_sessions
Maximum number of ISR sessions the node can participate in at once.

cp_create_parms.isr_sessions_upper_threshold
See **cp_create_parms.isr_sessions_lower_threshold**

cp_create_parms.isr_sessions_lower_threshold
The upper and lower thresholds control the node's congestion status. The node state changes from

uncongested to congested if the number of ISR sessions exceeds the upper threshold. The node state changes back to uncongested once the number of ISR sessions dips below the lower threshold.

cp_create_parms.isr_max_ru_size
Maximum RU size supported for intermediate sessions.

cp_create_parms.isr_rcv_pac_window
Suggested receive pacing window size for intermediate sessions. This value is only used on the secondary hop of intermediate sessions if the adjacent node does not support adaptive pacing.

cp_create_parms.store_endpt_rscvs
Specifies whether RSCVs are stored for diagnostic purposes (AP_YES or AP_NO).

cp_create_parms.store_isr_rscvs
Specifies whether RSCVs are stored for diagnostic purposes (AP_YES or AP_NO).

cp_create_parms.store_dlur_rscvs
Specifies whether the node stores RSCVs for diagnostic purposes (AP_YES or AP_NO). If this field is set to AP_YES, then an RSCV is returned on the QUERY_DLUR_LU verb.

cp_create_parms.dlur_support
Specifies whether DLUR is supported (AP_YES or AP_NO).

cp_create_parms.pu_conc_support
Specifies whether PU concentration is supported (always AP_NO).

cp_create_parms.nn_rar
The network node's route additional resistance.

cp_create_parms.hpr_support
Specifies the level of support for HPR that is provided by the node (AP_NONE, AP_BASE, or AP_RTP).

cp_create_parms.mobile
Specifies whether the node is an HPR path-switch controller (AP_YES or AP_NO). If the **cp_create_parms.hpr_support** field is not set to AP_RTP this field is reserved.

cp_create_parms.discovery_support
Specifies whether Discovery functions are utilized by this node.

AP_DISCOVERY_CLIENT
Discovery client functions are used by this node

AP_DISCOVERY_SERVER
Discovery server functions are used by this node.

cp_create_parms.discovery_group_name
Specifies the group name used on Discovery functions utilized by the node. If this field is set to all zeros, the default group name is used.

cp_create_parms.implicit_lu_0_to_3
Specifies whether the node supports implicit definition of LUs of type 0 to 3 by ACTLU (AP_YES or AP_NO).

cp_create_parms.default_preference
Specifies the preferred method of routing when initiating sessions from this node.

Note: This can be overridden on a per LU basis using the DEFINE_PARTNER_LU verb.

This field can take the following values:

AP_NATIVE
Use native (APPN) routing protocols only.

AP_NONNATIVE
Use non-native (AnyNet) routing protocols only.

AP_NATIVE_THEN_NONNATIVE
Try native (APPN) protocols, and if the partner LU cannot be located, then retry session activation using non-native (AnyNet) protocols.

AP_NONNATIVE_THEN_NATIVE
Try non-native (AnyNet) protocols, and if the partner LU cannot be located, then retry session activation using native (APPN) protocols.

Note: The latter three values are only meaningful when an AnyNet DLC is available to the Node Operator Facility, and there is an AnyNet Link Station defined.

cp_create_parms.anynet_supported
Specifies support for AnyNet (TCP/IP) routing.

cp_create_parms.max_compress_lvl
The maximum compression level supported by the node.

AP_NONE
The node does not support compression.

AP_RLE_COMPRESSION
The node can support RLE compression.

cp_create_parms.node_spec_data_len
This field should always be set to zero.

cp_create_parms.ptf
Array for configuring and controlling future program temporary fix (PTF) operation.

cp_create_parms.ptf[0]
REQDISCONT support. Personal Communications or Communications Server normally uses REQDISCONT to deactivate limited resource host links that are no longer required by session traffic. This byte can be used to suppress Personal Communications or Communications Server 's use of REQDISCONT, or to modify the settings used on REQDISCONT requests sent by Personal Communications or Communications Server .

AP_SUPPRESS_REQDISCONT
If this bit is set, Personal Communications or Communications Server does not use REQDISCONT (all other bits in this byte are ignored).

AP_OVERRIDE_REQDISCONT
If this bit is set, Personal Communications or Communications Server overrides the normal settings on REQDISCONT, based on the following two bits:

AP_REQDISCONT_TYPE
If this bit is set, Personal Communications or Communications Server specifies a type of “immediate” on REQDISCONT. Otherwise, Personal Communications or Communications Server specifies a type of “normal”. (This bit is ignored if AP_OVERRIDE_REQDISCONT is not set.)

AP_REQDISCONT_RECONTACT
If this bit is set, Personal Communications or Communications Server specifies “immediate recontact” in REQDISCONT. Otherwise,Personal Communications or Communications Server specifies “no immediate recontact”. (This bit is ignored if AP_OVERRIDE_REQDISCONT is not set.)

cp_create_parms.ptf[1]

ERP support.

Personal Communications or Communications Server normally processes an ACTPU(ERP) as an ERP (ACTPU(ERP) requests the PU-SSCP session be reset, but, unlike ACTPU(cold), does not request implicit deactivation of the subservient LU-SSCP and PLU-SLU sessions). SNA implementations can legally process ACTPU(ERP) as if it were ACTPU(cold).

AP_OVERRIDE_ERP
If this bit is set, Personal Communications or Communications Server processes all ACTPU requests as ACTPU(cold).

cp_create_parms.ptf[2]

BIS support.

Personal Communications or Communications Server normally uses the BIS protocol prior to deactivating a limited resource LU 6.2 session. This byte allows the use of BIS to be overridden.

AP_SUPPRESS_BIS
If this bit is set, Personal Communications or Communications Server does not use the BIS protocol. Limited resource LU 6.2 session are deactivated immediately using UNBIND(cleanup).

up_time Time (in hundredths of a second) since the node was started (or restarted).

mem_size Size of the available storage, as obtained by storage management from the underlying operating system.

mem_used Number of bytes of storage that are currently allocated to a process.

mem_warning_threshold
Allocation threshold beyond which storage management considers the storage resources to be constrained.

mem_critical_threshold
Allocation threshold beyond which storage management considers the storage resources to be critically constrained.

nn_functions_supported
Reserved.

functions_supported
Specifies which functions are supported. This can be one or more of the following values:

AP_NEGOTIABLE_LS
AP_SEGMENT_REASSEMBLY
AP_BIND_REASSEMBLY
AP_PARALLEL_TGS
AP_CALL_IN
AP_ADAPTIVE_PACING

en_functions_supported
Specifies the end-node functions supported.

AP_SEGMENT_GENERATION
Node supports segment generation.

AP_MODE_TO_COS_MAP
Node supports mode name to COS name mapping.

AP_LOCATE_CDINIT
Node supports generation of locates and cross-domain initiate GDS variables for locating remote LUs.

AP_REG_WITH_NN
Node will register its LUs with the adjacent serving network node.

AP_REG_CHARS_WITH_NN
Node supports send register characteristics (can only be supported when send registered names is also supported).

nn_status Reserved.

nn_frsn Reserved.

nn_rsn Reserved.

def_ls_good_xids Total number of successful XID exchanges that have occurred on all defined link stations since the node was last started.

def_ls_bad_xids Total number of unsuccessful XID exchanges that have occurred on all defined link stations since the node was last started.

dyn_ls_good_xids Total number of successful XID exchanges that have occurred on all dynamic link stations since the node was last started.

dyn_ls_bad_xids Total number of unsuccessful XID exchanges that have occurred on all dynamic link stations since the node was last started.

dlur_release_level Specifies the current DLUR release level.

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_PARTNER_LU

QUERY_PARTNER_LU returns information about partner LUs that have been used by a local LU.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific partner LU, or to obtain the list information in several "chunks," the **plu_alias** field should be set (or the **fqplu_name** if the **plu_alias** is set to all zeros). If the **list_options** field is set to AP_FIRST_IN_LIST, both of these fields will be ignored. The **lu_name** or **lu_alias** field must always be set. The **lu_name**, if nonzero, will be used in preference to the **lu_alias**. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by the **fqplu_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering). If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

If **plu_alias** is set to all zeros, the **fqplu_name** value will be used; otherwise, the **plu_alias** is always used and the **fqplu_name** is ignored.

The list of partner LUs returned can be filtered according to whether they currently have any active sessions. If filtering is desired, the **active_sessions** field should be set to AP_YES (otherwise this field should be set to AP_NO).

This verb returns information that is determined when at least one session is established with the partner LU.

The QUERY_PARTNER_LU_DEFINITION verb returns definition information only.

VCB Structure

```
typedef struct query_partner_lu
{
    unsigned short     opcode;              /* verb operation code              */
    unsigned  char     reserv2;             /*  reserved                        */
    unsigned  char     format;              /*  format                          */
    unsigned short     primary_rc;          /* primary return code              */
    unsigned long      secondary_rc;        /* secondary return code            */
    unsigned char      *buf_ptr;            /* pointer to buffer                */
    unsigned long      buf_size;            /* buffer size                      */
    unsigned long      total_buf_size;      /* total buffer size required       */
    unsigned short     num_entries;         /* number of entries                */
    unsigned short     total_num_entries;   /* total number of entries          */
    unsigned char      list_options;        /* listing options                  */
    unsigned  char     reserv3;             /*  reserved                        */
    unsigned char      lu_name[8];          /* LU name                          */
    unsigned char      lu_alias[8];         /* LU alias                         */
    unsigned char      plu_alias[8];        /* partner LU alias                 */
    unsigned char      fqplu_name[17];      /* fully qualified partner          */
                                            /* LU name                          */
    unsigned char      active_sessions;     /* active sessions only filter      */
} QUERY_PARTNER_LU;
```

QUERY_PARTNER_LU

```
typedef struct plu_summary
{
    unsigned short   overlay_size;          /* size of this entry                */
    unsigned char    plu_alias[8];          /* partner LU alias                  */
    unsigned char    fqplu_name[17];        /* fully qualified partner           */
                                            /* LU name                           */
   unsigned  char    reserv1;               /*  reserved                         */
   unsigned  char    description[RD_LEN];
                                            /* resource description              */
    unsigned short   act_sess_count;        /* curr active sessions count        */
    unsigned char    partner_cp_name[17]; /* partner LU CP name                */
    unsigned char    partner_lu_located;  /* CP name resolved?                 */
} PLU_SUMMARY;

typedef struct plu_detail
{
    unsigned short   overlay_size;          /* size of this entry                */
    unsigned char    plu_alias[8];          /* partner LU alias                  */
    unsigned char    fqplu_name[17];        /* fully qualified partner           */
                                            /* LU name                           */
   unsigned  char    reserv1;               /*  reserved                         */
   unsigned  char    description[RD_LEN];
                                            /* resource description              */
    unsigned short   act_sess_count;        /* curr active sessions count        */
    unsigned char    partner_cp_name[17]; /* partner LU CP name                */
    unsigned char    partner_lu_located;  /* CP name resolved?                 */
    unsigned char    plu_un_name[8];        /* partner LU uninterpreted name     */
    unsigned char    parallel_sess_supp;  /* parallel sessions supported?      */
    unsigned char    conv_security;         /* conversation security             */
    unsigned short   max_mc_ll_send_size; /* max send LL size for mapped       */
                                            /*  conversations                    */
    unsigned char    implicit;              /* implicit or explicit entry        */
    unsigned char    security_details;    /* conversation security detail      */
    unsigned char    duplex_support;        /* full-duplex support               */
    unsigned char    preference;            /* routing preference                */
   unsigned  char    reserva[16];           /*  reserved                         */
} PLU_DETAIL;
```

The application supplies the following parameters:

opcode AP_QUERY_PARTNER_LU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of the **lu_name** (or **lu_alias** if the **lu_name** is set to all zeros) and **plu_alias** (or **fqplu_name** if the **plu_alias** is set to all zeros) specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned:

AP_FIRST_IN_LIST
The **plu_alias** and **fqplu_name** fields are ignored and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name LU name. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the index.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** are set to all zeros then the LU associated with the control point (the default LU) is used.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field will be used as the index value.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

active_sessions Active session filter. Specifies whether the returned partner LUs should be filtered according to whether they currently have any active sessions (AP_YES or AP_NO).

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

plu_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

plu_summary.plu_alias
Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

plu_summary.fqplu_name
17-byte fully qualified network name for the partner LU. This name is 17 bytes long and is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

plu_summary.description
Resource description (as specified on DEFINE_PARTNER_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

plu_summary.act_sess_count
Total number of active sessions between the local LU and the partner LU. If the **active_sessions** filter has been set to AP_YES, then this field will always be greater than zero.

plu_summary.partner_cp_name
17-byte fully qualified network name for the control point of the partner LU. This name is composed of two type A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

plu_summary.partner_lu_located
Specifies whether the control point name for the partner LU has been resolved (AP_YES or AP_NO).

plu_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

plu_detail.plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

plu_detail.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

plu_detail.description
Resource description (as specified on DEFINE_PARTNER_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

plu_detail.act_sess_count
Total number of active sessions between the local LU and the partner LU. If the **active_sessions** filter has been set to AP_YES, then this field will always be greater than zero.

plu_detail.partner_cp_name
17-byte fully qualified network name for the control point of the partner LU. This name is composed of two type A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

plu_detail.partner_lu_located
Specifies whether the control point name for the partner LU has been resolved (AP_YES or AP_NO).

plu_detail.plu_un_name
Uninterpreted name of the partner LU. This is an 8-byte type-A EBCDIC character string.

plu_detail.parallel_sess_supp
Specifies whether parallel sessions are supported (AP_YES or AP_NO).

plu_detail.conv_security
Specifies whether conversation security information can be sent to this partner LU (AP_YES or AP_NO). If it is set to AP_NO, then any security information supplied by a transaction program is not sent to the partner LU.

plu_detail.max_mc_ll_send_size
Maximum size of logical length (LL) record that can be sent to the partner LU. Data records that are larger than this are broken down into several LL records before being sent to the partner LU. The maximum value **max_mc_ll_send_size** can take is 32767.

plu_detail.implict Specifies whether the entry is the result of an implicit (AP_YES) or explicit (AP_NO) definition.

plu_detail.security_details
Returns the conversation security support as negotiated on the BIND. This can be one or more of the following values:

AP_CONVERSATION_LEVEL_SECURITY
Conversation security information will be accepted on requests to or from the partner LU to allocate a conversation. The specific types of conversation security support are described by the following values.

AP_ALREADY_VERIFIED
Both local and partner LU agree to accept already verified requests to allocate a conversation. An already verified request need carry only a user ID, and not a password.

AP_PERSISTENT_VERIFICATION
Persistent verification is supported on the session between the local and partner LUs. This means that, once the initial request (carrying a user ID and, typically, a password) for a

conversation has been verified, subsequent requests for a conversation need only carry the user ID.

AP_PASSWORD_SUBSTITUTION
The local and partner LU support password substitution conversation security. When a request to allocate a conversation is issued, the request carries an encrypted form of the password. If password substitution is not supported, the password is carried in clear text (nonencrypted) format.

Note: If the session does not support password substitution, then an ALLOCATE or SEND_CONVERSATION with security type of AP_PGM_STRONG will fail.

plu_detail.duplex_support
Returns the conversation duplex support as negotiated on the BIND. This is one of the following values:

AP_HALF_DUPLEX
Only half-duplex conversations are supported.

AP_FULL_DUPLEX
Full-duplex as well as half-duplex conversations are supported.

AP_UNKNOWN
The conversation duplex support is not known because there are no active sessions to the partner LU.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PLU_NAME

AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS
AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_PARTNER_LU_DEFINITION

QUERY_PARTNER_LU_DEFINITION returns information that had previously been passed in on a DEFINE_PARTNER_LU verb.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific partner LU, or to obtain the list information in several "chunks," the **plu_alias** field (or the **fqplu_name** if the **plu_alias** is set to all zeros) should be set. If the **plu_alias** field is nonzero it will be used to determine the index and the **fqplu_name** is ignored. If the **plu_alias** field is set to all zeros, the **fqplu_name** will be used to determine the index. If the **list_options** field is set to AP_FIRST_IN_LIST then both of these fields will be ignored. (In this case the returned list will be ordered by **plu_alias** if the AP_LIST_BY_ALIAS **list_options** is set, otherwise it will be ordered by **fqplu_name**). See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered on either **plu_alias** or **fqplu_name** according to the options specified. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering). If AP_LIST_FROM_NEXT is selected the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

Note this verb returns definition information only. The QUERY_PARTNER_LU verb returns information that is determined when at least one session is established with the partner LU.

VCB Structure

```
typedef struct query_partner_lu_definition
{
    unsigned short   opcode;              /* verb operation code          */
   unsigned  char    reserv2;             /*  reserved                    */
   unsigned  char    format;              /*  format                      */
    unsigned short   primary_rc;          /* primary return code          */
    unsigned long    secondary_rc;        /* secondary return code        */
    unsigned char    *buf_ptr;            /* pointer to buffer            */
    unsigned long    buf_size;            /* buffer size                  */
    unsigned long    total_buf_size;      /* total buffer size required   */
    unsigned short   num_entries;         /* number of entries            */
    unsigned short   total_num_entries;   /* total number of entries      */
    unsigned char    list_options;        /* listing options              */
   unsigned  char    reserv3;             /*  reserved                    */
    unsigned char    plu_alias[8];        /* partner LU alias             */
    unsigned char    fqplu_name[17];      /* fully qualified partner      */
                                          /* LU name                      */
} QUERY_PARTNER_LU_DEFINITION;

typedef struct partner_lu_def_summary
{
    unsigned short   overlay_size;        /* size of this entry           */
    unsigned char    plu_alias[8];        /* partner LU alias             */
    unsigned char    fqplu_name[17];      /* fully qualified partner      */
                                          /* LU name                      */
   unsigned  char    description[RD_LEN];
```

```
                                                    /* resource description              */
} PARTNER_LU_DEF_SUMMARY;

typedef struct partner_lu_def_detail
{
    unsigned short   overlay_size;          /* size of this entry                  */
    unsigned char    plu_alias[8];          /* partner LU alias                    */
    unsigned char    fqplu_name[17];        /* fully qualified partner             */
                                            /* LU name                             */
   unsigned  char    reserv1;               /*  reserved                           */
    PLU_CHARS           plu_chars;          /* partner LU characteristics          */
} PARTNER_LU_DEF_DETAIL;

typedef struct plu_chars
{
    unsigned char    fqplu_name[17];        /* fully qualified partner             */
                                            /* LU name                             */
    unsigned char    plu_alias[8];          /* partner LU alias                    */
    unsigned char    description[RD_LEN]; /* resource description                */
    unsigned char    plu_un_name[8];        /* partner LU uninterpreted name */
    unsigned char    preference;            /* routing preference                  */
   unsigned  short   max_mc_ll_send_size;
                                            /* max MC send LL size                 */
   unsigned  char    conv_security_ver;   /*  already_verified  accepted          */
    unsigned char    parallel_sess_supp;  /* parallel sessions supported?    */
   unsigned  char    reserv2[8];            /*  reserved                           */
} PLU_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_PARTNER_LU_DEFINITION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **plu_alias** (or the **fqplu_name** if the **plu_alias** is set to all zeros) specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

AP_LIST_BY_ALIAS
The returned list is ordered by **plu_alias**. This option is only valid when AP_FIRST_IN_LIST is specified. If AP_LIST_FROM_NEXT or AP_LIST_INCLUSIVE is specified, the list ordering will depend on whether the **plu_alias** or **fqplu_name** has been supplied as a starting point.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field is used to specify the required partner LU. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**

partner_lu_def_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

partner_lu_def_summary.plu_alias
Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

partner_lu_def_summary.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

partner_lu_def_summary.description
Resource description (as specified on DEFINE_PARTNER_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

partner_lu_def_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

partner_lu_def_detail.plu_alias
Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

partner_lu_def_detail.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

partner_lu_def_detail.plu_chars.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

partner_lu_def_detail.plu_chars.plu_alias
Partner LU alias.

partner_lu_def_detail.plu_chars.description
Resource description (as specified on DEFINE_PARTNER_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

partner_lu_def_detail.plu_chars.plu_un_name
Uninterpreted name of the partner LU. This is an 8-byte type-A EBCDIC character string.

plu_chars.preference
The set of routing protocols to be preferred for session activation to this partner LU. This field can take the following values:

AP_NATIVE
Use native (APPN) routing protocols only.

AP_NONNATIVE
Use non-native (AnyNet) routing protocols only.

AP_NATIVE_THEN_NONNATIVE
Try native (APPN) protocols, and if the partner LU cannot be located then retry session activation using non-native (AnyNet) protocols.

AP_NONNATIVE_THEN_NATIVE
Try non-native (AnyNet) protocols, and if the partner LU cannot be located then retry session activation using native (APPN) protocols.

AP_USE_DEFAULT_PREFERENCE
Use the default preference defined when the node was started.

Note: Non-native routing is only meaningful when an AnyNet DLC is available to the Node Operator Facility, and there is an AnyNet link station defined.

partner_lu_def_detail.plu_chars.max_mc_ll_send_size
Maximum size of logical length (LL) record that can be sent to the partner LU. Data records that are larger than this are broken down into several LL records before being sent to the partner LU. The maximum value **max_mc_ll_send_size** can take is 32 767.

partner_lu_def_detail.plu_chars.conv_security_ver
Specifies whether the partner LU is authorized to validate **user_ids** on behalf of local LUs, that is whether the partner LU can set the already verified indicator in an Attach request.

AP_YES
AP_NO

partner_lu_def_detail.plu_chars.parallel_sess_supp
Specifies whether parallel sessions are supported (AP_YES or AP_NO).

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PLU_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_PORT

QUERY_PORT returns a list of information about a node's ports. This information is structured as “determined data” (data gathered dynamically during execution) and “defined data” (the data supplied by the application on DEFINE_PORT).

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific port, or to obtain the list information in several “chunks,” the **port_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **port_name**. Ordering is by name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with IBM's 6611 APPN MIB ordering). If AP_LIST_FROM_NEXT is selected, the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

The list of ports returned can be filtered by the name of the DLC that they belong to. In this case the **dlc_name** field should be set (otherwise this field should be set to all zeros).

VCB Structure

```
typedef struct query_port
{
    unsigned short   opcode;                /* verb operation code              */
    unsigned  char   reserv2;               /*  reserved                        */
    unsigned  char   format;                /*  format                          */
    unsigned short   primary_rc;            /* primary return code              */
    unsigned long    secondary_rc;          /* secondary return code            */
    unsigned char    *buf_ptr;              /* pointer to buffer                */
    unsigned long    buf_size;              /* buffer size                      */
    unsigned long    total_buf_size;        /* total buffer size required       */
    unsigned short   num_entries;           /* number of entries                */
    unsigned  short  total_num_entries;     /*  total  number  of  entries      */
    unsigned char    list_options;          /* listing options                  */
    unsigned  char   reserv3;               /*  reserved                        */
    unsigned char    port_name[8];          /* port name                        */
    unsigned char    dlc_name[8];           /* DLC name filter                  */
} QUERY_PORT;

typedef struct port_summary
{
    unsigned short   overlay_size;          /* size of this entry               */
    unsigned char    port_name[8];          /* port name                        */
    unsigned  char   description[RD_LEN];
                                            /* resource description             */
    unsigned char    port_state;            /* port state                       */
    unsigned  char   reserv1[1];            /*  reserved                        */
    unsigned char    dlc_name[8];           /* name of DLC                      */
} PORT_SUMMARY;
```

```
typedef struct port_detail
{
    unsigned short    overlay_size;          /* size of this entry                */
    unsigned char     port_name[8];           /* port name                         */
    unsigned  char    reserv1[2];            /*  reserved                         */
    PORT_DET_DATA     det_data;                /*  determined  data                */
    PORT_DEF_DATA     def_data;                /*  defined  data                   */
} PORT_DETAIL;

typedef struct port_det_data
{
    unsigned char     port_state;            /* port state                        */
    unsigned char     dlc_type;               /* DLC type                         */
    unsigned char     port_sim_rim;           /* port initialization options      */
    unsigned  char    reserv1;               /*  reserved                         */
    unsigned short    def_ls_good_xids;      /* number of successful XIDs         */
    unsigned short    def_ls_bad_xids;       /* number of unsuccessful XIDs       */
    unsigned short    dyn_ls_good_xids;      /* successful XIDs on dynamic        */
                                             /* LS count                          */
    unsigned short    dyn_ls_bad_xids;       /* failed XIDs on dynamic            */
                                             /* LS count                          */
    unsigned  char    reserva[20];           /*  reserved                         */
} PORT_DET_DATA;

typedef struct port_def_data
{
    unsigned  char    description[RD_LEN];
                                             /* resource description             */
    unsigned char     dlc_name[8];            /* DLC name associated with port    */
    unsigned char     port_type;              /* port type                        */
    unsigned char     reserv3[7];             /* unsigned char                    */
    unsigned long     port_number;            /* port number                      */
    unsigned short    max_rcv_btu_size;      /* max receive BTU size              */
    unsigned short    tot_link_act_lim;      /* total link activation limit       */
    unsigned short    inb_link_act_lim;      /* inbound link activation limit     */
    unsigned short    out_link_act_lim;      /* outbound link activation limit    */
    unsigned char     ls_role;                /* initial link station role        */
    unsigned  char    reserv1[15];           /*  reserved                         */
    unsigned  char    implicit_dspu_template[8];
                                             /* implicit DSPU template           */
    unsigned  char    reserv2[3];            /*  reserved                         */
    unsigned  char    implicit_dspu_services;
                                             /* implicit links support DSPUs      */
    unsigned  short   implicit_deact_timer;
                                             /* Implicit link HPR link           */
                                             /* deactivation timer               */
    unsigned  short   act_xid_exchange_limit;
                                             /* activation XID exchange limit     */
    unsigned  short   nonact_xid_exchange_limit;
                                             /* non-act. XID exchange limit       */
    unsigned char     ls_xmit_rcv_cap;       /* LS transmit-rcv capability        */
    unsigned char     max_ifrm_rcvd;          /* max number of I-frames that      */
                                             /* can be received                  */
    unsigned  short   target_pacing_count;
                                             /* target pacing count              */
    unsigned  short   max_send_btu_size;   /*  max  send  BTU  size              */
    LINK_ADDRESS      dlc_data;               /* DLC data                         */
    LINK_ADDRESS      hpr_dlc_data;           /* HPR DLC data                     */
```

```
    unsigned  char    implicit_cp_cp_sess_support;
                                                /* Implicit links allow CP-CP          */
                                                /*  sessions                                  */
    unsigned  char    implicit_limited_resource;
                                                /* Implicit links are                  */
                                                /* limited resource                      */
    unsigned  char    implicit_hpr_support;
                                                /* Implicit links support HPR          */
    unsigned  char    implicit_link_lvl_error;
                                                /* Implicit links support              */
                                                /* HPR link-level error recovery      */
    unsigned  char    retired1;                 /*  reserved                                 */
     TG_DEFINED_CHARS default_tg_chars;   /* Default TG chars                          */
    unsigned  char    discovery_supported;
                                                /* Discovery function supported?      */
     unsigned short   port_spec_data_len; /* length of port spec data              */
     unsigned short   link_spec_data_len; /* length of link spec data              */
} PORT_DEF_DATA;

typedef struct link_address
{
          unsigned  short   length;            /*  length                                  */
          unsigned  short   reserve1;          /*  reserved                                */
          unsigned  char    address[MAX_LINK_ADDR_LEN];
                                                /*  address                                  */
} LINK_ADDRESS;

typedef struct tg_defined_chars
{
           unsigned char    effect_cap;       /* effective capacity                    */
           unsigned  char   reserve1[5];     /*  reserved                                 */
           unsigned char    connect_cost;    /* connection cost                        */
           unsigned char    byte_cost;        /* byte cost                               */
          unsigned  char    reserve2;         /*  reserved                                */
          unsigned  char    security;         /*  security                                */
           unsigned char    prop_delay;       /* propagation delay                      */
           unsigned  char   modem_class;     /*  modem  class                             */
          unsigned  char    user_def_parm_1;
                                                /* user_defined parameter 1            */
          unsigned  char    user_def_parm_2;
                                                /* user_defined parameter 2            */
          unsigned  char    user_def_parm_3;
                                                /* user_defined parameter 3            */
} TG_DEFINED_CHARS;

typedef struct port_spec_data
{
         unsigned  char   port_data[SIZEOF_PORT_SPEC_DATA];

}   PORT_SPEC_DATA;

typedef struct link_spec_data
{
         unsigned  char   link_data[SIZEOF_LINK_SPEC_DATA];

}   LINK_SPEC_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_PORT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information.

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **port_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

port_name Name of port being queried. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

dlc_name DLC name filter. This should be set to all zeros or an 8-byte string in a locally displayable character set. If this field is set then only ports belonging to this DLC are returned. This field is ignored if it is set to all zeros.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

port_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

port_summary.port_name
Name of port associated with this link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

port_summary.description
Resource description (as specified on DEFINE_PORT). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

port_summary.port_state
Specifies the current state of the port.

AP_NOT_ACTIVE
AP_PENDING_ACTIVE
AP_ACTIVE
AP_PENDING_INACTIVE

port_summary.dlc_name
Name of the DLC. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

port_detail.overlay_size
The number of bytes in this entry (including any **link_spec_data**), and hence the offset to the next entry returned (if any).

port_detail.port_name
Name of port associated with this link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

port_detail.det_data.port_state
Specifies the current state of the port.

AP_NOT_ACTIVE
AP_PENDING_ACTIVE
AP_ACTIVE
AP_PENDING_INACTIVE

port_detail.det_data.dlc_type
Type of DLC. Personal Communications or Communications Server supports the following types:

AP_ANYNET
AP_LLC2
AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

port_detail.det_data.port_sim_rim
Specifies whether Set Initialization Mode (SIM) and Receive Initialization Mode (RIM) are supported (AP_YES or AP_NO).

port_detail.det_data.def_ls_good_xids
Total number of successful XID exchanges that have occurred on all defined link stations on this port since the last time this port was started.

port_detail.det_data.def_ls_bad_xids
Total number of unsuccessful XID exchanges that have occurred on all defined link stations on this port since the last time this port was started.

port_detail.det_data.dyn_ls_good_xids
Total number of successful XID exchanges that have occurred on all dynamic link stations on this port since the last time this port was started.

port_detail.det_data.dyn_ls_bad_xids
Total number of unsuccessful XID exchanges that have occurred on all dynamic link stations on this port since the last time this port was started.

port_detail.def_data.description
Resource description (as specified on DEFINE_PORT). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

port_detail.def_data.dlc_name
Name of associated DLC. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

port_detail.def_data.port_type
Specifies the type of line used by the port. The value corresponds to one of the following values:

AP_PORT_NONSWITCHED
AP_PORT_SWITCHED
AP_PORT_SATF

port_detail.def_data.port_number
Port number.

port_detail.def_data.max_rcv_btu_size
Maximum BTU size that can be received.

port_detail.def_data.tot_link_act_lim
Total link activation limit.

port_detail.def_data.inb_link_act_lim
Inbound link activation limit.

port_detail.def_data.out_link_act_lim
Outbound link activation limit.

port_detail.def_data.ls_role
Link station role. This can be negotiable (AP_LS_NEG), primary (AP_LS_PRI), or secondary (AP_LS_SEC). Reserved if **implicit_hpr_support** is set to AP_NO.

def_data.implicit_dspu_template
Specifies the DSPU template, defined with the DEFINE_DSPU_TEMPLATE verb, that is used for definitions if the local node is to provide PU Concentration for an implicit link activated on this port. If the template specified does not exist (or is already at its instance limit) when the link is activated, activation fails. This is an 8-byte string in a locally-displayable character set. All 8 bytes are significant and must be set.

If the **def_data.implicit_dspu_services** field is not set to AP_PU_CONCENTRATION, then this field is reserved.

def_data.implicit.dspu_services
Specifies the services that the local node will provide to the downstream PU across implicit links activated on this port. This is set to one of the following values:

AP_DLUR
Local node will provide DLUR services for the downstream PU (using the default DLUS configured through the DEFINE_DLUR_DEFAULTS verb).

AP_PU_CONCENTRATION
Local node will provide PU Concentration for the downstream PU (and will put in place definitions as specified by the DSPU template specified in the field **def_data.implicit_dspu_template**).

AP_NONE
Local node will provide no services for this downstream PU.

def_data.implicit_deact_timer
Limited resource link deactivation timer (in seconds). If **implicit_limited_resource** is set to AP_YES or AP_NO_SESSIONS, then an HPR-capable implicit link is automatically deactivated if no data traverses the link for the duration of this timer, and no sessions are using the link.

If **implicit_limited_resource** is set to AP_INACTIVITY then an implicit link is automatically deactivated if no data traverses the link for the duration of this timer.

If zero is specified the default value of 30 is used. Otherwise the minimum value is 5. (If it is set any lower, the specified value will be ignored and 5 will be used.) Note that this parameter is reserved unless **implicit_limited_resource** is set to AP_NO.

port_detail.def_data.act_xid_exchange_limit
Activation XID exchange limit.

port_detail.def_data.nonact_xid_exchange_limit
Nonactivation XID exchange limit.

port_detail.def_data.ls_xmit_rcv_cap
Specifies the link station transmit/receive capability. This is either two-way simultaneous (AP_LS_TWS) or two way alternating (AP_LS_TWA).

port_detail.def_data.max_ifrm_rcvd
Maximum number of I-frames that can be received by local link stations before an acknowledgment is sent. Range: 1—127

port_detail.def_data.target_pacing_count
Numeric value between 1 and 32767 inclusive indicating the desired pacing window size for BINDs on this TG. The number is only significant when fixed bind pacing is being performed. Personal Communications or Communications Server does not currently use this value.

port_detail.def_data.max_send_btu_size
Maximum BTU size that can be sent.

port_detail.def_data.dlc_data.length
Port address length.

port_detail.def_data.dlc_data.address
Port address.

port_detail.def_data.hpr_dlc_data.length
HPR Port address length.

port_detail.def_data.hpr_dlc_data.address
HPR Port address. This is currently used when supporting HPR links. The field specifies the information sent by Personal Communications or Communications Server in the X'80' subfield of the X'61' control vector on XID3 exchanged on link stations using this port.

port_detail.def_data.implicit_cp_cp_sess_support
Specifies whether CP-CP sessions are permitted for implicit link stations off this port (AP_YES or AP_NO).

port_detail.def_data.implicit_limited_resource
Specifies whether implicit link stations off this port should be deactivated when there are no sessions using the link. This is set to one of the following values:

AP_NO
Implicit links are not limited resources and will not be deactivated automatically.

AP_YES or AP_NO_SESSIONS
Implicit links are a limited resource and will be deactivated automatically when no active sessions are using them.

AP_INACTIVITY
Implicit links are a limited resource and will be deactivated automatically when no active sessions are using them, or when no data has followed on the link for the time period specified by the **implicit_deact_timer** field.

port_detail.def_data.implicit_hpr_support
Specifies whether HPR is supported on implicit links (AP_YES or AP_NO).

port_detail.def_data.implicit_link_lvl_error
Specifies whether HPR traffic is sent on implicit links using link-level error recovery (AP_YES or AP_NO).

port_detail.def_data.default_tg_chars
TG characteristics (See "DEFINE_COS" on page 37). These are used for implicit link stations off this port and also for defined link stations which specify **use_default_tg_chars**.

port_detail.def_data.discovery_supported
Specifies whether Discovery search functions are performed on this port (AP_YES or AP_NO).

port_detail.def_data.port_spec_data_len
Unpadded length, in bytes, of data passed unchanged to the port on the ACTIVATE_PORT signal. The data is concatenated to the PORT_DETAIL structure.

port_detail.def_data.link_spec_data_len
Data passed unchanged to the link station component during initialization. The data is concatenated to the PORT_DETAIL structure immediately following the port-specific data. The port-specific data and the link-specific data together will be padded to end on a 4-byte boundary. There will be no explicit padding between the port-specific data and the link-specific data.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PORT_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_PU

QUERY_PU returns a list of local PUs and the links associated with them.

The information is returned as a list. To obtain information about a specific PU, or to obtain the list information in several "chunks," the **pu_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

The verb specifies whether local PUs are attached directly to the host system or attached via DLUR. The **host_attachment** field can be used as a filter so that only information about the specified attachment type is returned.

VCB Structure

```
typedef struct query_pu
{
    unsigned short   opcode;              /* verb operation code            */
   unsigned  char    reserv2;             /*  reserved                      */
   unsigned  char    format;              /*  format                        */
    unsigned short   primary_rc;          /* primary return code            */
    unsigned long    secondary_rc;        /* secondary return code          */
    unsigned char    *buf_ptr;            /* pointer to buffer              */
    unsigned long    buf_size;            /* buffer size                    */
    unsigned long    total_buf_size;      /* total buffer size required     */
    unsigned short   num_entries;         /* number of entries              */
    unsigned short   total_num_entries; /* total number of entries          */
    unsigned char    list_options;        /* listing options               */
   unsigned  char    reserv3;             /*  reserved                      */
    unsigned char    pu_name[8];          /* PU name                        */
   unsigned  char    host_attachment;    /*  Host  Attachment               */
} QUERY_PU;

typedef struct pu_data
{
    unsigned short   overlay_size;        /* size of this entry             */
    unsigned char    pu_name[8];          /* PU name                        */
   unsigned  char    description[RD_LEN];
                                         /* resource description           */
    unsigned char    ls_name[8];          /* LS name                        */
   unsigned  char    pu_sscp_sess_active;
                                         /* Is PU-SSCP session active      */
   unsigned  char    host_attachment;    /*  Host  attachment              */
   SESSION_STATS     pu_sscp_stats;      /* PU-SSCP session statistics     */
   unsigned  char    reserva[20];        /*  reserved                      */
} PU_DATA;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;         /* session receive RU size        */
    unsigned short   send_ru_size;        /* session send RU size           */
    unsigned short   max_send_btu_size; /* max send BTU size                */
    unsigned  short  max_rcv_btu_size;  /*  max  rcv  BTU  size             */
    unsigned  short  max_send_pac_win;  /*  max  send  pacing  window  size */
    unsigned  short  cur_send_pac_win;  /*  curr  send  pacing  window  size */
    unsigned short   max_rcv_pac_win;    /* max recv pacing window size     */
```

```
    unsigned short    cur_rcv_pac_win;     /* current receive pacing          */
                                           /* window size                     */
    unsigned long     send_data_frames;    /* number of data frames sent      */
   unsigned  long     send_fmd_data_frames;
                                           /* num of FMD data frames sent     */
   unsigned  long     send_data_bytes;     /* number of data bytes sent       */
   unsigned  long     rcv_data_frames;     /* num data frames received        */
   unsigned  long     rcv_fmd_data_frames;
                                           /* num of FMD data frames rcvd     */
    unsigned long     rcv_data_bytes;      /* number of data bytes received */
    unsigned char     sidh;                /* session ID high byte            */
                                           /* (from LFSID)                    */
    unsigned char     sidl;                /* session ID low byte             */
                                           /* (from LFSID)                    */
    unsigned char     odai;                /* ODAI bit set                    */
    unsigned char     ls_name[8];          /* Link station name               */
   unsigned  char     reserve;             /*  reserved                       */
} SESSION_STATS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_PU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information.

The **pu_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

pu_name Name of the first PU to be listed. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

host_attachment Filter for host attachment:

AP_NONE
Return information about all local PUs.

AP_DLUR_ATTACHED
Return information about all local PUs that are supported by DLUR.

AP_DIRECT_ATTACHED
Return information about only those PUs that are directly attached to the host system.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

pu_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

pu_data.pu_name PU name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

pu_data.description
Resource description (as specified on DEFINE_LS or DEFINE_INTERNAL_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

pu_data.ls_name Name of the link station associated with this PU. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

pu_data.pu_sscp_sess_active
Specifies whether the PU-SSCP session is active (AP_YES or AP_NO).

pu_data.host_attachment
Local PU host attachment type:

AP_DLUR_ATTACHED
PU is attached to host system using DLUR.

AP_DIRECT_ATTACHED
PU is directly attached to host system.

pu_data.pu_sscp_stats.rcv_ru_size
This field is always reserved.

pu_data.pu_sscp_stats.send_ru_size
This field is always reserved.

pu_data.pu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

pu_data.pu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

pu_data.pu_sscp_stats.max_send_pac_win
This field will always be set to zero.

pu_data.pu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

pu_data.pu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

pu_data.pu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

pu_data.pu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

pu_data.pu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

pu_data.pu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

pu_data.pu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

pu_data.pu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

pu_data.pu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

pu_data.pu_sscp_stats.sidh
Session ID high byte.

pu_data.pu_sscp_stats.sidl
Session ID low byte.

pu_data.pu_sscp_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the ACTPU sets this field to zero if the local node contains the primary link station, and sets it to one if the ACTPU sender is the node containing the secondary link station.

pu_data.pu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_PU_NAME
	AP_INVALID_PU_TYPE AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_RTP_CONNECTION

QUERY_RTP_CONNECTION is used at a network node or an end node and returns list information about Rapid Transport Protocol (RTP) connections for which the node is an endpoint.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific RTP connection, or to obtain the list information in several "chunks," the **rtp_name** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by the **rtp_name**. Ordering is according to name length first, and then by ASCII lexicographical ordering for names of the same length (in accordance with normal MIB ordering). If AP_LIST_FROM_NEXT is selected the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

VCB Structure

```
typedef struct query_rtp_connection
{
    unsigned short   opcode;              /* verb operation code          */
    unsigned  char   reserv2;             /*  reserved                    */
    unsigned  char   format;              /*  format                      */
    unsigned short   primary_rc;          /* Primary return code          */
    unsigned long    secondary_rc;        /* Secondary return code        */
    unsigned char    *buf_ptr;            /* pointer to buffer            */
    unsigned long    buf_size;            /* buffer size                  */
    unsigned long    total_buf_size;      /* total buffer size required   */
    unsigned short   num_entries;         /* number of entries            */
    unsigned  short  total_num_entries;   /*  total  number  of  entries  */
    unsigned char    list_options;        /* listing options              */
    unsigned  char   reserv3;             /*  reserved                    */
    unsigned char    rtp_name[8];         /* name of RTP connection       */
} QUERY_RTP_CONNECTION;

typedef struct rtp_connection_summary
{
    unsigned short   overlay_size;        /* size of this entry           */
    unsigned char    rtp_name[8];         /* RTP connection name          */
    unsigned  char   first_hop_ls_name[8];
                                          /* LS name of first hop         */
    unsigned char    dest_node_name[17]; /* fully qualified name of       */
                                          /* destination node             */
    unsigned  char   reserv1;             /*  reserved                    */
    unsigned char    cos_name[8];         /* class-of-service name        */
    unsigned short   num_sess_active;     /* number of active sessions    */
} RTP_CONNECTION_SUMMARY;

typedef struct rtp_connection_detail
{
    unsigned short   overlay_size;        /* size of this entry           */
    unsigned char    rtp_name[8];         /* RTP connection name          */
    unsigned  char   first_hop_ls_name[8];
                                          /* LS name of first hop         */
```

```
    unsigned char     dest_node_name[17]; /* fully qualified name of          */
                                          /* destination node                 */
   unsigned  char    reserv1[3];          /*  reserved                        */
    unsigned char     cos_name[8];        /* class-of-service name            */
    unsigned short    max_btu_size;       /* max BTU size                     */
    unsigned long     liveness_timer;     /* liveness timer                   */
    unsigned char     local_tcid[8];      /* local TCID                       */
    unsigned char     remote_tcid[8];     /* remote TCID                      */
    RTP_STATISTICS    rtp_stats;          /* RTP statistics                   */
    unsigned short    num_sess_active;    /* number of active sessions        */
   unsigned  char    reserv2[16];         /*  reserved                        */
    unsigned short    rscv_len;           /* length of appended RSCV          */
} RTP_CONNECTION_DETAIL;

typedef struct rtp_statistics
{
    unsigned long     bytes_sent;         /* total number of bytes sent       */
    unsigned long     bytes_received;     /* total number of bytes received   */
    unsigned long     bytes_resent;       /* total number of bytes resent     */
    unsigned long     bytes_discarded;    /* total number bytes discarded     */
    unsigned long     packets_sent;       /* total number of packets sent     */
   unsigned  long    packets_received;   /* total number packets received    */
    unsigned long     packets_resent;     /* total number of packets resent   */
    unsigned long     packets_discarded;  /* total number packets discarded   */
    unsigned long     gaps_detected;      /* gaps detected                    */
    unsigned long     send_rate;          /* current send rate                */
    unsigned long     max_send_rate;      /* maximum send rate                */
    unsigned long     min_send_rate;      /* minimum send rate                */
    unsigned long     receive_rate;       /* current receive rate             */
   unsigned  long    max_receive_rate;   /*  maximum receive rate            */
   unsigned  long    min_receive_rate;   /*  minimum receive rate            */
    unsigned long     burst_size;         /* current burst size               */
    unsigned long     up_time;            /* total uptime of connection       */
    unsigned long     smooth_rtt;         /* smoothed round-trip time         */
    unsigned long     last_rtt;           /* last round-trip time             */
    unsigned long     short_req_timer;    /* SHORT_REQ timer duration         */
    unsigned long     short_req_timeouts; /* number of SHORT_REQ timeouts     */
    unsigned long     liveness_timeouts;  /* number of liveness timeouts      */
   unsigned  long    in_invalid_sna_frames;
                                          /* number of invalid SNA frames     */
                                          /*  received                        */
    unsigned long     in_sc_frames;       /* number of SC frames received     */
    unsigned long     out_sc_frames;      /* number of SC frames sent         */
   unsigned  char    reserve[40];         /*  reserved                        */
} RTP_STATISTICS;
```

Note: The **rtp_connection_detail** overlay will be followed by a Route Selection Control Vector (RSCV) as defined by SNA. After RTP connection setup and before any path switch, the RSCV for an RTP connection will be stored and displayed at each node as follows:

The RSCV will contain all the hops from the local node to the partner RTP node.

If the partner RTP node is not an endpoint of the session causing the RTP connection to be activated, the RSCV will also store one “boundary function hop” leading away from the partner RTP node.

The RSCV will never contain a boundary function hop leading into the local node, even if the local node does not contain a session endpoint.

After path switch has occurred, the RSCVs stored and displayed will only include the hops from the local node to the partner RTP node. (Never a boundary function hop).

Supplied parameters

The application supplies the following parameters:

opcode AP_QUERY_RTP_CONNECTION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information.

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **rtp_name** represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The **rtp_name** is ignored and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

rtp_name RTP connection name. This name is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

rtp_connection_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

rtp_connection_summary.rtp_name
RTP connection name. This name is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

rtp_connection_summary.first_hop_ls_name
Link station name of the first hop of the RTP connection. This name is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

rtp_connection_summary.dest_node_name
Fully qualified, 17-byte name of the destination node of the RTP connection composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

rtp_connection_summary.cos_name
Class-of-service name for the RTP connection. This is an 8-byte alphanumeric type-A EBCDIC character string, padded to the right with EBCDIC spaces.

rtp_connection_summary.num_sess_active
Number of sessions currently active on the RTP connection.

rtp_connection_detail.overlay_size
The number of bytes in this entry (including any appended RSCV), and hence the offset to the next entry returned (if any).

rtp_connection_detail.rtp_name
RTP connection name. This name is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

rtp_connection_detail.first_hop_ls_name
Link station name of the first hop of the RTP connection. This name is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

rtp_connection_detail.dest_node_name
Fully qualified, 17-byte name of the destination node of the RTP connection composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded-with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

rtp_connection_detail.cos_name
Class-of-service name for the RTP connection. This is an 8-byte alphanumeric type-A EBCDIC character string, padded to the right with EBCDIC spaces.

rtp_connection_detail.max_btu_size
Maximum btu size for the RTP connection measured in bytes.

rtp_connection_detail.liveness_timer
Liveness timer for the RTP connection, measured in seconds.

rtp_connection_detail.local_tcid
Local TCID for the RTP connection.

rtp_connection_detail.remote_tcid
Remote TCID for the RTP connection.

rtp_connection_detail.rtp_stats.bytes_sent
Total number of bytes that the local node has sent on this RTP connection.

rtp_connection_detail.rtp_stats.bytes_received
Total number of bytes that the local node has received on this RTP connection.

rtp_connection_detail.rtp_stats.bytes_resent
Total number of bytes resent by the local node owing to loss in transit.

rtp_connection_detail.rtp_stats.bytes_discarded
Total number of bytes sent by the other end of the RTP connection and were discarded as duplicates of data already received.

rtp_connection_detail.rtp_stats.packets_sent
Total number of packets that the local node has sent on this RTP connection.

rtp_connection_detail.rtp_stats.packets_received
Total number of packets that the local node has received on this RTP connection.

rtp_connection_detail.rtp_stats.packets_resent
Total number of packets resent by the local node owing to loss in transit.

rtp_connection_detail.rtp_stats.packets_discarded
Total number of packets sent by the other end of the RTP connection that were discarded as duplicates of data already received.

rtp_connection_detail.rtp_stats.gaps_detected
Total number of gaps detected by the local node. Each gap corresponds to one or more lost frames.

rtp_connection_detail.rtp_stats.send_rate
Current send rate on this RTP connection (measured in kilobits per second). This is the maximum allowed send rate as calculated by the ARB algorithm.

rtp_connection_detail.rtp_stats.max_send_rate
Maximum send rate on this RTP connection (measured in kilobits per second).

rtp_connection_detail.rtp_stats.min_send_rate
Minimum send rate on this RTP connection (measured in kilobits per second).

rtp_connection_detail.rtp_stats.receive_rate
Current receive rate on this RTP connection (measured in kilobits per second). This is the actual receive rate calculated over the last measurement interval.

rtp_connection_detail.rtp_stats.max_receive_rate
Maximum receive rate on this RTP connection (measured in kilobits per second).

rtp_connection_detail.rtp_stats.min_receive_rate
Minimum receive rate on this RTP connection (measured in kilobits per second).

rtp_connection_detail.rtp_stats.burst_size
Current burst size on the RTP Connection measured in bytes.

rtp_connection_detail.rtp_stats.up_time
Total number of seconds the RTP connection has been active.

rtp_connection_detail.rtp_stats.smooth_rtt
Smoothed measure of round-trip time between the local node and the partner RTP node (measured in milliseconds).

rtp_connection_detail.rtp_stats.last_rtt
The last measured round-trip time between the local node and the partner RTP node (measured in milliseconds).

rtp_connection_detail.rtp_stats.short_req_timer
The current duration used for the SHORT_REQ timer (measured in milliseconds).

rtp_connection_detail.rtp_stats.short_req_timeouts
Total number of times the SHORT_REQ timer has expired for this RTP connection.

rtp_connection_detail.rtp_stats.liveness_timeouts
Total number of times the liveness timer has expired for this RTP connection. The liveness timer expires when the connection has been idle for the period specified in **rtp_connection_detail.liveness_timer**.

rtp_connection_detail.rtp_stats.in_invalid_sna_frames
Total number of SNA frames received and discarded as not valid on this RTP connection.

rtp_connection_detail.rtp_stats.in_sc_frames
Total number of session control frames received on this RTP connection.

rtp_connection_detail.rtp_stats.out_sc_frames
Total number of session control frames sent on this RTP connection.

rtp_connection_detail.num_sess_active
Number of sessions currently active on the RTP connection.

rtp_connection_detail.rscv_len
Length of the appended Route Selection Control Vector for the RTP connection. (If none is appended, then the length is zero.) The RSCV will be padded to end on a 4-byte boundary to ensure correct alignment of the next detail entry, but the **rscv_len** does not include this padding.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_INVALID_RTP_CONNECTION
	AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_SESSION

QUERY_SESSION returns list information about sessions for which the node is an endpoint.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific session, or to obtain the list information in several "chunks," the **session_id** field should be set. Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. Note that the **lu_name** (or **lu_alias**) and **plu_alias** (or **fqplu_name**) fields must always be set. The **lu_name**, if nonzero, will be used in preference to the **lu_alias**. See "Querying the Node" on page 12, for background on how the list formats are used.

If **plu_alias** is set to all zeros, the **fqplu_name** value will be used, otherwise the **plu_alias** is always used and the **fqplu_name** is ignored.

The list of sessions returned can be filtered by the name of the mode that they are associated with. In this case the **mode_name** field should be set (otherwise this field should be set to all zeros).

VCB Structure

```
typedef struct query_session
{
    unsigned short   opcode;              /* verb operation code            */
   unsigned  char    reserv2;             /*  reserved                      */
   unsigned  char    format;              /*  format                        */
    unsigned short   primary_rc;          /* primary return code            */
    unsigned long    secondary_rc;        /* secondary return code          */
    unsigned char    *buf_ptr;            /* pointer to buffer              */
    unsigned long    buf_size;            /* buffer size                    */
    unsigned long    total_buf_size;      /* total buffer size required     */
    unsigned short   num_entries;         /* number of entries              */
    unsigned short   total_num_entries; /* total number of entries          */
    unsigned char    list_options;        /* listing options                */
   unsigned  char    reserv3;             /*  reserved                      */
    unsigned char    lu_name[8];          /* LU name                        */
    unsigned char    lu_alias[8];         /* LU alias                       */
    unsigned char    plu_alias[8];        /* partner LU alias               */
    unsigned char    fqplu_name[17];      /* fully qualified partner        */
                                          /* LU name                        */
    unsigned char    mode_name[8];        /* mode name                      */
    unsigned char    session_id[8];       /* session ID                     */
} QUERY_SESSION;

typedef struct session_summary
{
    unsigned short   overlay_size;        /* size of this entry             */
    unsigned char    plu_alias[8];        /* partner LU alias               */
    unsigned char    fqplu_name[17];      /* fully qualified partner        */
                                          /* LU name                        */
   unsigned  char    reserv3[1];          /*  reserved                      */
    unsigned char    mode_name[8];        /* mode name                      */
    unsigned char    session_id[8];       /* session ID                     */
    FQPCID           fqpcid;              /* fully qualified procedure      */
                                          /* correlator ID                  */
} SESSION_SUMMARY;
```

```
typedef struct session_detail
{
    unsigned short   overlay_size;        /* size of this entry                */
    unsigned char    plu_alias[8];        /* partner LU alias                  */
    unsigned char    fqplu_name[17];      /* fully qualified partner           */
                                          /* LU name                           */
   unsigned  char    reserv3[1];          /*  reserved                         */
    unsigned char    mode_name[8];        /* mode name                         */
    unsigned char    session_id[8];       /* session ID                        */
    FQPCID           fqpcid;              /* fully qualified procedure         */
                                          /* correlator ID                     */
    unsigned char    cos_name[8];         /* Class-of-service name             */
    unsigned char    trans_pri;           /* Transmission priority:            */
    unsigned char    ltd_res;             /* Session spans a limited           */
                                          /*  resource                         */
    unsigned char    polarity;            /* Session polarity                  */
    unsigned char    contention;          /* Session contention                */
   SESSION_STATS     sess_stats;          /*  Session  statistics              */
    unsigned char    duplex_support;      /* full-duplex support               */
   unsigned  char    reserv3a[2];         /*  reserved                         */
   unsigned  char    reserva[20];         /*  reserved                         */
    unsigned char    plu_slu_comp_lvl;    /* PLU to SLU compression level */
    unsigned char    slu_plu_comp_lvl;    /* SLU to PLU compression level */
    unsigned char    rscv_len;            /* Length of following RSCV          */
} SESSION_DETAIL;

typedef struct fqpcid
{
    unsigned char    pcid[8];             /* pro correlator identifier         */
    unsigned char    fqcp_name[17];       /* orig's network qualified          */
                                          /* CP name                           */
   unsigned  char    reserve3[3];         /*  reserved                         */
} FQPCID;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;         /* session receive RU size           */
    unsigned short   send_ru_size;        /* session send RU size              */
    unsigned short   max_send_btu_size; /* Maximum send BTU size               */
    unsigned  short  max_rcv_btu_size;  /*  Maximum  rcv  BTU  size            */
    unsigned  short  max_send_pac_win;  /*  Max  send  pacing  window  size  */
    unsigned  short  cur_send_pac_win;  /*  Curr  send  pacing  window  size */
    unsigned short   max_rcv_pac_win;     /* Max receive pacing win size    */
    unsigned short   cur_rcv_pac_win;     /* Curr rec pacing window size    */
    unsigned long    send_data_frames;    /* Number of data frames sent     */
   unsigned  long    send_fmd_data_frames;
                                          /* num of FMD data frames sent    */
   unsigned  long    send_data_bytes;    /*  Number  of  data  bytes  sent      */
   unsigned  long    rcv_data_frames;    /*  Num  data  frames  received       */
   unsigned  long    rcv_fmd_data_frames;
                                          /* num of FMD data frames recvd */
    unsigned long    rcv_data_bytes;      /* Num data bytes received           */
    unsigned char    sidh;                /* Session ID high byte              */
    unsigned char    sidl;                /* Session ID low byte               */
    unsigned char    odai;                /* ODAI bit set                      */
    unsigned char    ls_name[8];          /* Link station name                 */
   unsigned  char    reserve;             /*  reserved                         */
} SESSION_STATS;
```

Supplied parameters

The application supplies the following parameters:

opcode AP_QUERY_SESSION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information.

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The combination of **lu_name** (or **lu_alias** if the **lu_name** is set to all zeros), **pu_alias** (or **fqplu_name** if the **plu_alias** is set to all zeros), **mode_name** and **session_id** specified (see the following parameter) represent an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The **session_id** is ignored and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name LU name. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the index.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** fields are set to all zeros, the LU associated with the control point (the default LU) is used.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field will be used for determining the index.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

mode_name Mode name filter. This should be set to all zeros or an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. If this field is set then only sessions associated with this mode are returned. This field is ignored if it is set to all zeros.

session_id 8-byte identifier of the session. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

session_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

session_summary.plu_alias
Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

session_summary.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces.

session_summary.mode_name
Mode name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

session_summary.session_id
8-byte identifier of the session.

session_summary.fqpcid.pcid
Procedure correlator ID. This is an 8-byte hexadecimal string.

session_summary.fqpcid.fqcp_name
Fully qualified control point name. This 17-byte name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with

EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

session_detail.overlay_size
The number of bytes in this entry (including any appended RSCV), and hence the offset to the next entry returned (if any).

session_detail.plu_alias
Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

session_detail.fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces.

session_detail.mode_name
Mode name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

session_detail.session_id
8-byte identifier of the session.

session_detail.fqpcid.pcid
Procedure correlator ID. This is an 8-byte hexadecimal string.

session_detail.fqpcid.fqcp_name
Fully qualified control point name. This 17-byte name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

session_detail.cos_name
Class-of-service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

session_detail.trans_pri
Transmission priority. This is set to one of the following values:

AP_LOW
AP_MEDIUM
AP_HIGH
AP_NETWORK

session_detail.ltd_res
Specifies whether the session uses a limited resource link (AP_YES or AP_NO).

session_detail.polarity
Specifies the polarity of the session (AP_PRIMARY or AP_SECONDARY).

session_detail.contention
Specifies the session contention polarity. This indicates whether the local LU has 'first refusal' for the use of this

session (AP_CONWINNER) or whether it must bid before using the session (AP_CONLOSER).

session_detail.sess_stats.rcv_ru_size
Maximum receive RU size.

session_detail.sess_stats.send_ru_size
Maximum send RU size.

session_detail.sess_stats.max_send_btu_size
Maximum BTU size that can be sent.

session_detail.sess_stats.max_rcv_btu_size
Maximum BTU size that can be received.

session_detail.sess_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

session_detail.sess_stats.cur_send_pac_win
Current size of the send pacing window on this session.

session_detail.sess_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

session_detail.sess_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

session_detail.sess_stats.send_data_frames
Number of normal flow data frames sent.

session_detail.sess_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

session_detail.sess_stats.send_data_bytes
Number of normal flow data bytes sent.

session_detail.sess_stats.rcv_data_frames
Number of normal flow data frames received.

session_detail.sess_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

session_detail.sess_stats.rcv_data_bytes
Number of normal flow data bytes received.

session_detail.sess_stats.sidh
Session ID high byte.

session_detail.sess_stats.sidl
Session ID low byte.

session_detail.sess_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station. It sets it to one if the BIND sender is the node containing the secondary link station.

session_detail.sess_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate the session statistics with the link over which session data flows.

session_detail.duplex_support
Returns the conversation duplex support as negotiated on the BIND. This is one of the following values:

AP_HALF_DUPLEX
Only half-duplex conversations are supported.

AP_FULL_DUPLEX
Full-duplex as well as half-duplex conversations are supported. Expedited data is also supported.

session_detail.plu_slu_comp_lvl
Specifies the compression level for data sent from the PLU to the SLU.

AP_NONE
Compression is not used.

AP_RLE_COMPRESSION
RLE compression is used.

session_detail.slu_plu_comp_lvl
Specifies the compression level for data sent from the SLU to the PLU.

AP_NONE
Compression is not used.

AP_RLE_COMPRESSION
RLE compression is used.

session_detail.rscv_len
Length of the RSCV that is appended to the **session_detail** structure. (If none is appended, then the length is zero.) The RSCV will be padded to end on a 4-byte boundary.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_SESSION_ID

AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS
AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_STATISTICS

QUERY_STATISTICS queries link station and port statistics. Personal Communications or Communications Server passes this query directly to the DLC. The format of the statistics depends on the DLC implementation.

VCB Structure

```
typedef struct query_statistics
{
    unsigned short   opcode;              /* verb operation code            */
   unsigned  char    reserv2;             /*  reserved                      */
   unsigned  char    format;              /*  format                        */
    unsigned short   primary_rc;          /* primary return code            */
    unsigned long    secondary_rc;        /* secondary return code          */
    unsigned char    name[8];             /* LS or port name                */
    unsigned char    stats_type;          /* LS or port statistics?         */
    unsigned char    table_type;          /* statistics table requested */
    unsigned char    reset_stats;         /* reset the statistics?          */
    unsigned char    dlc_type;            /* type of DLC                    */
    unsigned char    statistics[256]; /* current statistics                 */
   unsigned  char    reserva[20];         /*  reserved                      */
} QUERY_STATISTICS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_STATISTICS

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

name Name defined for the link station or port (depending on setting of **stats_type** parameter). This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. Personal Communications or Communications Server uses this to correlate the response to the correct link station or port.

stats_type The type of resource for which statistics are requested. This must be set to one of the following values:

AP_LS
AP_PORT

table_type The type of statistics table requested. This must be set to one of the following categories of information:

AP_STATS_TBL
Specifies that statistical information will be returned.

AP_ADMIN_TBL
Specifies that administrative information will be returned.

AP_OPER_TBL
Specifies that operational information will be returned. The format of the information returned for each category is DLC implementation specific.

reset_stats Specifies whether the statistics should be reset (AP_YES or AP_NO).

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

dlc_type Type of the DLC. The value of this field is DLC implementation specific. The values are as follows:

AP_ANYNET
AP_LLC2
AP_OEM_DLC
AP_SDLC
AP_TWINAX
AP_X25

statistics Current statistics of link station or port.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LINK_NAME

AP_INVALID_PORT_NAME
AP_INVALID_STATS_TYPE
AP_INVALID_TABLE_TYPE

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_LINK_DEACTIVATED

AP_PORT_DEACTIVATED

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_TP

QUERY_TP returns information about transaction programs currently being used by a local LU.

The information is returned as a list. To obtain information about a specific transaction program, or to obtain the list information in several "chunks," the **tp_name** field should be set. If the **list_options** field is set to AP_FIRST_IN_LIST then this field will be ignored. Note that the **lu_name** or **lu_alias** field must always be set. The **lu_name** field, if nonzero, will be used in preference to the **lu_alias** field. See "Querying the Node" on page 12, for background on how the list formats are used.

This list is ordered by the **tp_name** using EBCDIC lexicographical ordering for names of the same length. This verb returns information that is determined once the TP starts to be used by a local LU. The QUERY_TP_DEFINITION verb returns definition information only.

VCB Structure

```
typedef struct query_tp
{
    unsigned short   opcode;              /* Verb operation code          */
   unsigned  char    reserv2;             /*  reserved                    */
   unsigned  char    format;              /*  format                      */
    unsigned short   primary_rc;          /* Primary return code          */
    unsigned long    secondary_rc;        /* Secondary return code        */
    unsigned char    *buf_ptr;            /* pointer to buffer            */
    unsigned long    buf_size;            /* buffer size                  */
    unsigned long    total_buf_size;      /* total buffer size required   */
    unsigned short   num_entries;         /* number of entries            */
    unsigned short   total_num_entries;   /* total number of entries      */
    unsigned char    list_options;        /* listing options              */
   unsigned  char    reserv3;             /*  reserved                    */
    unsigned char    lu_name[8];          /* LU name                      */
    unsigned char    lu_alias[8];         /* LU alias                     */
    unsigned char    tp_name[64];         /* TP name                      */
} QUERY_TP;

typedef struct tp_data
{
    unsigned short   overlay_size;        /* size of this entry           */
    unsigned char    tp_name[64];         /* TP name                      */
   unsigned  char    description[RD_LEN];
                                         /* resource description         */
    unsigned short   instance_limit;      /* max instance count           */
    unsigned short   instance_count;      /* current instance count       */
   unsigned  short   locally_started_count;
                                         /* locally started instance     */
                                         /*  count                       */
   unsigned  short   remotely_started_count;
                                         /* remotely started instance    */
                                         /*  count                       */
   unsigned  char    reserva[20];        /*  reserved                    */
} TP_DATA;
```

```
typedef struct tp_spec_data
{
        unsigned char pathname[256];     /* path and TP name                    */
        unsigned char parameters[64];    /* parameters for TP                   */
        unsigned char queued;            /* queued TP (AP_YES)                  */
        unsigned char load_type;         /* type of load-DETACHED/CONSOLE */
        unsigned char dynamic_load;      /* dynamic loading of TP enabled */
        unsigned char reserved[5];       /* max size is 120 bytes               */
} TP_SPEC_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_TP

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information: The combination of **lu_name** (or **lu_alias** if the **lu_name** is set to all zeros) and **tp_name** specified (see the following parameter) represents an index value that is used to specify the starting point of the actual information to be returned.

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

lu_name LU name. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the index.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** are set to all zeros, the LU that is associated with the control point (the default LU) is used.

tp_name Transaction program name. This is a 64-byte string, padded to the right with spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc	AP_OK
buf_size	Length of the information returned in the buffer.
total_buf_size	Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.
num_entries	Number of entries actually returned.
total_num_entries	Total number of entries that could have been returned. This can be higher than **num_entries**.
tp_data.overlay_size	The number of bytes in this entry, and hence the offset to the next entry returned (if any).
tp_data.tp_name	Transaction program name. This is a 64-byte string, padded to the right with spaces.
tp_data.instance.description	Resource description (as specified on DEFINE_TP). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.
tp_data.instance_limit	Maximum number of concurrently active instances of the specified transaction program.
tp_data.instance_count	Number of instances of the specified transaction program that are currently active.
tp_data.locally_started_count	Number of instances of the specified transaction program which have been started locally (by the transaction program issuing a TP_STARTED verb).
tp_data.remotely_started_count	Number of instances of the specified transaction program that have been started remotely (by a received Attach request).
tp_chars.tp_data.pathname	Specifies the path and transaction program name.
tp_chars.tp_data.parameters	Specifies the parameters for the transaction program.
tp_chars.tp_data.queued	Specifies whether the transaction program will be queued.
tp_chars.tp_data.load_type	Specifies how the transaction program will be loaded.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK

secondary_rc	AP_INVALID_TP_NAME
	AP_INVALID_LU_NAME AP_INVALID_LU_ALIAS AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

QUERY_TP_DEFINITION

QUERY_TP_DEFINITION returns both information previously passed in on a DEFINE_TP verb and information about Personal Communications or Communications Server defined transaction programs.

The information is returned as a list in one of two formats, either summary or detailed information. To obtain information about a specific transaction program, or to obtain the list information in several “chunks,” the **tp_name** field should be set.

Otherwise (if the **list_options** field is set to AP_FIRST_IN_LIST), this field will be ignored. See “Querying the Node” on page 12, for background on how the list formats are used.

This list is ordered by the **tp_name**, using EBCDIC lexicographical ordering. If AP_LIST_FROM_NEXT is selected the returned list starts from the next entry according to the defined ordering (whether the specified entry exists or not).

This verb returns definition information only. The QUERY_TP verb returns information that is determined once the transaction program starts to be used by a local LU.

VCB Structure

```
typedef struct query_tp_definition
{
    unsigned short   opcode;                /* Verb operation code                */
    unsigned  char   reserv2;               /*  reserved                          */
    unsigned  char   format;                /*  format                            */
    unsigned short   primary_rc;            /* Primary return code                */
    unsigned long    secondary_rc;          /* Secondary return code              */
    unsigned char    *buf_ptr;              /* pointer to buffer                  */
    unsigned long    buf_size;              /* buffer size                        */
    unsigned long    total_buf_size;        /* total buffer size required         */
    unsigned short   num_entries;           /* number of entries                  */
    unsigned  short  total_num_entries;     /*  total  number  of  entries        */
    unsigned char    list_options;          /* listing options                    */
    unsigned  char   reserv3;               /*  reserved                          */
    unsigned char    tp_name[64];           /* TP name                            */
} QUERY_TP_DEFINITION;

typedef struct tp_def_summary
{
    unsigned short   overlay_size;          /* size of this entry                 */
    unsigned char    tp_name[64];           /* TP name                            */
    unsigned  char   description[RD_LEN];
                                            /* resource description               */
} TP_DEF_SUMMARY;

typedef struct tp_def_detail
{
    unsigned short   overlay_size;          /* size of this entry                 */
    unsigned char    tp_name[64];           /* TP name                            */
    TP_CHARS         tp_chars;              /* TP characteristics                 */
} TP_DEF_DETAIL;
```

```
typedef struct tp_chars
{
   unsigned  char    description[RD_LEN];
                                          /* resource description              */
    unsigned char     conv_type;           /* conversation type                 */
    unsigned char     security_rqd;        /* security support                  */
    unsigned char     sync_level;          /* synchronization level support */
    unsigned char     dynamic_load;        /* dynamic load                      */
    unsigned char     enabled;             /* is the TP enabled?                */
    unsigned char     pip_allowed;         /* program initialization            */
                                           /* parameters supported              */
    unsigned char     duplex_support;      /* duplex supported                  */
   unsigned  char    reserv3[9];          /*  reserved                         */
    unsigned short    tp__instance_limit; /* limit on currently active TP    */
                                          /*  instances                        */
   unsigned  short    incoming_alloc_timeout;
                                          /* incoming allocation timeout      */
    unsigned  short   rcv_alloc_timeout;  /*  receive  allocation  timeout     */
    unsigned short    tp_data_len;        /* TP data length                    */
    TP_SPEC_DATA      tp_data;            /* TP data                          */
} TP_CHARS;

typedef struct tp_spec_data
{
   unsigned char pathname[256];          /* path and TP name                  */
   unsigned char parameters[64];         /* parameters for TP                 */
   unsigned char queued;                 /* queued TP (AP_YES)                */
   unsigned char load_type;              /* type of load-DETACHED/CONSOLE */
   unsigned char dynamic_load;           /* dynamic loading of TP enabled */
   unsigned char reserved[5];            /* max size is 120 bytes             */
} TP_SPEC_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_TP_DEFINITION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written. The application can append data to the end of the VCB, in which case **buf_ptr** must be set to NULL.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information:

AP_SUMMARY
Returns summary information only.

AP_DETAIL
Returns detailed information.

The **tp_name** specified (see the following parameter)

represents an index value that is used to specify the starting point of the actual information to be returned:

AP_FIRST_IN_LIST
The index value is ignored, and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

tp_name Name of the defined transaction program. This is a 64-byte string, padded to the right with spaces. This field is ignored if **list_options** is set to AP_FIRST_IN_LIST.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size Returned value indicating the size of buffer that would have been required to return all the list information requested. This can be higher than **buf_size**.

num_entries Number of entries actually returned.

total_num_entries Total number of entries that could have been returned. This can be higher than **num_entries**.

tp_def_summary.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

tp_def_summary.tp_name
Defined transaction program name. This is a 64-byte string, padded to the right with spaces.

tp_def_summary.description
Resource description (as specified on DEFINE_TP). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

tp_def_detail.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

tp_def_detail.tp_name
Defined transaction program name. This is a 64-byte string, padded to the right with spaces.

tp_def_detail.tp_chars.description
Resource description (as specified on DEFINE_TP). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

tp_def_detail.tp_chars.conv_type
Specifies the types of conversation supported by the transaction program:

AP_BASIC
AP_MAPPED
AP_EITHER

tp_def_detail.tp_chars.security_rqd
Specifies whether conversation security information is required to start the transaction program (AP_NO or AP_YES).

tp_def_detail.tp_chars.sync_level
Specifies the synchronization levels supported by the transaction program:

AP_NONE
The transaction program supports a synchronization level of None.

AP_CONFIRM_SYNC_LEVEL
The transaction program supports a synchronization level of Confirm.

AP_EITHER
The transaction program supports a synchronization level of None or Confirm.

AP_SYNCPT_REQUIRED
The transaction program supports a synchronization level of Sync-point.

AP_SYNCPT_NEGOTIABLE
The transaction program supports a synchronization level of None, Confirm, or Sync-point.

tp_def_detail.tp_chars.dynamic_load
Specifies whether the transaction program can be dynamically loaded (AP_YES or AP_NO).

tp_def_detail.tp_chars.enabled
Specifies whether the transaction program can be attached successfully (AP_YES or AP_NO). The default is AP_NO.

tp_def_detail.tp_chars.pip_allowed
Specifies whether the transaction program can receive program initialization (PIP) parameters (AP_YES or AP_NO).

tp_def_detail.tp_chars.duplex_support
Indicates whether the transaction program is full or half duplex.

AP_FULL_DUPLEX
Specifies the transaction program is full duplex.

AP_HALF_DUPLEX
Specifies the transaction program is half duplex.

AP_EITHER_DUPLEX
Specifies the transaction program can be either half or full duplex

tp_def_detail.tp_chars.tp_instance_limit
Limit on the number of concurrently active transaction program instances.

tp_def_detail.tp_chars.incoming_alloc_timeout
Specifies the number of seconds that an incoming Attach will be queued waiting for a RECEIVE_ALLOCATE. Zero implies no timeout, and so it will be held indefinitely.

tp_def_detail.tp_chars.rcv_alloc_timeout
Specifies the number of seconds that a RECEIVE_ALLOCATE verb will be queued while waiting for an Attach. Zero implies no timeout, and so it will be held indefinitely.

tp_def_detail.tp_chars.tp_data_len
Length of the implementation-dependent transaction program data.

tp_def_detail.tp_chars.tp_data
Implementation-dependent transaction program data that is passed unchanged on the DYNAMIC_LOAD_INDICATION.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_TP_NAME

AP_INVALID_LIST_OPTION

If the verb does not execute because the node has not yet been started, the Program returns the following parameters:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

Chapter 7. Session Limit Verbs

This chapter describes verbs used to initialize, change, or reset session limits.

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CHANGE_SESSION_LIMIT

The CHANGE_SESSION_LIMIT verb requests that the session limits of a particular mode (or session group) be changed. Sessions can be activated or deactivated as a result of processing this verb.

VCB Structure

```
typedef struct change_session_limit
{
    unsigned short   opcode;                 /* verb operation code          */
    unsigned  char   reserv2;                /*  reserved                    */
    unsigned  char   format;                 /*  format                      */
    unsigned short   primary_rc;             /* primary return code          */
    unsigned long    secondary_rc;           /* secondary return code        */
    unsigned char    lu_name[8];             /* local LU name                */
    unsigned char    lu_alias[8];            /* local LU alias               */
    unsigned char    plu_alias[8];           /* partner LU alias             */
    unsigned char    fqplu_name[17];         /* fully qualified partner      */
                                             /* LU name                      */
    unsigned  char   reserv3;                /*  reserved                    */
    unsigned char    mode_name[8];           /* mode name                    */
    unsigned  char   reserv3a;               /*  reserved                    */
    unsigned char    set_negotiable;         /* set max negotiable limit? */
    unsigned  short  plu_mode_session_limit;
                                             /* session limit                */
    unsigned  short  min_conwinners_source;
                                             /* min source contention        */
                                             /* winner sessions              */
    unsigned  short  min_conwinners_target;
                                             /* min target contention        */
                                             /* winner sessions              */
    unsigned short   auto_act;               /* auto activation limit        */
    unsigned char    responsible;            /* responsible indicator        */
    unsigned  char   reserv4[3];             /*  reserved                    */
    unsigned long    sense_data;             /* sense data                   */
} CHANGE_SESSION_LIMIT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_CHANGE_SESSION_LIMIT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU requested to change session limits. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias of the local LU requested to change session limits. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** fields are set to all zeros then the verb is forwarded to the LU associated with the control point (the default LU).

plu_alias Alias by which the partner LU is known to the local LU. This name must match the name of a partner LU established during configuration. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field is used to specify the required partner LU.

fqplu_name Fully qualified LU name for the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros.

mode_name Name of a set of networking characteristics defined during configuration. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

set_negotiable Specifies whether the maximum negotiable session limit for this mode should be modified to become the **plu_mode_session_limit**.

AP_YES
AP_NO

plu_mode_session_limit
Requested total session limit for this mode. The actual session limit (which can be negotiated with the partner LU), is the agreed maximum number of sessions supported between the local LU and the partner LU on this mode.

min_conwinners_source
Minimum number of sessions in this mode for which the local LU is the contention winner.

min_conwinners_target
Minimum number of sessions in this mode for which the partner LU is the contention winner.

auto_act Number of sessions to automatically activate after the session limit is changed. The actual number of automatically activated sessions is the minimum of this value and the negotiated minimum number of contention winner sessions for the local LU. When sessions are deactivated normally (specifying AP_DEACT_NORMAL) below this limit, new sessions are activated up to this limit.

responsible Indicates whether the source (local) or target (partner) LU is responsible for deactivating sessions after the session limit is changed (AP_SOURCE or AP_TARGET).

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

secondary_rc	AP_AS_SPECIFIED
	AP_AS_NEGOTIATED

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK
secondary_rc	AP_EXCEEDS_MAX_ALLOWED
	AP_INVALID_MODE_NAME AP_INVALID_PLU_NAME AP_INVALID_RESPONSIBLE AP_INVALID_SET_NEGOTIABLE AP_INVALID_LU_NAME AP_INVALID_LU_ALIAS

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc	AP_STATE_CHECK
secondary_rc	AP_MODE_RESET

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of an allocation error, the Program returns the following parameters:

primary_rc	AP_ALLOCATION_ERROR
secondary_rc	AP_ALLOCATION_FAILURE_NO_RETRY
sense_data	Sense data associated with allocation error.

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

If the verb does not execute because of an error, the Program returns the following parameters:

primary_rc	AP_CONV_FAILURE_NO_RETRY
	AP_CNOS_PARTNER_LU_REJECT
secondary_rc	AP_CNOS_COMMAND_RACE_REJECT
	AP_CNOS_MODE_NAME_REJECT

INITIALIZE_SESSION_LIMIT

The INITIALIZE_SESSION_LIMIT verb initializes the mode session limits.

VCB Structure

```
typedef struct initialize_session_limit
{
    unsigned short   opcode;                 /* verb operation code          */
    unsigned  char   reserv2;                /*  reserved                    */
    unsigned  char   format;                 /*  format                      */
    unsigned short   primary_rc;             /* primary return code          */
    unsigned long    secondary_rc;           /* secondary return code        */
    unsigned char    lu_name[8];             /* local LU name                */
    unsigned char    lu_alias[8];            /* local LU alias               */
    unsigned  char   plu_alias[8];           /*  partner                     */
    unsigned char    fqplu_name[17];         /* fully qualified partner      */
                                             /* LU name                      */
    unsigned  char   reserv3;                /*  reserved                    */
    unsigned char    mode_name[8];           /* mode name                    */
    unsigned  char   reserv3a;               /*  reserved                    */
    unsigned char    set_negotiable;         /* set max negotiable limit? */
    unsigned  short  plu_mode_session_limit;
                                             /* session limit                */
    unsigned  short  min_conwinners_source;
                                             /* min source contention        */
                                             /* winner sessions              */
    unsigned  short  min_conwinners_target;
                                             /* min target contention        */
                                             /* winner sessions              */
    unsigned short   auto_act;               /* auto activation limit        */
    unsigned  char   reserv4[4];             /*  reserved                    */
    unsigned long    sense_data;             /* sense data                   */
} INITIALIZE_SESSION_LIMIT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_INITIALIZE_SESSION_LIMIT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU requested to initialize session limits. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias of the local LU requested to initialize session limits. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and **lu_alias** are set to all zeros, the verb is forwarded to the LU associated with the control point (the default LU).

plu_alias Alias by which the partner LU is known to the local LU. This name must match the name of a partner LU established during configuration. This is an 8-byte string in a locally displayable character set. All 8 bytes are

significant and must be set. If this field is set to all zeros, the **fqplu_name** field is used to specify the required partner LU.

fqplu_name
Fully qualified LU name for the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros.

mode_name
Name of a set of networking characteristics defined during configuration. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

set_negotiable
Specifies whether the maximum negotiable session limit for this mode should be modified to become the **plu_mode_session_limit**.

AP_YES
AP_NO

plu_mode_session_limit
Requested total session limit for this mode. The actual session limit (which can be negotiated with the partner LU), is the agreed maximum number of sessions supported between the local LU and the partner LU on this mode. This must be set to a value in the range one to 32767.

min_conwinners_source
Minimum number of sessions in this mode for which the local LU is the contention winner. This must be set to a value in the range zero to 32767.

min_conwinners_target
Minimum number of sessions in this mode for which the partner LU is the contention winner. This must be set to a value in the range zero to 32767.

auto_act Number of sessions to automatically activate after the session limit is changed. The actual number of automatically activated sessions is the minimum of this value and the negotiated minimum number of contention winner sessions for the local LU. When sessions are deactivated normally (specifying AP_DEACT_NORMAL) below this limit, new sessions are activated up to this limit. This must be set to a value in the range zero to 32767.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc	AP_OK
secondary_rc	AP_AS_SPECIFIED
	AP_AS_NEGOTIATED

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc	AP_PARAMETER_CHECK

secondary_rc	AP_EXCEEDS_MAX_ALLOWED
	AP_INVALID_SET_NEGOTIABLE
	AP_INVALID_PLU_NAME
	AP_INVALID_MODE_NAME
	AP_INVALID_LU_NAME
	AP_INVALID_LU_ALIAS

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc	AP_STATE_CHECK
secondary_rc	AP_MODE_NOT_RESET

If the verb does not execute because the node has not yet been started, the Program returns the following parameters:

primary_rc	AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc	AP_NODE_STOPPING

If the verb does not execute because of an allocation error, the Program returns the following parameters:

primary_rc	AP_ALLOCATION_ERROR
secondary_rc	AP_ALLOCATION_FAILURE_NO_RETRY
sense_data	Sense data associated with allocation error.

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc	AP_UNEXPECTED_SYSTEM_ERROR

If the verb does not execute because of an error, the Program returns the following parameters:

primary_rc	AP_CONV_FAILURE_NO_RETRY
	AP_CNOS_PARTNER_LU_REJECT
secondary_rc	AP_CNOS_COMMAND_RACE_REJECT
	AP_CNOS_MODE_NAME_REJECT

RESET_SESSION_LIMIT

The RESET_SESSION_LIMIT verb requests that the mode session limits be reset.

VCB Structure

```
typedef struct reset_session_limit
{
    unsigned short   opcode;              /* verb operation code          */
    unsigned char    reserv2;             /*  reserved                    */
    unsigned char    format;              /*  format                      */
    unsigned short   primary_rc;          /* primary return code          */
    unsigned long    secondary_rc;        /* secondary return code        */
    unsigned char    lu_name[8];          /* local LU name                */
    unsigned char    lu_alias[8];         /* local LU alias               */
    unsigned char    plu_alias[8];        /* partner LU alias             */
    unsigned char    fqplu_name[17];      /* fully qual partner LU name   */
    unsigned char    reserv3;             /*  reserved                    */
    unsigned char    mode_name[8];        /* mode name                    */
    unsigned char    mode_name_select;    /* select mode name             */
    unsigned char    set_negotiable;      /* set max negotiable limit?    */
    unsigned char    reserv4[8];          /*  reserved                    */
    unsigned char    responsible;         /*  responsible                 */
    unsigned char    drain_source;        /* drain source                 */
    unsigned char    drain_target;        /* drain target                 */
    unsigned char    force;               /*  force                       */
    unsigned long    sense_data;          /* sense data                   */
} RESET_SESSION_LIMIT;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_RESET_SESSION_LIMIT

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU requested to reset session limits. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias of the local LU requested to reset session limits. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If this is set to all zeros, the verb is forwarded to the LU associated with the control point (the default LU).

plu_alias Alias by which the partner LU is known to the local LU. This name must match the name of a partner LU established during configuration. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. If this field is set to all zeros, the **fqplu_name** field is used to specify the required partner LU.

fqplu_name Fully qualified LU name for the partner LU. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros.

mode_name Name of a set of networking characteristics defined during configuration. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

mode_name_select Selects whether session limits should be reset on a single specified mode, or on all modes between the local and partner LUs.

AP_ONE
AP_ALL

set_negotiable Specifies whether the maximum negotiable session limit for this mode should be modified.

AP_YES
AP_NO

responsible Indicates whether the source (local) or target (partner) LU is responsible for deactivating sessions after the session limit is reset (AP_SOURCE or AP_TARGET).

drain_source Specifies whether the source LU satisfies waiting session requests before deactivating a session when session limits are changed or reset (AP_NO or AP_YES).

drain_target Specifies whether the target LU satisfies waiting session requests before deactivating a session when session limits are changed or reset (AP_NO or AP_YES).

force Specifies whether session limits will be set to zero even if CNOS negotiation fails (AP_YES or AP_NO).

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc AP_OK

secondary_rc AP_FORCED

AP_AS_SPECIFIED
AP_AS_NEGOTIATED

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_EXCEEDS_MAX_ALLOWED

AP_INVALID_PLU_NAME
AP_INVALID_MODE_NAME
AP_INVALID_MODE_NAME_SELECT
AP_INVALID_RESPONSIBLE

AP_INVALID_DRAIN_SOURCE
AP_INVALID_DRAIN_TARGET
AP_INVALID_FORCE
AP_INVALID_SET_NEGOTIABLE
AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_MODE_RESET

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of an allocation error, the Program returns the following parameter:

primary_rc AP_ALLOCATION_ERROR

secondary_rc AP_ALLOCATION_FAILURE_NO_RETRY

sense_data Sense data associated with allocation error.

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

If the verb does not execute because of an error, the Program returns the following parameters:

primary_rc AP_CONV_FAILURE_NO_RETRY

AP_CNOS_PARTNER_LU_REJECT

secondary_rc AP_CNOS_COMMAND_RACE_REJECT

AP_CNOS_MODE_NAME_REJECT

Chapter 8. Node Operator Facility API Indications

The Node Operator Facility API generates indication verbs to notify a node operator about changes in the node. Indication verbs use the following general structure:

```
typedef struct indication_hdr
        {
          unsigned short   opcode;          /* verb operation code        */
          unsigned  char   reserv2;         /*  reserved                  */
          unsigned  char   format;          /*  format                    */
          unsigned short   primary_rc;      /* primary return code        */
          unsigned  long   secondary_rc;    /*  secondary  return  code   */
          unsigned char    data_lost;       /* previous indication lost */
        }  INDICATION_HDR;
```

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DLC_INDICATION

This indication is generated when the DLC goes from active to inactive, or from inactive to active.

VCB Structure

```
typedef struct dlc_indication
{
    unsigned short   opcode;                 /* verb operation code                */
   unsigned  char    reserv2;                /*  reserved                           */
   unsigned  char    format;                 /*  format                             */
    unsigned short   primary_rc;             /* primary return code                */
    unsigned long     secondary_rc;          /* secondary return code              */
    unsigned char     data_lost;             /* previous indication lost           */
    unsigned char     deactivated;           /* has session been deactivated? */
    unsigned char     dlc_name[8];           /* link station name                  */
    unsigned char     description[RD_LEN]; /* resource description               */
   unsigned  char    reserva[20];            /*  reserved                           */
} DLC_INDICATION;
```

Parameters

opcode AP_DLC_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

deactivated Set to AP_YES when the DLC becomes inactive. Set to AP_NO when the DLC becomes active.

dlc_name Name of DLC. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

description Resource description (as specified on DEFINE_DLC). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

DLUR_LU_INDICATION

This indication is generated whenever a DLUR LU is activated or deactivated. This allows a registered application to maintain a list of currently active DLUR LUs.

VCB Structure

```
typedef struct dlur_lu_indication
{
    unsigned short   opcode;          /* verb operation code              */
   unsigned  char    reserv2;         /*  reserved                        */
   unsigned  char    format;          /*  format                          */
    unsigned short   primary_rc;      /* primary return code              */
    unsigned long    secondary_rc;    /* secondary return code            */
    unsigned char    data_lost;       /* previous indication lost         */
    unsigned char    reason;          /* reason for this indication       */
    unsigned char    lu_name[8];      /* LU name                          */
    unsigned char    pu_name[8];      /* PU name                          */
    unsigned char    nau_address;     /* NAU address                      */
   unsigned  char    reserv5[7];      /*  reserved                        */
} DLUR_LU_INDICATION;
```

Parameters

opcode AP_DLUR_LU_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

reason Set to AP_ADDED if the DLUR LU has just been activated by the DLUS. Set to AP_REMOVED if the DLUR LU has been deactivated, either explicitly by the DLUS or implicitly by a link failure or the deactivation of the PU.

lu_name Name of the LU. This is an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

pu_name Name of the PU that this LU uses. This is an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

nau_address Network addressable unit address of the LU, which must be in the range 1–255.

DLUS_INDICATION

This indication is generated when a pipe to a DLUS node goes from inactive to active (or vice versa). Pipe statistics are supplied when the pipe becomes inactive.

VCB Structure

```
typedef struct dlus_indication
{
    unsigned short   opcode;                /* verb operation code                */
   unsigned  char    reserv2;               /*  reserved                          */
   unsigned  char    format;                /*  format                            */
    unsigned short   primary_rc;            /* primary return code                */
    unsigned long    secondary_rc;          /* secondary return code              */
    unsigned char    data_lost;             /* previous indication lost           */
    unsigned char    deactivated;           /* has session been deactivated?      */
    unsigned char    dlus_name[17];         /* DLUS name                          */
   unsigned  char    reserv1;               /*  reserved                          */
    PIPE_STATS       pipe_stats;            /* pipe statistics                    */
   unsigned  char    reserva[20];           /*  reserved                          */
} DLUS_INDICATION;

typedef struct pipe_stats
{
    unsigned long    reqactpu_sent;         /* REQACTPUs sent to DLUS             */
   unsigned  long    reqactpu_rsp_received;
                                            /* RSP(REQACTPU)s received            */
                                            /* from DLUS                          */
    unsigned long    actpu_received;        /* ACTPUs received from DLUS          */
    unsigned long    actpu_rsp_sent;        /* RSP(ACTPU)s sent to DLUS           */
    unsigned long    reqdactpu_sent;        /* REQDACTPUs sent to DLUS            */
   unsigned  long    reqdactpu_rsp_received;
                                            /* RSP(REQDACTPU)s received           */
                                            /* from DLUS                          */
    unsigned long    dactpu_received;       /* DACTPUs received from DLUS         */
    unsigned long    dactpu_rsp_sent;       /* RSP(DACTPU)s sent to DLUS          */
    unsigned long    actlu_received;        /* ACTLUs received from DLUS          */
    unsigned long    actlu_rsp_sent;        /* RSP(ACTLU)s sent to DLUS           */
    unsigned long    dactlu_received;       /* DACTLUs received from DLUS         */
    unsigned long    dactlu_rsp_sent;       /* RSP(DACTLU)s sent to DLUS          */
    unsigned long    sscp_pu_mus_rcvd;      /* MUs for SSCP-PU sess received      */
    unsigned long    sscp_pu_mus_sent;      /* MUs for SSCP-PU sessions sent      */
    unsigned long    sscp_lu_mus_rcvd;      /* MUs for SSCP-LU sess received      */
    unsigned long    sscp_lu_mus_sent;      /* MUs for SSCP-LU sessions sent      */
} PIPE_STATS;
```

Parameters

opcode AP_DLUS_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

deactivated
Set to AP_YES when the pipe becomes inactive. Set to AP_NO when the pipe becomes active.

dlus_name
Name of the DLUS. This is a 17-byte string composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, which is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

pipe_stats.reqactpu_sent
Number of REQACTPUs sent to DLUS over the pipe.

pipe_stats.reqactpu_rsp_received
Number of RSP(REQACTPU)s received from DLUS over the pipe.

pipe_stats.actpu_received
Number of ACTPUs received from DLUS over the pipe.

pipe_stats.actpu_rsp_sent
Number of RSP(ACTPU)s sent to DLUS over the pipe.

pipe_stats.reqdactpu_sent
Number of REQDACTPUs sent to DLUS over the pipe.

pipe_stats.reqdactpu_rsp_received
Number of RSP(REQDACTPU)s received from DLUS over the pipe.

pipe_stats.dactpu_received
Number of DACTPUs received from DLUS over the pipe.

pipe_stats.dactpu_rsp_sent
Number of RSP(DACTPU)s sent to DLUS over the pipe.

pipe_stats.actlu_received
Number of ACTLUs received from DLUS over the pipe.

pipe_stats.actlu_rsp_sent
Number of RSP(ACTLU)s sent to DLUS over the pipe.

pipe_stats.dactlu_received
Number of DACTLUs received from DLUS over the pipe.

pipe_stats.dactlu_rsp_sent
Number of RSP(DACTLU)s sent to DLUS over the pipe.

pipe_stats.sscp_pu_mus_rcvd
Number of SSCP-PU MUs received from DLUS over the pipe.

pipe_stats.sscp_pu_mus_sent
Number of SSCP-PU MUs sent to DLUS over the pipe.

pipe_stats.sscp_lu_mus_rcvd
Number of SSCP-LU MUs received from DLUS over the pipe.

pipe_stats.sscp_lu_mus_sent
Number of SSCP-LU MUs sent to DLUS over the pipe.

DOWNSTREAM_LU_INDICATION

This indication is generated when the LU-SSCP session between the downstream LU and the host goes from inactive to active (or vice-versa) or when the PLU-SLU session goes from inactive to active (or vice-versa). LU-SSCP statistics are supplied when the LU-SSCP session deactivates and PLU-SLU statistics are supplied when the PLU-SLU session deactivates.

VCB Structure

```
typedef struct downstream_lu_indication
{
    unsigned short   opcode;                 /* verb operation code              */
    unsigned  char   reserv2;                /*  reserved                        */
    unsigned  char   format;                 /*  format                          */
    unsigned short   primary_rc;             /* primary return code              */
    unsigned long    secondary_rc;           /* secondary return code            */
    unsigned char    data_lost;              /* previous indication lost         */
    unsigned char    dspu_name[8];           /* PU Name                          */
    unsigned char    ls_name[8];             /* Link station name                */
    unsigned char    dslu_name[8];           /* LU Name                          */
    unsigned  char   description[RD_LEN];    /*  resource  description           */
    unsigned char    nau_address;            /* NAU address                      */
    unsigned  char   lu_sscp_sess_active;
                                             /* Is SSCP session active?          */
    unsigned char    plu_sess_active;        /* Is PLU-SLU session active?       */
    unsigned char    dspu_services;          /* DSPU services                    */
    unsigned  char   reserv1;                /*  reserved                        */
    SESSION_STATS    lu_sscp_stats;          /*  LU-SSCP  session  statistics    */
    SESSION_STATS    ds_plu_stats;           /*  Downstream  PLU-SLU  sess  stats */
    SESSION_STATS    us_plu_stats;           /*  Upstream  PLU-SLU  sess  stats   */
} DOWNSTREAM_LU_INDICATION;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;            /* session receive RU size          */
    unsigned short   send_ru_size;           /* session send RU size             */
    unsigned short   max_send_btu_size;      /* max send BTU size                */
    unsigned short   max_rcv_btu_size;       /* max rcv BTU size                 */
    unsigned short   max_send_pac_win;       /* max send pacing window size      */
    unsigned short   cur_send_pac_win;       /* curr send pacing window size     */
    unsigned short   max_rcv_pac_win;        /* max rcv pacing window size       */
    unsigned short   cur_rcv_pac_win;        /* curr receive pacing win size     */
    unsigned long    send_data_frames;       /* number of data frames sent       */
    unsigned  long   send_fmd_data_frames;
                                             /* num FMD data frames sent         */
    unsigned long    send_data_bytes;        /* number of data bytes sent        */
    unsigned long    rcv_data_frames;        /* num of data frames received      */
    unsigned  long   rcv_fmd_data_frames;
                                             /* num FMD data frames received     */
    unsigned long    rcv_data_bytes;         /* num data bytes received          */
    unsigned char    sidh;                   /* session ID high byte             */
    unsigned char    sidl;                   /* session ID low byte              */
    unsigned char    odai;                   /* ODAI bit set                     */
    unsigned char    ls_name[8];             /* Link station name                */
```

```
    unsigned char    reserve;                /* reserved                    */
} SESSION_STATS;
```

Parameters

opcode AP_DOWNSTREAM_LU_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

dspu_name
Name of the downstream PU associated with the downstream LU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

ls_name Name of link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

dslu_name
Name of the downstream LU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description
Resource description (as specified on DEFINE_DOWNSTREAM_LU).

nau_address
Network addressable unit address of the LU which must be in the range 1–255.

lu_sscp_sess_active
Indicates whether the LU-SSCP session to the downstream LU is active. Set to either AP_YES or AP_NO.

plu_sess_active
Indicates whether the PLU-SLU session to the downstream LU is active. Set to either AP_YES or AP_NO.

dspu_services
Specifies the services which the local node provides to the downstream LU across the link. This is set to one of the following.

AP_PU_CONCENTRATION
Local node provides PU concentration for the downstream PU.

AP_DLUR
Local node provides DLUR support for the downstream PU.

lu_sscp_stats.rcv_ru_size
This field is always reserved.

lu_sscp_stats.send_ru_size
This field is always reserved.

lu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

lu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

lu_sscp_stats.max_send_pac_win
This field will always be set to zero.

lu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

lu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

lu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

lu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

lu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

lu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

lu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

lu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

lu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

lu_sscp_stats.sidh
Session ID high byte.

lu_sscp_stats.sidl
Session ID low byte.

lu_sscp_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station.

lu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

ds_plu_stats.rcv_ru_size
Maximum receive RU size.

ds_plu_stats.send_ru_size
Maximum send RU size.

ds_plu_stats.max_send_btu_size
Maximum BTU size that can be sent.

ds_plu_stats.max_rcv_btu_size
Maximum BTU size that can be received.

ds_plu_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

ds_plu_stats.cur_send_pac_win
Current size of the send pacing window on this session

ds_plu_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

ds_plu_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

ds_plu_stats.send_data_frames
Number of normal flow data frames sent.

ds_plu_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

ds_plu_stats.send_data_bytes
Number of normal flow data bytes sent.

ds_plu_stats.rcv_data_frames
Number of normal flow data frames received.

ds_plu_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

ds_plu_stats.rcv_data_bytes
Number of normal flow data bytes received.

ds_plu_stats.sidh
Session ID high byte.

ds_plu_stats.sidl
Session ID low byte.

ds_plu_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station.

ds_plu_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

us_plu_stats.rcv_ru_size
Maximum receive RU size.

us_plu_stats.send_ru_size
Maximum send RU size.

us_plu_stats.max_send_btu_size
Maximum BTU size that can be sent.

us_plu_stats.max_rcv_btu_size
Maximum BTU size that can be received.

us_plu_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

us_plu_stats.cur_send_pac_win
Current size of the send pacing window on this session

us_plu_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

us_plu_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

us_plu_stats.send_data_frames
Number of normal flow data frames sent.

us_plu_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

us_plu_stats.send_data_bytes
Number of normal flow data bytes sent.

us_plu_stats.rcv_data_frames
Number of normal flow data frames received.

us_plu_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

us_plu_stats.rcv_data_bytes
Number of normal flow data bytes received.

us_plu_stats.sidh
Session ID high byte. This field is reserved if **dspu_services** is set to AP_PU_CONCENTRATION.

us_plu_stats.sidl
Session ID low byte. This field is reserved if **dspu_services** is set to AP_PU_CONCENTRATION.

us_plu_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station. This field is reserved if **dspu_services** is set to AP_PU_CONCENTRATION.

us_plu_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field is reserved if **dspu_services** is set to AP_PU_CONCENTRATION.

DOWNSTREAM_PU_INDICATION

This indication is generated when the PU-SSCP session between the downstream PU and the host goes from inactive to active (or vice-versa). PU-SSCP statistics are supplied when the PU-SSCP session deactivates.

VCB Structure

```
typedef struct downstream_pu_indication
{
    unsigned short   opcode;                /* verb operation code              */
   unsigned  char    reserv2;               /*  reserved                        */
   unsigned  char    format;                /*  format                          */
    unsigned short   primary_rc;            /* primary return code              */
    unsigned long    secondary_rc;          /* secondary return code            */
    unsigned char    data_lost;             /* previous indication lost         */
    unsigned char    dspu_name[8];          /* PU Name                          */
   unsigned  char    description[RD_LEN];   /*  resource  description           */
    unsigned char    ls_name[8];            /* Link Station name                */
   unsigned  char    pu_sscp_sess_active;
                                           /* Is PU-SSCP session active?       */
    unsigned char    dspu_services;         /* DSPU services                    */
   unsigned  char    reserv1[2];            /*  reserved                        */
   SESSION_STATS     pu_sscp_stats;         /*  PU-SSCP  session  statistics    */
} DOWNSTREAM_PU_INDICATION;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;           /* session receive RU size          */
    unsigned short   send_ru_size;          /* session send RU size             */
    unsigned short   max_send_btu_size;     /* max send BTU size                */
    unsigned short   max_rcv_btu_size;      /* max rcv BTU size                 */
    unsigned short   max_send_pac_win;      /* max send pacing window size      */
    unsigned short   cur_send_pac_win;      /* curr send pacing window size     */
    unsigned short   max_rcv_pac_win;       /* max rcv pacing window size       */
    unsigned short   cur_rcv_pac_win;       /* curr receive pacing win size     */
    unsigned long    send_data_frames;      /* number of data frames sent       */
   unsigned  long    send_fmd_data_frames;
                                           /* num FMD data frames sent         */
    unsigned long    send_data_bytes;       /* number of data bytes sent        */
    unsigned long    rcv_data_frames;       /* num of data frames received      */
   unsigned  long    rcv_fmd_data_frames;
                                           /* num FMD data frames received     */
    unsigned long    rcv_data_bytes;        /* num data bytes received          */
    unsigned char    sidh;                  /* session ID high byte             */
    unsigned char    sidl;                  /* session ID low byte              */
    unsigned char    odai;                  /* ODAI bit set                     */
    unsigned char    ls_name[8];            /* Link station name                */
   unsigned  char    reserve;               /*  reserved                        */
} SESSION_STATS;
```

Parameters

opcode AP_DOWNSTREAM_PU_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

dspu_name
Name of the downstream PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description
Resource description (as specified on DEFINE_LS.

ls_name Name of link station. This is a 8-byte string in a locally displayable character set. All 8 bytes are significant.

pu_sscp_sess_active
Indicates whether the PU-SSCP session to the downstream PU is active. Set to either AP_YES or AP_NO.

dspu_services
Specifies the services which the local node provides to the downstream PU across the link. This is set to one of the following.

AP_PU_CONCENTRATION
Local node provides PU concentration for the downstream PU.

AP_DLUR
Local node provides DLUR support for the downstream PU.

pu_sscp_stats.rcv_ru_size
This field is always reserved.

pu_sscp_stats.send_ru_size
This field is always reserved.

pu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

pu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

pu_sscp_stats.max_send_pac_win
This field will always be set to zero.

pu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

pu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

pu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

pu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

pu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

pu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

pu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

pu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

pu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

pu_sscp_stats.sidh
Session ID high byte.

pu_sscp_stats.sidl
Session ID low byte.

pu_sscp_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station.

pu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

FOCAL_POINT_INDICATION

This indication is generated whenever a focal point is acquired, changed or revoked.

VCB Structure

```
typedef struct focal_point_indication
{
    unsigned short   opcode;              /* verb operation code              */
   unsigned  char    reserv2;             /*  reserved                         */
   unsigned  char    format;              /*  format                           */
    unsigned short   primary_rc;          /* primary return code              */
    unsigned long    secondary_rc;        /* secondary return code            */
    unsigned char    data_lost;           /* previous indication lost         */
    unsigned char    ms_category[8];      /* Focal point category             */
   unsigned  char    fp_fqcp_name[17];    /*  Fully  qualified  focal         */
                                          /* point CP name                    */
    unsigned char    ms_appl_name[8];     /* Focal point application name */
    unsigned char    fp_type;             /* type of current focal point   */
    unsigned char    fp_status;           /* status of focal point         */
    unsigned char    fp_routing;          /* type of MDS routing to        */
                                          /* reach FP                         */
   unsigned  char    reserva[20];         /*  reserved                        */
} FOCAL_POINT_INDICATION;
```

Parameters

opcode AP_FOCAL_POINT_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

ms_category Category of focal point where the focal point has been acquired, changed or revoked. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services categories as described in *SNA Management Services*, or an 8-byte type 1134 EBCDIC installation defined name.

fp_fqcp_name The fully qualified control point name of the current focal point. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This name will be all zeros if the focal point has been revoked and not replaced (so that there is no currently active focal point).

ms_appl_name Name of the current focal point application. This can either be one of the 4-byte architecturally defined values (right-padded with EBCDIC spaces) for management services applications as described in *SNA Management Services*, or an 8-byte type-1134 EBCDIC installation defined name. This will be all zeros if the focal point has been revoked and not replaced (so that there is no currently active focal point).

fp_type Type of focal point. Refer to *SNA Management Services* for further details.

AP_EXPLICIT_PRIMARY_FP
AP_BACKUP_FP
AP_DEFAULT_PRIMARY_FP
AP_DOMAIN_FP
AP_HOST_FP
AP_NO_FP

fp_status Status of the focal point:

AP_NOT_ACTIVE
The focal point has gone from active to inactive.

AP_ACTIVE
The focal point has gone from inactive or pending active to active.

fp_routing Type of routing that applications should specify when using MDS transport to send data to the focal point (only significant if the focal point status is AP_ACTIVE):

AP_DEFAULT
Default routing is used to deliver the MDS_MU to the focal point.

AP_DIRECT
The MDS_MU will be routed on a session directly to the focal point.

ISR_INDICATION

This indication is generated when an ISR session is activated or deactivated. When the session is deactivated, final session statistics are returned. When the session is activated the **pri_sess_stats** and **sec_sess_stats** fields are reserved.

VCB Structure

```
typedef struct isr_indication
{
    unsigned short   opcode;                /* verb operation code              */
   unsigned  char    reserv2;               /*  reserved                         */
   unsigned  char    format;                /*  format                           */
    unsigned short   primary_rc;            /* primary return code              */
    unsigned long    secondary_rc;          /* secondary return code            */
    unsigned char    data_lost;             /* previous indication lost         */
    unsigned char    deactivated;           /* has ISR session been             */
                                            /*  deactivated?                    */
    FQPCID           fqpcid;                /* fully qualified procedure        */
                                            /* correlator ID                    */
    unsigned char    fqplu_name[17];        /* fully qualified primary          */
                                            /* LU name                          */
    unsigned char    fqslu_name[17];        /* fully qualified secondary        */
                                            /* LU name                          */
    unsigned char    mode_name[8];          /* mode name                        */
    unsigned char    cos_name[8];           /* COS name                         */
   unsigned  char    transmission_priority;
                                            /* transmission priority            */
    unsigned long    sense_data;            /* sense data                       */
   unsigned  char    reserv2a[2];           /*  reserved                        */
   SESSION_STATS     pri_sess_stats;        /*  primary  hop  session  stats    */
   SESSION_STATS     sec_sess_stats;        /*  secondary  hop  session         */
                                            /*  statistics                      */
   unsigned  char    reserva[20];           /*  reserved                        */
} ISR_INDICATION;

typedef struct fqpcid
{
    unsigned char    pcid[8];               /* pro correlator identifier        */
    unsigned char    fqcp_name[17];         /* orig's network qualified         */
                                            /* CP name                          */
   unsigned  char    reserve3[3];           /*  reserved                        */
} FQPCID;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;           /* session receive RU size          */
    unsigned short   send_ru_size;          /* session send RU size             */
    unsigned short   max_send_btu_size; /* Maximum send BTU size               */
    unsigned  short  max_rcv_btu_size;  /*  Maximum  rcv  BTU  size            */
    unsigned  short  max_send_pac_win;  /*  Max  send  pacing  window  size  */
    unsigned  short  cur_send_pac_win;  /*  Curr  send  pacing  window  size */
    unsigned short   max_rcv_pac_win;       /* Max receive pacing win size      */
    unsigned short   cur_rcv_pac_win;       /* Curr rec pacing window size      */
    unsigned long    send_data_frames;      /* Number of data frames sent       */
```

```
    unsigned  long     send_fmd_data_frames;
                                          /* num of FMD data frames sent    */
    unsigned  long     send_data_bytes;    /* Number of data bytes sent      */
    unsigned  long     rcv_data_frames;    /* Num data frames received       */
    unsigned  long     rcv_fmd_data_frames;
                                          /* num of FMD data frames recvd */
     unsigned long      rcv_data_bytes;      /* Num data bytes received        */
     unsigned char      sidh;                /* Session ID high byte           */
     unsigned char      sidl;                /* Session ID low byte            */
     unsigned char      odai;                /* ODAI bit set                     */
     unsigned char      ls_name[8];          /* Link station name              */
    unsigned  char     reserve;             /*  reserved                        */
} SESSION_STATS;
```

Parameters

The application supplies the following parameters:

opcode AP_ISR_INDICATION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

primary_rc AP_OK

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure which has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields may be set to null. The application should issue a QUERY verb to update the information which has been lost.

deactivate Set to AP_YES when the ISR session is deactivated. Set to AP_NO when the session is activated.

fqpcid.pcid Procedure Correlator ID. This is an 8-byte hexadecimal string.

fqpcid.pcid_name Fully qualified Control Point name. This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

fqplu_name Fully qualified primary LU name (as specified on the BIND request). This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This name will be all zeros if **deactivated** is AP_YES.

fqslu_name Fully qualified secondary LU name (as specified on the BIND request). This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This name will be all zeros if **deactivated** is AP_YES.

cos_name Class of Service name. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces. This name will be all zeros if **deactivated** is AP_YES.

transmission_priority
The transmission priority associated with the session. This field is reserved if **deactivated** is AP_YES.

sense_data The sense data sent or received on the UNBIND request. This field is reserved if **deactivated** is AP_YES.

pri_sess_stats.rcv_ru_size
Maximum receive RU size.

pri_sess_stats.send_ru_size
Maximum send RU size.

pri_sess_stats.max_send_btu_size
Maximum BTU size that can be sent.

pri_sess_stats.max_rcv_btu_size
Maximum BTU size that can be received.

pri_sess_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

pri_sess_stats.cur_send_pac_win
Current size of the send pacing window on this session.

pri_sess_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

pri_sess_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

pri_sess_stats.send_data_frames
Number of normal flow data frames sent.

pri_sess_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

pri_sess_stats.send_data_bytes
Number of normal flow data bytes sent.

pri_sess_stats.rcv_data_frames
Number of normal flow data frames received.

pri_sess_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

pri_sess_stats.rcv_data_bytes
Number of normal flow data bytes received.

pri_sess_stats.sidh Session ID high byte.

pri_sess_stats.sidl Session ID low byte.

pri_sess_stats.odai Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station. It sets it to one if the BIND sender is the node containing the secondary link station.

pri_sess_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate the session statistics with the link over which session traffic flows.

sec_sess_stats.rcv_ru_size
Maximum receive RU size.

sec_sess_stats.send_ru_size
Maximum send RU size.

sec_sess_stats.max_send_btu_size
Maximum BTU size that can be sent.

sec_sess_stats.max_rcv_btu_size
Maximum BTU size that can be received.

sec_sess_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

sec_sess_stats.cur_send_pac_win
Current size of the send pacing window on this session.

sec_sess_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

sec_sess_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

sec_sess_stats.send_data_frames
Number of normal flow data frames sent.

sec_sess_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

sec_sess_stats.send_data_bytes
Number of normal flow data bytes sent.

sec_sess_stats.rcv_data_frames
Number of normal flow data frames received.

sec_sess_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

sec_sess_stats.rcv_data_bytes
Number of normal flow data bytes received.

sec_sess_stats.sidh
Session ID high byte.

sec_sess_stats.sidl Session ID low byte.

sec_sess_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station. It sets it to one if the BIND sender is the node containing the secondary link station.

sec_sess_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are

significant. This field can be used to correlate the session statistics with the link over which session traffic flows.

LOCAL_LU_INDICATION

This indication is generated whenever a LOCAL LU is defined or deleted. This allows a registered application to maintain a list of all local LUs currently defined.

VCB Structure

```
typedef struct local_lu_indication
{
    unsigned short   opcode;                  /* verb operation code                  */
    unsigned  char   reserv2;                 /*  reserved                            */
    unsigned  char   format;                  /*  format                              */
    unsigned short   primary_rc;              /* primary return code                  */
    unsigned long    secondary_rc;            /* secondary return code                */
    unsigned char    data_lost;               /* previous indication lost             */
    unsigned char    reason;                  /* reason for this indication           */
    unsigned char    lu_name[8];              /* LU name                              */
    unsigned  char   description[RD_LEN];
                                              /* resource description                 */
    unsigned char    lu_alias[8];             /* LU alias                             */
    unsigned char    nau_address;             /* NAU address                          */
    unsigned  char   reserv4;                 /*  reserved                            */
    unsigned char    pu_name[8];              /* PU name                              */
    unsigned char    lu_sscp_active;          /* Is LU-SSCP session active            */
    unsigned  char   reserv5;                 /*  reserved                            */
    SESSION_STATS    lu_sscp_stats;           /*  LU-SSCP  session  statistics        */
} LOCAL_LU_INDICATION;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;             /* session receive RU size              */
    unsigned short   send_ru_size;            /* session send RU size                 */
    unsigned  short  max_send_btu_size;       /*  max  send  BTU  size                */
    unsigned short   max_rcv_btu_size;        /* max rcv BTU size                     */
    unsigned short   max_send_pac_win;        /* max send pacing window size          */
    unsigned short   cur_send_pac_win;        /* current send pacing win size         */
    unsigned short   max_rcv_pac_win;         /* max receive pacing win size          */
    unsigned short   cur_rcv_pac_win;         /* curr receive pacing winsize          */
    unsigned  long   send_data_frames;        /*  number  of  data  frames  sent      */
    unsigned  long   send_fmd_data_frames;
                                              /* num of FMD data frames sent          */
    unsigned long    send_data_bytes;         /* number of data bytes sent            */
    unsigned long    rcv_data_frames;         /* num of data frames received          */
    unsigned  long   rcv_fmd_data_frames;
                                              /* num FMD data frames received         */
    unsigned long    rcv_data_bytes;          /* number of data bytes received */
    unsigned char    sidh;                    /* session ID high byte                 */
    unsigned char    sidl;                    /* session ID low byte                  */
    unsigned char    odai;                    /* ODAI bit set                         */
    unsigned char    ls_name[8];              /* Link station name                    */
    unsigned  char   reserve;                 /*  reserved                            */
} SESSION_STATS;
```

Note: The LU-SSCP statistics are only valid when both **nau_address** is nonzero and the LU-SSCP session goes from active to inactive. In all other cases the fields are reserved.

Parameters

opcode AP_LOCAL_LU_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES, then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

reason Reason for indication being issued:

AP_ADDED
The LU has been defined.

AP_REMOVED
The LU has been deleted, either explicitly using DELETE_LOCAL_LU or implicitly using DELETE_LS, DELETE_PORT or DELETE_DLC.

AP_SSCP_ACTIVE
The LU-SSCP session has become active after the node has successfully processed an ACTLU.

AP_SSCP_INACTIVE
The LU-SSCP session has become inactive after a normal DACTLU or a link failure.

lu_name Name of the LU. Name of the local LU whose state has changed. This is an 8-byte alphanumeric type A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description Resource description (as specified on DEFINE_LOCAL_LU).

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

nau_address Network addressable unit address of the LU, which must be in the range 0–255. A non-zero value implies the LU is a dependent LU. Zero implies the LU is an independent LU.

pu_name Name of the PU that this LU uses. This is an 8-byte alphanumeric type A EBCDIC string. This field is only significant if the LU is a dependent LU (that is, **nau_address** is nonzero), and will be set to all binary zeros for independent LUs.

lu_sscp_sess_active
Specifies whether the LU-SSCP session is active (AP_YES or AP_NO). If **nau_address** is zero then this field is reserved.

lu_sscp_stats.rcv_ru_size
This field is always reserved.

lu_sscp_stats.send_ru_size
This field is always reserved.

lu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

lu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

lu_sscp_stats.max_send_pac_win
This field will always be set to zero.

lu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

lu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

lu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

lu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

lu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

lu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

lu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

lu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

lu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

lu_sscp_stats.sidh Session ID high byte.

lu_sscp_stats.sidl Session ID low byte.

lu_sscp_stats.odai Origin destination address indicator. When bringing up a session, the sender of the ACTLU sets this field to zero if the local node contains the primary link station, and sets it to 1 if the ACTLU sender is the node containing the secondary link station.

lu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate this session with the link over which the session flows.

LOCAL_TOPOLOGY_INDICATION

This indication is generated when a TG entry in a node's local topology database changes from active to inactive, or from inactive to active.

VCB Structure

```
typedef struct local_topology_indication
{
    unsigned short   opcode;          /* verb operation code              */
    unsigned char    reserv2;         /*  reserved                        */
    unsigned char    format;          /*  format                          */
    unsigned short   primary_rc;      /* primary return code              */
    unsigned long    secondary_rc;    /*  secondary  return  code         */
    unsigned char    data_lost;       /* previous indication lost         */
    unsigned char    status;          /* TG status                        */
    unsigned char    dest[17];        /* name of TG destination node      */
    unsigned char    dest_type;       /* TG destination node type         */
    unsigned char    tg_num;          /* TG number                        */
    unsigned char    reserva[20];     /*  reserved                        */
} LOCAL_TOPOLOGY_INDICATION;
```

Parameters

opcode AP_LOCAL_TOPOLOGY_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

status Specifies the status of the TG. This can be one or more of the following values ORed together:

AP_TG_OPERATIVE
AP_TG_CP_CP_SESSIONS
AP_TG_QUIESCING
AP_NONE

dest Fully qualified destination node name for the TG. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

dest_type Type of the node. It is one of the following values:

AP_END_NODE
AP_NETWORK_NODE
AP_VRN

tg_num Number associated with the TG.

LS_INDICATION

This indication is generated when the number of active sessions using the link changes, or the external state of the link station changes. Link station statistics are supplied when the link station becomes inactive.

VCB Structure

```
typedef struct ls_indication
{
    unsigned short   opcode;                 /* verb operation code                */
   unsigned  char    reserv2;                /*  reserved                          */
   unsigned  char    format;                 /*  format                            */
    unsigned short   primary_rc;             /* primary return code                */
    unsigned long    secondary_rc;           /* secondary return code              */
    unsigned char    data_lost;              /* previous indication lost           */
    unsigned char    deactivated;            /* has session been deactivated? */
    unsigned char    ls_name[8];             /* link station name                  */
    unsigned char    description[RD_LEN]; /* resource description               */
    unsigned char    adj_cp_name[17];        /* network qualified Adj CP name */
    unsigned char    adj_node_type;          /* adjacent node type                 */
    unsigned short   act_sess_count;         /* active session count on link    */
    unsigned char    indication_cause;       /* cause of indication             */
    LS_STATS         ls_stats;               /* link station statistics            */
    unsigned char    tg_num;                 /* TG number                          */
    unsigned long    sense_data;             /* sense data                         */
   unsigned  char    reserva[19];            /*  reserved                          */
} LS_INDICATION;

typedef struct ls_stats
{
    unsigned long    in_xid_bytes;           /* num of XID bytes received       */
    unsigned long    in_msg_bytes;           /* num message bytes received      */
    unsigned long    in_xid_frames;          /* num XID frames received         */
    unsigned long    in_msg_frames;          /* num message frames received     */
    unsigned long    out_xid_bytes;          /* num XID bytes sent              */
    unsigned long    out_msg_bytes;          /* num message bytes sent          */
    unsigned long    out_xid_frames;         /* number of XID frames sent       */
    unsigned long    out_msg_frames;         /* num message frames sent         */
   unsigned  long    in_invalid_sna_frames;
                                            /* num invalid frames recvd        */
   unsigned  long    in_session_control_frames;
                                            /* number of control               */
                                            /* frames recvd                    */
   unsigned  long    out_session_control_frames;
                                            /* number of control               */
                                            /* frames sent                     */
    unsigned long    echo_rsps;              /* response from adj LS count      */
    unsigned long    current_delay;          /* time taken for last             */
                                            /* test signal                     */
    unsigned long    max_delay;              /* max delay by test signal        */
    unsigned long    min_delay;              /* min delay by test signal        */
    unsigned long    max_delay_time;         /* time since longest delay        */
    unsigned long    good_xids;              /* successful XID on LS count      */
    unsigned long    bad_xids;               /* unsuccessful XID on LS count    */
} LS_STATS;
```

Parameters

opcode AP_LS_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

deactivated
Set to AP_YES when the LS becomes inactive. Set to AP_NO when the LS becomes active.

ls_name Name of link station. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

description
Resource description (as specified on DEFINE_LS). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

adj_cp_name
Fully-qualified, 17-byte long, adjacent control point name. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

adj_node_type
Type of the node. It is one of the following values:

AP_END_NODE
AP_NETWORK_NODE
AP_LEN_NODE
AP_VRN

act_sess_count
Total number of active sessions (both endpoint and intermediate) using the link.

indication_cause
Cause of the indication. It is one of the following values:

AP_ACTIVATION_STARTED
The link is activating.

AP_ACTIVATING
The link has become active.

AP_DEACTIVATION_STARTED
The link is being deactivated.

AP_DEACTIVATING
The link has become inactive.

AP_SESS_COUNT_CHANGING
The number of active sessions using the link has changed.

AP_CP_NAME_CHANGING
An adjacent node has changed its control point name.

AP_FAILED
The link has failed.

AP_ACTIVATION_FAILED
The link failed to activate.

AP_DATA_LOST
A previous indication has been lost. Note that link station statistics are only supplied when the link station goes from active to inactive (that is, deactivating is set to AP_YES and **indication_cause** is set to AP_DEACTIVATING). In all other cases the fields are reserved.

ls_stats.in_xid_bytes
Total number of XID (Exchange Identification) bytes received on this link station.

ls_stats.in_msg_bytes
Total number of data bytes received on this link station.

ls_stats.in_xid_frames
Total number of XID (Exchange Identification) frames received on this link station.

ls_stats.in_msg_frames
Total number of data frames received on this link station.

ls_stats.out_xid_bytes
Total number of XID (Exchange Identification) bytes sent on this link station.

ls_stats.out_msg_bytes
Total number of data bytes sent on this link station.

ls_stats.out_xid_frames
Total number of XID (Exchange Identification) frames sent on this link station.

ls_stats.out_msg_frames
Total number of data frames sent on this link station.

ls_stats.in_invalid_sna_frames
Total number of SNA incorrect frames received on this link station.

ls_stats.in_session_control_frames
Total number of session control frames received on this link station.

ls_stats.out_session_control_frames
Total number of session control frames sent on this link station.

ls_stats.echo_rsps
Number of echo responses received from the adjacent node. Echo requests are sent periodically to gauge the propagation delay to the adjacent node.

ls_stats.current_delay
Time (in milliseconds) that it took for the last test signal to be sent and returned from this link station to the adjacent link station.

ls_stats.max_delay
Longest time taken (in milliseconds) for a test signal to be sent and returned from this link station to the adjacent link station.

ls_stats.min_delay
Shortest time taken (in milliseconds) for a test signal to be sent and returned from this link station to the adjacent link station.

ls_stats.max_delay_time
Time since system startup (in hundredths of a second) when the longest delay occurred.

ls_stats.good_xids
Total number of successful XID exchanges that have occurred on this link station since it was started.

ls_stats.bad_xids
Total number of unsuccessful XID exchanges that have occurred on this link station since it was started.

tg_num Number associated with the TG.

sense_data
This sense data is set if Personal Communications or Communications Server detects an XID protocol error. This field is reserved unless **indication_cause** is AP_FAILED.

LU_0_TO_3_INDICATION

This indication is generated when the state of a local LU (Type 0-3) changes.

VCB Structure

```
typedef struct lu_0_to_3_indication
{
    unsigned short   opcode;                /* verb operation code              */
   unsigned  char    reserv2;               /*  reserved                         */
   unsigned  char    format;                /*  format                           */
    unsigned short   primary_rc;            /* primary return code              */
    unsigned long     secondary_rc;         /* secondary return code            */
    unsigned char     data_lost;            /* previous indication lost         */
    unsigned char     pu_name[8];           /* PU Name                          */
    unsigned char     lu_name[8];           /* LU Name                          */
    unsigned char     description[RD_LEN]; /* resource description             */
    unsigned char     nau_address;          /* NAU address                      */
   unsigned  char    lu_sscp_sess_active;
                                            /* Is SSCP session active?          */
    unsigned char     appl_conn_active;     /* Is application using LU?         */
    unsigned char     plu_sess_active;      /* Is PLU-SLU session active?       */
    unsigned char     host_attachment;      /* Host attachment                  */
   SESSION_STATS     lu_sscp_stats;         /* LU-SSCP session statistics       */
   SESSION_STATS     plu_stats;             /* PLU-SLU session statistics       */
} LU_0_TO_3_INDICATION;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;           /* session receive RU size          */
    unsigned short   send_ru_size;          /* session send RU size             */
    unsigned  short  max_send_btu_size;     /* max send BTU size                */
    unsigned short   max_rcv_btu_size;      /* max rcv BTU size                 */
    unsigned short   max_send_pac_win;      /* max send pacing window size      */
    unsigned short   cur_send_pac_win;      /* current send pacing win size     */
    unsigned short   max_rcv_pac_win;       /* max receive pacing win size      */
    unsigned short   cur_rcv_pac_win;       /* curr receive pacing winsize      */
   unsigned  long    send_data_frames;      /* number of data frames sent       */
   unsigned  long    send_fmd_data_frames;
                                            /* num of FMD data frames sent      */
    unsigned long     send_data_bytes;      /* number of data bytes sent        */
    unsigned long     rcv_data_frames;      /* num of data frames received      */
   unsigned  long    rcv_fmd_data_frames;
                                            /* num FMD data frames received     */
    unsigned long     rcv_data_bytes;       /* number of data bytes received */
    unsigned char     sidh;                 /* session ID high byte             */
    unsigned char     sidl;                 /* session ID low byte              */
    unsigned char     odai;                 /* ODAI bit set                     */
    unsigned char     ls_name[8];           /* Link station name                */
   unsigned  char    reserve;               /*  reserved                        */
} SESSION_STATS;
```

Parameters

opcode AP_LU_0_TO_3_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

pu_name Name of local PU. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

lu_name Name of the local LU whose state has changed. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description
Resource description (as specified on DEFINE_LU_0_TO_3). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

nau_address
Network addressable unit address of the LU (which will be in the range 10—2554).

lu_sscp_sess_active
Specifies whether the ACTLU has been successfully processed (AP_YES or AP_NO).

appl_conn_active
Set if the application is using this LU (AP_YES or AP_NO).

plu_sess_active
Specifies whether the PLU-SLU session has been activated (AP_YES or AP_NO).

host_attachment
Specifies the LU host attachment type:

AP_DLUR_ATTACHED
LU is attached to host system using DLUR.

AP_DIRECT_ATTACHED
LU is directly attached to host system. Note the LU-SSCP and PLU-SLU statistics are only valid when the sessions go from active to inactive. In all other cases the fields are reserved.

lu_sscp_stats.rcv_ru_size
This field is always reserved.

lu_sscp_stats.send_ru_size
This field is always reserved.

lu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

lu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

lu_sscp_stats.max_send_pac_win
This field will always be set to zero.

lu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

lu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

lu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

lu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

lu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

lu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

lu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

lu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

lu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

lu_sscp_stats.sidh
Session ID high byte.

lu_sscp_stats.sidl
Session ID low byte.

lu_sscp_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the ACTLU sets this field to zero if the local node contains the primary link station, and sets it to 1 if the ACTLU sender is the node containing the secondary link station.

lu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate this session with the link over which the session flows.

plu_stats.rcv_ru_size
Maximum receive RU size.

plu_stats.send_ru_size
Maximum send RU size.

plu_stats.max_send_btu_size
Maximum BTU size that can be sent.

plu_stats.max_rcv_btu_size
Maximum BTU size that can be received.

plu_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

plu_stats.cur_send_pac_win
Current size of the send pacing window on this session.

plu_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

plu_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

plu_stats.send_data_frames
Number of normal flow data frames sent.

plu_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

plu_stats.send_data_bytes
Number of normal flow data bytes sent.

plu_stats.rcv_data_frames
Number of normal flow data frames received.

plu_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

plu_stats.rcv_data_bytes
Number of normal flow data bytes received.

plu_stats.sidh
Session ID high byte.

plu_stats.sidl
Session ID low byte.

plu_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the ACTLU sets this field to zero if the local node contains the primary link station, and sets it to 1 if the ACTLU sender is the node containing the secondary link station.

plu_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate this session with the link over which the session flows.

MODE_INDICATION

This indication is sent when a local LU and partner LU combination start to use a particular mode, and when the current session count for the local LU, partner LU, and mode combination changes.

VCB Structure

```
typedef struct mode_indication
{
    unsigned short   opcode;                 /* verb operation code          */
   unsigned  char    reserv2;                /*  reserved                    */
   unsigned  char    format;                 /*  format                      */
    unsigned short   primary_rc;             /* primary return code          */
    unsigned long     secondary_rc;          /* secondary return code        */
    unsigned char     data_lost;             /* previous indication lost     */
    unsigned char     removed;               /* is entry being removed?      */
    unsigned char     lu_alias[8];           /* LU alias                     */
    unsigned char     plu_alias[8];          /* partner LU alias             */
    unsigned char     fqplu_name[17];        /* fully qualified partner      */
                                             /* LU name                      */
    unsigned char     mode_name[8];          /* mode name                    */
   unsigned  char    description[RD_LEN];    /*  resource  description       */
    unsigned short   curr_sess_count;       /* current session count        */
   unsigned  char    reserva[20];            /*  reserved                    */
} MODE_INDICATION;
```

Parameters

opcode AP_MODE_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

removed Specifies whether an entry is being removed (AP_YES or AP_NO). It is set when entry is being removed rather than added.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

MODE_INDICATION

mode_name	Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.
description	Resource description (as specified on DEFINE_MODE). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.
curr_sess_count	Current count of sessions for this local LU, partner LU, and mode combination.

NN_TOPOLOGY_NODE_INDICATION

This indication is generated when a node entry in a network node's topology database changes from active to inactive, or from inactive to active.

VCB Structure

```
typedef struct nn_topology_node_indication
{
    unsigned short   opcode;          /* verb operation code              */
    unsigned char    reserv2;         /*  reserved                        */
    unsigned char    format;          /*  format                          */
    unsigned short   primary_rc;      /* primary return code              */
    unsigned long    secondary_rc;    /*  secondary  return  code         */
    unsigned char    data_lost;       /* previous indication lost         */
    unsigned char    deactivated;     /* has the node become inactive? */
    unsigned char    node_name[17];   /* node name                        */
    unsigned char    node_type;       /* node type                        */
    unsigned char    reserva[20];     /*  reserved                        */
} NN_TOPOLOGY_NODE_INDICATION;
```

Parameters

opcode AP_NN_TOPOLOGY_TG_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

deactivated Set to AP_YES when the node becomes inactive. Set to AP_NO when the node becomes active.

node_name Network qualified node name from network topology database. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

node_type Type of the node. It is one of the following.

AP_NETWORK_NODE
AP_VRN

NN_TOPOLOGY_TG_INDICATION

This indication is generated when a TG entry in a network node's topology database changes from active to inactive, or from inactive to active.

VCB Structure

```
typedef struct nn_topology_tg_indication
{
    unsigned short   opcode;          /* verb operation code              */
    unsigned  char   reserv2;         /*  reserved                        */
    unsigned  char   format;          /*  format                          */
    unsigned short   primary_rc;      /* primary return code              */
    unsigned  long   secondary_rc;    /*  secondary  return  code         */
    unsigned char    data_lost;       /* previous indication lost         */
    unsigned char    status;          /* TG status                        */
    unsigned char    owner[17];       /* name of TG owner node            */
    unsigned char    dest[17];        /* name of TG destination node      */
    unsigned char    tg_num;          /* TG number                        */
    unsigned char    owner_type;      /* Type of node that owns the TG */
    unsigned char    dest_type;       /* TG destination node type         */
    unsigned  char   reserva[18];     /*  reserved                        */
} NN_TOPOLOGY_TG_INDICATION;
```

Parameters

opcode AP_NN_TOPOLOGY_TG_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

status Specifies the status of the TG. This can be one or more of the following values ORed together:

AP_TG_OPERATIVE
AP_TG_QUIESCING
AP_TG_CP_CP_SESSIONS
AP_NONE

owner Name of the TG's originating node (always set to the local node name). This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

dest Fully qualified destination node name for the TG. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings

concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

tg_num Number associated with the TG.

owner_type Type of the node that owns the TG.

AP_NETWORK_NODE
AP_VRN

dest_type Type of the node.

AP_NETWORK_NODE
AP_VRN

PLU_INDICATION

This indication is generated when a local LU first connects to a partner LU. This will happen when the first ALLOCATE to this PLU is processed or when the first BIND is received from this PLU. This indication is also generated if the partner control point name changes.

VCB Structure

```
typedef struct plu_indication
{
    unsigned short   opcode;                  /* verb operation code          */
   unsigned  char    reserv2;                 /*  reserved                    */
   unsigned  char    format;                  /*  format                      */
    unsigned short   primary_rc;              /* primary return code          */
    unsigned long    secondary_rc;            /* secondary return code        */
    unsigned char    data_lost;               /* has previous indication      */
                                              /* been lost?                   */
    unsigned char    removed;                 /* is entry being removed?      */
    unsigned char    lu_alias[8];             /* LU alias                     */
    unsigned char    plu_alias[8];            /* partner LU alias             */
    unsigned char    fqplu_name[17];          /* fully qualified partner      */
                                              /* LU name                      */
    unsigned char    description[RD_LEN];     /* resource description         */
    unsigned char    partner_cp_name[17];     /* partner CP name              */
   unsigned  char    partner_lu_located;      /* partner CP name resolved?    */
   unsigned  char    reserva[20];             /* reserved                     */
} PLU_INDICATION;
```

Parameters

opcode AP_PLU_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether one or more indications have been lost (AP_YES or AP_NO). It is set when an internal component was unable to send a previous indication. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

removed Specifies whether an entry is being removed (AP_YES or AP_NO). It is set when entry is being removed rather than added.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with

EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

description Resource description (as specified on DEFINE_PARTNER_LU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

partner_cp_name 17-byte fully qualified network name for the control point of the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

partner_lu_located Specifies whether the partner control point name has been resolved (AP_YES or AP_NO), and thus whether the **partner_cp_name** field contains the control point name.

PORT_INDICATION

This indication is generated when the port goes from active to inactive (or vice versa).

VCB Structure

```
typedef struct port_indication
{
    unsigned short   opcode;                 /* verb operation code                */
   unsigned  char    reserv2;                /*  reserved                          */
   unsigned  char    format;                 /*  format                            */
    unsigned short   primary_rc;             /* primary return code                */
    unsigned long     secondary_rc;          /* secondary return code              */
    unsigned char     data_lost;             /* previous indication lost           */
    unsigned char     deactivated;           /* has session been deactivated? */
    unsigned char     port_name[8];          /* link station name                  */
   unsigned  char    description[RD_LEN];    /*  resource  description             */
   unsigned  char    reserva[20];            /*  reserved                          */
} PORT_INDICATION;
```

Parameters

opcode AP_PORT_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

secondary_rc Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

deactivated Set to AP_YES when the port becomes inactive. Set to AP_NO when the port becomes active.

port_name Name of port. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

description Resource description (as specified on DEFINE_PORT). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

PU_INDICATION

This indication is generated when the state of a local PU changes.

VCB Structure

```
typedef struct pu_indication
{
    unsigned short   opcode;                /* verb operation code              */
   unsigned  char    reserv2;               /*  reserved                        */
   unsigned  char    format;                /*  format                          */
    unsigned short   primary_rc;            /* primary return code              */
    unsigned long     secondary_rc;         /* secondary return code            */
    unsigned char     data_lost;            /* previous indication lost         */
    unsigned char     pu_name[8];           /* PU Name                          */
   unsigned  char    description[RD_LEN];   /*  resource  description           */
   unsigned  char    pu_sscp_sess_active;
                                           /* Is SSCP session active?          */
    unsigned char     host_attachment;      /* Host attachment                  */
   unsigned  char    reserv1[2];            /*  reserved                        */
   SESSION_STATS     pu_sscp_stats;        /*  PU-SSCP  session  statistics    */
} PU_INDICATION;

typedef struct session_stats
{
    unsigned short   rcv_ru_size;           /* session receive RU size          */
    unsigned short   send_ru_size;          /* session send RU size             */
    unsigned short   max_send_btu_size;     /* max send BTU size                */
    unsigned short   max_rcv_btu_size;      /* max rcv BTU size                 */
    unsigned short   max_send_pac_win;      /* max send pacing window size      */
    unsigned short   cur_send_pac_win;      /* curr send pacing window size     */
    unsigned short   max_rcv_pac_win;       /* max rcv pacing window size       */
    unsigned short   cur_rcv_pac_win;       /* curr receive pacing win size     */
    unsigned long     send_data_frames;     /* number of data frames sent       */
   unsigned  long    send_fmd_data_frames;
                                           /* num FMD data frames sent         */
    unsigned long     send_data_bytes;      /* number of data bytes sent        */
    unsigned long     rcv_data_frames;      /* num of data frames received      */
   unsigned  long    rcv_fmd_data_frames;
                                           /* num FMD data frames received     */
    unsigned long     rcv_data_bytes;       /* num data bytes received          */
    unsigned char     sidh;                 /* session ID high byte             */
    unsigned char     sidl;                 /* session ID low byte              */
    unsigned char     odai;                 /* ODAI bit set                     */
    unsigned char     ls_name[8];           /* Link station name                */
   unsigned  char    reserve;               /*  reserved                        */
} SESSION_STATS;
```

Parameters

opcode AP_PU_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc

AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

pu_name Name of the PU (configured on the DEFINE_LS verb). This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

description
Resource description (as specified on DEFINE_LS or DEFINE_INTERNAL_PU). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

pu_sscp_sess_active
Specifies whether the ACTPU has been successfully processed (AP_YES or AP_NO).

host_attachment
PU host attachment type:

AP_DLUR_ATTACHED
PU is attached to host system using DLUR.

AP_DIRECT_ATTACHED
PU is directly attached to host system.

Note: PU-SSCP statistics are valid only when the session state has moved from active to inactive.

In all other cases the following fields are reserved:

pu_sscp_stats.rcv_ru_size
This field is always reserved.

pu_sscp_stats.send_ru_size
This field is always reserved.

pu_sscp_stats.max_send_btu_size
Maximum BTU size that can be sent.

pu_sscp_stats.max_rcv_btu_size
Maximum BTU size that can be received.

pu_sscp_stats.max_send_pac_win
This field will always be set to zero.

pu_sscp_stats.cur_send_pac_win
This field will always be set to zero.

pu_sscp_stats.max_rcv_pac_win
This field will always be set to zero.

pu_sscp_stats.cur_rcv_pac_win
This field will always be set to zero.

pu_sscp_stats.send_data_frames
Number of normal flow data frames sent.

pu_sscp_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

pu_sscp_stats.send_data_bytes
Number of normal flow data bytes sent.

pu_sscp_stats.rcv_data_frames
Number of normal flow data frames received.

pu_sscp_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

pu_sscp_stats.rcv_data_bytes
Number of normal flow data bytes received.

pu_sscp_stats.sidh
Session ID high byte.

pu_sscp_stats.sidl
Session ID low byte.

pu_sscp_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the ACTPU sets this field to zero if the local node contains the primary link station, and sets it to 1 if the ACTPU sender is the node containing the secondary link station.

pu_sscp_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate this session with the link over which the session flows.

REGISTRATION_FAILURE

REGISTRATION_FAILURE indicates that an attempt to register resources with the network node server failed.

VCB Structure

```
typedef struct registration_failure
{
    unsigned short   opcode;                 /* verb operation code          */
   unsigned  char    reserv2;                /*  reserved                     */
   unsigned  char    format;                 /*  format                       */
    unsigned short   primary_rc;             /* primary return code          */
    unsigned long    secondary_rc;           /* secondary return code        */
    unsigned char    data_lost;              /* previous indication lost */
    unsigned char    resource_name[17];      /* network qualified            */
                                             /* resource name                */
    unsigned short   resource_type;          /* resource type                */
   unsigned  char    description[RD_LEN];    /*  resource  description       */
   unsigned  char    reserv2b[2];            /*  reserved                    */
    unsigned long    sense_data;             /* sense data                   */
   unsigned  char    reserva[20];            /*  reserved                    */
} REGISTRATION_FAILURE;
```

Parameters

opcode AP_REGISTRATION_FAILURE

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc AP_OK

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES, then subsequent data fields may be set to null. The application should issue a QUERY verb to update the information that has been lost.

resource_name Name of resource that failed to register. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

resource_type Resource type. One of the following values:

AP_NNCP_RESOURCE
AP_ENCP_RESOURCE
AP_LU_RESOURCE

description Resource description (as specified on DEFINE_LOCAL_LU, or DEFINE_ADJACENT_NODE).

sense_data Sense data (specified in *SNA Formats*).

RTP_INDICATION

This indication is generated when:

an RTP connection is connected or disconnected

the active session count changes

the connection performs a path-switch.

When the connection is disconnected, final RTP statistics will be returned. At other times the **rtp_stats** field is reserved.

VCB Structure

```
typedef struct rtp_indication
{
    unsigned short    opcode;                 /* verb operation code                */
    unsigned  char    reserv2;                /*  reserved                          */
    unsigned  char    format;                 /*  format                            */
    unsigned short    primary_rc;             /* primary return code                */
    unsigned long     secondary_rc;           /* secondary return code              */
    unsigned char     data_lost;              /* previous indication(s) lost        */
    unsigned char     connection_state;       /* the current state of the RTP       */
                                              /*  connection                        */
    unsigned char     rtp_name[8];            /* name of the RTP connection         */
    unsigned short    num_sess_active;        /* number of active sessions          */
    unsigned char     indication_cause;       /* reason for this indication         */
    unsigned  char    reserv3[3];             /*  reserved                          */
    RTP_STATISTICS    rtp_stats;              /* RTP statistics                     */
} RTP_INDICATION;

 typedef struct rtp_statistics
{
    unsigned long     bytes_sent;             /* total num of bytes sent            */
    unsigned long     bytes_received;         /* total num bytes received           */
    unsigned long     bytes_resent;           /* total num of bytes resent          */
    unsigned long     bytes_discarded;        /* total num bytes discarded          */
    unsigned long     packets_sent;           /* total num of packets sent          */
    unsigned long     packets_received;       /* total num packets received         */
    unsigned long     packets_resent;         /* total num of packets resent        */
    unsigned  long    packets_discarded;      /* total num packets discarded        */
    unsigned long     gaps_detected;          /* gaps detected                      */
    unsigned long     send_rate;              /* current send rate                  */
    unsigned long     max_send_rate;          /* maximum send rate                  */
    unsigned long     min_send_rate;          /* minimum send rate                  */
    unsigned long     receive_rate;           /* current receive rate               */
    unsigned long     max_receive_rate;       /* maximum receive rate               */
    unsigned long     min_receive_rate;       /* minimum receive rate               */
    unsigned long     burst_size;             /* current burst size                 */
    unsigned long     up_time;                /* total uptime of connection         */
    unsigned long     smooth_rtt;             /* smoothed round-trip time           */
    unsigned long     last_rtt;               /* last round-trip time               */
    unsigned long     short_req_timer;        /* SHORT_REQ timer duration           */
    unsigned long     short_req_timeouts;     /* number of SHORT_REQ timeouts       */
    unsigned  long    liveness_timeouts;      /* number of liveness timeouts        */
    unsigned  long    in_invalid_sna_frames;
                                              /* number of invalid SNA frames       */
                                              /*  received                          */
```

```
    unsigned long     in_sc_frames;          /* number of SC frames received     */
    unsigned long     out_sc_frames;         /* number of SC frames sent         */
   unsigned  char    reserve[40];           /*  reserved                        */
} RTP_STATISTICS;
```

Parameters

opcode AP_RTP_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then the data contained might have changed more than once since the previous indication received.

connection_state
The current state of the RTP connection. It is one of the following values:

AP_CONNECTING
Connection setup has started, but is not yet complete.

AP_CONNECTED
The connection is fully active.

AP_DISCONNECTED
The connection is no longer active.

rtp_name
RTP connection name. This name is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

num_sess_active
Number of sessions currently active on the connection.

indication_cause
Cause of the indication. It is one of the following values:

AP_ACTIVATED
The connection has become active.

AP_DEACTIVATED
The connection has become inactive.

AP_PATH_SWITCHED
The connection has successfully completed a path switch.

AP_SESS_COUNT_CHANGING
The number of active sessions using the connection has changed.

AP_SETUP_FAILED
The connection has failed before becoming fully active. Note that RTP connection statistics are only supplied when the connection becomes

inactive, that is when **indication_cause** is AP_DEACTIVATED or AP_SETUP_FAILED. In all other cases the fields are reserved.

rtp_stats.bytes_sent
Total number of bytes that the local node has sent on this RTP connection.

rtp_stats.bytes_received
Total number of bytes that the local node has received on this RTP connection.

rtp_stats.bytes_resent
Total number of bytes resent by the local node owing to loss in transit.

rtp_stats.bytes_discarded
Total number of bytes sent by the other end of the RTP connection that were discarded as duplicates of data already received.

rtp_stats.packets_sent
Total number of packets that the local node has sent on this RTP connection.

rtp_stats.packets_received
Total number of packets that the local node has received on this RTP connection.

rtp_stats.packets_resent
Total number of packets resent by the local node owing to loss in transit.

rtp_stats.packets_discarded
Total number of packets sent by the other end of the RTP connection that were discarded as duplicates of data already received.

rtp_stats.gaps_detected
Total number of gaps detected by the local node. Each gap corresponds to one or more lost frames.

rtp_stats.send_rate
Current send rate on this RTP connection (measured in kilobits per second). This is the maximum allowed send rate as calculated by the ARB algorithm.

rtp_stats.max_send_rate
Maximum send rate on this RTP connection (measured in kilobits per second).

rtp_stats.min_send_rate
Minimum send rate on this RTP connection (measured in kilobits per second).

rtp_stats.receive_rate
Current receive rate on this RTP connection (measured in kilobits per second). This is the actual receive rate calculated over the last measurement interval.

rtp_stats.max_receive_rate
Maximum receive rate on this RTP connection (measured in kilobits per second).

rtp_stats.min_receive_rate
Minimum receive rate on this RTP connection (measured in kilobits per second).

rtp_stats.burst_size
Current burst-size on the RTP Connection measured in bytes.

rtp_stats.up_time
Total number of seconds the RTP connection has been active.

rtp_stats.smooth_rtt
Smoothed measure of round-trip time between the local node and the partner RTP node (measured in milliseconds).

rtp_stats.last_rtt
The last measured round-trip time between the local node and the partner RTP node (measured in milliseconds).

rtp_stats.short_req_timer
The current duration used for the SHORT_REQ timer (measured in milliseconds).

rtp_stats.short_req_timeouts
Total number of times the SHORT_REQ timer has expired for this RTP connection.

rtp_stats.liveness_timeouts
Total number of times the liveness timer has expired for this RTP connection. The liveness timer expires when the connection has been idle for the period specified in **rtp_connection_detail.liveness_timer**.

rtp_stats.in_invalid_sna_frames
Total number of SNA frames received and discarded as not valid on this RTP connection.

rtp_stats.in_sc_frames
Total number of session control frames received on this RTP connection.

rtp_stats.out_sc_frames
Total number of session control frames sent on this RTP connection.

SESSION_INDICATION

This indication is generated when a session is activated or deactivated. When a session is deactivated, final session statistics will be returned. When a session is activated, the **sess_stats** field is reserved.

VCB Structure

```
typedef struct session_indication
{
    unsigned short    opcode;                 /* verb operation code              */
   unsigned  char     reserv2;                /*  reserved                        */
   unsigned  char     format;                 /*  format                          */
    unsigned short    primary_rc;             /* primary return code              */
    unsigned long     secondary_rc;           /* secondary return code            */
    unsigned char     data_lost;              /* previous indication lost         */
    unsigned char     deactivated;            /* has session been deactivated? */
    unsigned char     lu_name[8];             /* LU name                          */
    unsigned char     lu_alias[8];            /* LU alias                         */
    unsigned char     plu_alias[8];           /* partner LU alias                 */
    unsigned char     fqplu_name[17];         /* fully qualified partner          */
                                              /* LU name                          */
    unsigned char     mode_name[8];           /* mode name                        */
    unsigned char     session_id[8];          /* session ID                       */
    FQPCID            fqpcid;                 /* fully qualified procedure        */
   unsigned  long     sense_data;             /*  sense_data                      */
    unsigned char     duplex_support;         /* full-duplex support              */
   SESSION_STATS      sess_stats;             /*  session  statistics             */
                                              /* correlator ID                    */
   unsigned  char     reserva[20];            /*  reserved                        */
} SESSION_INDICATION;

typedef struct fqpcid
{
    unsigned char     pcid[8];                /* procedure correlator             */
                                              /*  identifier                      */
    unsigned char     fqcp_name[17];          /* originator's network             */
                                              /* qualified CP name                */
   unsigned  char     reserve3[3];            /*  reserved                        */
} FQPCID;

typedef struct session_stats
{
    unsigned short    rcv_ru_size;            /* session receive RU size          */
    unsigned short    send_ru_size;           /* session send RU size             */
    unsigned short    max_send_btu_size;      /* max send BTU    size             */
    unsigned short    max_rcv_btu_size;       /* max rcv BTU size                 */
    unsigned short    max_send_pac_win;       /* max send pacing window size      */
    unsigned short    cur_send_pac_win;       /* curr send pacing window size     */
    unsigned short    max_rcv_pac_win;        /* max receive pacing win size      */
    unsigned short    cur_rcv_pac_win;        /* curr receive pacing win size     */
    unsigned long     send_data_frames;       /* number of data frames sent       */
   unsigned  long     send_fmd_data_frames;
                                              /* num FMD data frames sent         */
    unsigned long     send_data_bytes;        /* number of data bytes sent        */
    unsigned long     rcv_data_frames;        /* num data frames received         */
   unsigned  long     rcv_fmd_data_frames;
                                              /* num FMD data frames received     */
```

```
    unsigned long     rcv_data_bytes;        /* num data bytes received        */
    unsigned char     sidh;                   /* session ID high byte           */
    unsigned char     sidl;                   /* session ID low byte            */
    unsigned char     odai;                   /* ODAI bit set                     */
    unsigned char     ls_name[8];             /* Link station name              */
   unsigned  char    reserve;                /*  reserved                        */
} SESSION_STATS;
```

Parameters

opcode AP_SESSION_INDICATION

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

primary_rc
AP_OK

secondary_rc
Equals zero.

data_lost Specifies whether data has been lost (AP_YES or AP_NO). It is set when an internal component detects a failure that has caused a previous indication to be lost. If the **data_lost** flag is set to AP_YES then subsequent data fields can be set to null. The application should issue a QUERY verb to update the information that has been lost.

deactivated
Set to AP_NO when a session is activated. Set to AP_YES when a session is deactivated.

lu_name LU name. This name is an 8-byte type-A EBCDIC character string.

lu_alias Locally defined LU alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant.

plu_alias Partner LU alias. This is an 8-byte string in a locally displayable character set.

fqplu_name
17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

mode_name
Mode name, which designates the network properties for a group of sessions. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

session_id
8-byte identifier of the session.

fqpcid.pcid
Procedure correlator ID. This is an 8-byte hexadecimal string.

fqpcid.fqcp_name
Fully qualified control point name. This name is 17 bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

sense_data
The sense data sent or received on the UNBIND request. This field is reserved if **deactivated** is AP_NO.

duplex_support
Returns the conversation duplex support as negotiated on the BIND. This is one of the following values:

AP_HALF_DUPLEX
Only half-duplex conversations are supported.

AP_FULL_DUPLEX
Full-duplex as well as half-duplex conversations are supported.

AP_UNKNOWN
The conversation duplex support is not known because there are no active sessions to the partner LU.

sess_stats.rcv_ru_size
Maximum receive RU size.

sess_stats.send_ru_size
Maximum send RU size.

sess_stats.max_send_btu_size
Maximum BTU size that can be sent.

sess_stats.max_rcv_btu_size
Maximum BTU size that can be received.

sess_stats.max_send_pac_win
Maximum size of the send pacing window on this session.

sess_stats.cur_send_pac_win
Current size of the send pacing window on this session.

sess_stats.max_rcv_pac_win
Maximum size of the receive pacing window on this session.

sess_stats.cur_rcv_pac_win
Current size of the receive pacing window on this session.

sess_stats.send_data_frames
Number of normal flow data frames sent.

sess_stats.send_fmd_data_frames
Number of normal flow FMD data frames sent.

sess_stats.send_data_bytes
Number of normal flow data bytes sent.

sess_stats.rcv_data_frames
Number of normal flow data frames received.

sess_stats.rcv_fmd_data_frames
Number of normal flow FMD data frames received.

sess_stats.rcv_data_bytes
Number of normal flow data bytes received.

sess_stats.sidh
Session ID high byte.

sess_stats.sidl
Session ID low byte.

sess_stats.odai
Origin destination address indicator. When bringing up a session, the sender of the BIND sets this field to zero if the local node contains the primary link station, and sets it to 1 if the BIND sender is the node containing the secondary link station.

sess_stats_stats.ls_name
Link station name associated with statistics. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant. This field can be used to correlate the session statistics with the link over which session traffic flows.

Chapter 9. Security Verbs

This chapter describes verbs used to define and delete security passwords.

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DEFINE_LU_LU_PASSWORD

DEFINE_LU_LU_PASSWORD provides a password that is used for session-level verification between a local LU and a partner LU.

VCB Structure

```
typedef struct define_lu_lu_password
{
    unsigned short   opcode;              /* verb operation code          */
   unsigned  char    reserv2;             /*  reserved                    */
   unsigned  char    format;              /*  format                      */
    unsigned short   primary_rc;          /* primary return code          */
    unsigned long    secondary_rc;        /* secondary return code        */
    unsigned char    lu_name[8];          /* local LU name                */
    unsigned char    lu_alias[8];         /* local LU alias               */
   unsigned  char    fqplu_name[17];      /*  fully  qualified  partner   */
                                          /* LU name                      */
   unsigned  char    verification_protocol
                                          /* LULU verification protocol */
   unsigned  char    description[RD_LEN];
                                          /* resource description         */
   unsigned  char    reserv3[8];          /*  reserved                    */
   unsigned  char    password[8];         /*  password                    */
} DEFINE_LU_LU_PASSWORD;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_LU_LU_PASSWORD

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Local LU alias. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_alias** and the **lu_name** are set to all zeros, the verb is forwarded to the LU associated with the control point (the default LU).

fqplu_name Fully qualified partner LU name. This name is 17-byte s long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

verification_protocol LU-LU verification protocol for use with this partner LU:

AP_BASIC_PROTOCOL
Only the basic protocol will be used with this partner LU.

AP_ENHANCED_PROTOCOL
Only the enhanced protocol will be used with this partner LU.

AP_EITHER_PROTOCOL
Either the basic or the enhanced protocol can be used with this partner LU, subject to the following details:

The default setting of this field is AP_EITHER_PROTOCOL.

The value AP_EITHER_PROTOCOL is provided to ease migration to the use of the enhanced protocol. The local LU accepts the basic protocol until the partner LU once agrees to run the enhanced protocol. From then on, the basic protocol is not accepted unless a subsequent DEFINE_LU_LU_PASSWORD is issued to allow it.

description Resource description.

password Password. This is an 8-byte hexadecimal string. Note that the least significant bit of each byte in the password is not used in session-level verification.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PLU_NAME

AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DEFINE_USERID_PASSWORD

DEFINE_USERID_PASSWORD defines a password associated with a user ID.

VCB Structure

```
define_userid_password
{
    unsigned short   opcode;                /* verb operation code          */
   unsigned  char    reserv2;               /*  reserved                    */
   unsigned  char    format;                /*  format                      */
    unsigned short   primary_rc;            /* primary return code          */
    unsigned long     secondary_rc;         /* secondary return code        */
    unsigned short   define_type;           /* what the define type is      */
    unsigned char     user_id[10];          /* user id                      */
   unsigned  char    reserv3[8];            /*  reserved                    */
   USERID_PASSWORD_CHARS  password_chars;
                                           /* password characteristics     */
} DEFINE_USERID_PASSWORD;

typedef struct userid_password_chars
{
   unsigned  char    description[RD_LEN];
                                           /* resource description         */
    unsigned short   profile_count;         /* number of profiles           */
   unsigned  short   reserv1;              /*  reserved                    */
   unsigned  char    password[10];         /*  password                    */
   unsigned  char    profiles[10][10];     /*  profiles                    */
} USERID_PASSWORD_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_USERID_PASSWORD

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

define_type Specifies the type of user password being defined:

AP_ADD_USER
Specifies a new user, or change of password for an existing user.

AP_ADD_PROFILES
Specifies an addition to the profiles for an existing user.

user_id User identifier. This is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces.

password_chars.description Resource description. This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

password_chars.profile_count Number of profiles.

password_chars.password User's password. This is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces.

password_chars.profiles Profiles associated with user. Each of these is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_NO_PROFILES
AP_UNKNOWN_USER
AP_INVALID_UPDATE_TYPE
AP_TOO_MANY_PROFILES
AP_INVALID_USERID
AP_INVALID_PROFILE
AP_INVALID_PASSWORD

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_LU_LU_PASSWORD

DELETE_LU_LU_PASSWORD deletes an LU-LU password.

VCB Structure

```
typedef struct delete_lu_lu_password
{
    unsigned short   opcode;          /* verb operation code          */
    unsigned char    reserv2;         /* reserved                     */
    unsigned char    format;          /* format                       */
    unsigned short   primary_rc;      /* primary return code          */
    unsigned long    secondary_rc;    /* secondary return code        */
    unsigned char    lu_name[8];      /* LU name                      */
    unsigned char    lu_alias[8];     /* local LU alias               */
    unsigned char    fqplu_name[17];  /* fully qualified partner      */
                                      /* LU name                      */
    unsigned char    reserv3;         /* reserved                     */
} DELETE_LU_LU_PASSWORD;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_LU_LU_PASSWORD

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Local LU alias. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_alias** and the **lu_name** are set to all zeros, the verb is forwarded to the LU associated with the control point (the default LU).

fqplu_name Fully qualified partner LU name. This name is 17-bytes long and is right-padded with EBCDIC spaces. It is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PLU_NAME

AP_INVALID_LU_NAME
AP_INVALID_LU_ALIAS

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_USERID_PASSWORD

DELETE_USERID_PASSWORD deletes a password associated with a user ID.

VCB Structure

```
typedef struct delete_userid_password
{
    unsigned short   opcode;                 /* verb operation code          */
   unsigned  char    reserv2;                /*  reserved                     */
   unsigned  char    format;                 /*  format                       */
    unsigned short   primary_rc;             /* primary return code          */
    unsigned long     secondary_rc;          /* secondary return code        */
    unsigned short   delete_type;            /* type of delete               */
    unsigned char     user_id[10];           /* user id                      */
   USERID_PASSWORD_CHARS  password_chars;
                                             /* password characteristics     */

} DELETE_USERID_PASSWORD;

typedef struct userid_password_chars
{
    unsigned char     description[RD_LEN];   /* resource description         */
    unsigned short   profile_count;          /* number of profiles           */
   unsigned  short   reserv1;                /*  reserved                    */
   unsigned  char    password[10];           /*  password                    */
   unsigned  char    profiles[10][10];       /*  profiles                    */
} USERID_PASSWORD_CHARS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_USERID_PASSWORD

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

delete_type
Specifies the type of delete:

AP_REMOVE_USER
Deletes the user password, and all associated profiles.

AP_REMOVE_PROFILES
Deletes the specified profiles.

user_id User identifier. This is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces.

password_chars.description
This field is ignored when processing this verb.

password_chars.profile_count
Number of profiles.

password_chars.password
This field is ignored when processing this verb.

password_chars.profiles
Profiles associated with user. Each of these is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_NO_PROFILES

AP_UNKNOWN_USER
AP_INVALID_UPDATE_TYPE

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_USERID_PASSWORD

Chapter 10. APING and CPI-C Verbs

This chapter describes verbs used to “ping” another node and verbs used to define, delete, and query CPI-C side information.

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APING

APING allows a management application to “ping” a remote LU in the network. A verification data string (of specified length) can be appended to the end of the VCB and returned when the **partner_ver_len** field is set to a value greater than zero.

Personal Communications or Communications Server APING is implemented as an internal “service transaction program,” which uses the Personal Communications or Communications Server APPC API (described in the *Personal Communications Client/Server Communications Programming*).

VCB Structure

```
typedef struct aping
{
    unsigned short   opcode;              /* verb operation code              */
   unsigned  char    reserv2;             /*  reserved                        */
   unsigned  char    format;              /*  format                          */
    unsigned short   primary_rc;          /* primary return code              */
    unsigned long    secondary_rc;        /* secondary return code            */
    unsigned char    lu_name[8];          /* local LU name                    */
    unsigned char    lu_alias[8];         /* local LU alias                   */
    unsigned long    sense_data;          /* sense data                       */
    unsigned char    plu_alias[8];        /* partner LU alias                 */
    unsigned char    mode_name[8];        /* mode name                        */
    unsigned char    tp_name[64];         /* destination TP name              */
    unsigned char    security;            /* security level                   */
   unsigned  char    reserv3a[3];         /*  reserved                        */
   unsigned  char    pwd[10];             /*  password                        */
    unsigned char    user_id[10];         /* user ID                          */
    unsigned short   dlen;                /* length of data to send           */
    unsigned short   consec;              /* number of consecutive sends      */
    unsigned char    fqplu_name[17];      /* fully qualified partner          */
                                          /* LU name                          */
    unsigned char    echo;                /* data echo flag                   */
    unsigned short   iterations;          /* number of iterations             */
    unsigned long    alloc_time;          /* time taken for ALLOCATE          */
    unsigned long    min_time;            /* min send/receive time            */
    unsigned long    avg_time;            /* average send/receive time        */
    unsigned long    max_time;            /* max send/receive time            */
    unsigned short   partner_ver_len;     /* size of string to receive        */
} APING;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_APING

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

lu_name LU name of the local LU from which the APING verb is sent. This name is an 8-byte type-A EBCDIC character string. If this field is set to all zeros, the **lu_alias** field will be used for determining the local LU.

lu_alias Alias for the local LU from which the APING verb is sent. This is an 8-byte string in a locally displayable character set. This field is only significant if the **lu_name** field is set to all zeros, in which case all 8 bytes are significant and must be set. If both the **lu_name** and the **lu_alias** are set to binary zeros then the default (control point) LU is used.

plu_alias Alias by which the partner LU is known to the local transaction program. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set. This name must match the name of a partner LU established during configuration. If this parameter is set to binary zeros, the **fqplu_name** parameter is used instead.

mode_name Name of the mode to be used. This is an 8-byte alphanumeric type-A EBCDIC string (starting with a letter), padded to the right with EBCDIC spaces.

tp_name Name of the invoked transaction program. This is a 64-byte string. The Node Operator Facility does not check the character set of this string. The value of **tp_name** must match that configured on the remote LU. The string is usually set to “APINGD” in EBCDIC padded to the right with EBCDIC spaces.

security Specifies the information the partner LU requires in order to validate access to the invoked transaction program:

AP_NONE
AP_PGM
AP_SAME
AP_PGM_STRONG

pwd Password associated with **user_id**. This is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces. Only needed if **security** is set to AP_PGM or AP_PGM_STRONG.

user_id User ID required to access the partner transaction program. This is a 10-byte type-AE EBCDIC character string, padded to the right with EBCDIC spaces. Needed if **security** is set to AP_PGM, AP_PGM_STRONG or AP_SAME.

dlen Length of data to be sent by APING transaction program. APING sends a string of zeros, of length **dlen**.

consec Number of consecutive sends performed during each iteration. APING issues this number of MC_SEND_DATA verbs, each consisting of **dlen** bytes of data. If the **echo** parameter is set to AP_YES, APING marks the last MC_SEND_DATA as AP_SEND_DATA_P_TO_R_FLUSH (Prepare to Receive Flush) and awaits a response containing data from the partner APINGD transaction program (by issuing a MC_RECEIVE_AND_WAIT). If the **echo** parameter is set to AP_NO, APING flushes the data and awaits a confirm (by marking the last MC_SEND_DATA as AP_SEND_DATA_CONFIRM). In either case, the sequence described here corresponds to an SNA chain.

fqplu_name 17-byte fully qualified network name for the partner LU. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.) This field is only significant if the **plu_alias** field is set to all zeros.

echo Specifies whether the APING transaction program expects a response when it has completed sending the required amount of data:

AP_YES
AP_NO

iterations Number of iterations of consecutive sequences (defined by the **consec** parameter) issued by APING. In SNA terms, this parameter defines the number of chains that will be sent.

partner_ver_len Maximum length of the partner transaction program verification data string that can be received by the management application.

Returned Parameters

If the verb executes successfully, APING returns the following parameters:

primary_rc AP_OK

sense_data This will be zero if the verb has returned successfully.

alloc_time Time required (in milliseconds) for the MC_ALLOCATE to the remote transaction program to complete.

min_time Minimum time (in milliseconds) required for a data-sending iteration. This parameter includes the time required for the partner to respond (either by sending data or issuing a confirm, depending on the setting of the **echo** parameter).

avg_time Average time (in milliseconds) required for a data-sending iteration. This parameter includes the time required for the partner to respond (either by sending data or issuing a confirm, depending on the setting of the **echo** parameter).

max_time Maximum time (in milliseconds) required for a data-sending iteration. This parameter includes the time required for the partner to respond (either by sending data or issuing a confirm, depending on the setting of the **echo** parameter).

partner_ver_len Length of verification string returned by the partner transaction program. The string itself is appended to the end of the VCB.

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_LU_NAME

AP_INVALID_LU_ALIAS

APING uses the MC_ALLOCATE, MC_SEND_DATA, MC_RECEIVE_AND_WAIT, MC_CONFIRM, and MC_DEALLOCATE verbs provided by the Personal Communications or Communications Server APPC API. The parameters returned by these verbs in the case of unsuccessful execution are documented in the *Personal Communications Client/Server Communications Programming.*

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

CPI-C Verbs

DEFINE_CPIC_SIDE_INFO

This verb adds or replaces a side information entry in memory. A CPI-C side information entry associates a set of conversation characteristics with a symbolic destination name. If there is already a side information entry in memory with the same symbolic destination name as the one supplied with this verb, it is overwritten with the data supplied to this call. See *CPI-C Reference* for more information about the CPI-C support provided by Personal Communications or Communications Server .

VCB Structure

```
typedef struct define_cpic_side_info
{
    unsigned short   opcode;                 /* verb operation code              */
   unsigned  char    reserv2;                /*  reserved                        */
   unsigned  char    format;                 /*  format                          */
    unsigned short   primary_rc;             /* primary return code              */
    unsigned long     secondary_rc;          /* secondary return code            */
   unsigned  char    reserv2a[8];            /*  reserved                        */
   unsigned  char    sym_dest_name[8];       /*  Symbolic  destination  name     */
    CPIC_SIDE_INFO_DEF_DATA def_data;        /* defined data                     */
} DEFINE_CPIC_SIDE_INFO;

typedef struct cpic_side_info_def_data
{
   unsigned  char    description[RD_LEN];
                                            /* resource description            */
    CPIC_SIDE_INFO    side_info;             /* CPIC side info                  */
    unsigned char     user_data[32];         /* User defined data               */
} CPIC_SIDE_INFO_DEF_DATA;

typedef struct cpic_side_info
{
   unsigned  char    partner_lu_name[17];
                                            /* Fully qualified partner         */
                                            /* LU name                         */
   unsigned  char    reserved[3];            /*  Reserved                       */
    unsigned long     tp_name_type;          /* TP name type                    */
    unsigned char     tp_name[64];           /* TP name                         */
    unsigned char     mode_name[8];          /* Mode name                       */
   unsigned  long    conversation_security_type;
                                            /* Conversation security type      */
   unsigned  char    security_user_id[CPIC_SECURITY_INFO_LEN];
                                            /* User ID                         */
   unsigned  char    security_password[CPIC_SECURITY_INFO_LEN];
                                            /*  Password                       */
} CPIC_SIDE_INFO;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DEFINE_CPIC_SIDE_INFO

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

sym_dest_name
Symbolic destination name that identifies the side information entry. This is up to 8 bytes long, padded with spaces, in the locally displayable character set. The allowed characters are the uppercase letters (A to Z) and the digits 0–9.

def_data.description
Resource description (returned on QUERY_CPIC_SIDE_INFO). This is a 16-byte string in a locally displayable character set. All 16 bytes are significant.

def_data.side_info.partner_lu_name
Fully qualified name of the partner LU. This name is 17 bytes long and is right-padded with spaces, in the locally displayable character set. It is composed of two character strings concatenated by a dot. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

def_data.side_info.tp_name_type
Transaction program name type. This field is set to one of the following values:

XC_APPLICATION_TP
Specifies that the transaction program name supplied is not a service transaction program. All characters specified in the transaction program name must be valid characters in the locally displayable character set.

XC_SNA_SERVICE_TP
Specifies that the transaction program name supplied is that of a service transaction program. All characters, except the first, specified in the transaction program must be valid characters in the locally displayable character set. The first character must be a hexadecimal digit in the range X'01' to X'3F', excluding X'0E' and X'0F'.

def_data.side_info.tp_name
Transaction program name, a 64-byte character string in the locally displayable character set, right-padded with spaces.

def_data.side_info.mode_name
Mode name, an 8-byte character string in the locally displayable character set, padded to the right with spaces.

def_data.side_info.conversation_security_type
Conversation security type. This field is set to one of the following values:

XC_SECURITY_NONE
XC_SECURITY_SAME
XC_SECURITY_PROGRAM
XC_SECURITY_PROGRAM_STRONG.

def_data.side_info.security_user_id
User ID. Personal Communications or Communications Server will use this field for enforcing conversation-level security.

def_data.side_info.security_password
Password. Personal Communications or Communications Server will use this field for enforcing conversation-level security.

def_data.user_data
User data. This data is returned on QUERY_CPIC_SIDE_INFO but not used or interpreted by Personal Communications or Communications Server .

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_SYM_DEST_NAME

AP_INVALID_LENGTH

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

DELETE_CPIC_SIDE_INFO

This verb deletes a CPI-C side information entry. See the *CPI-C Reference* for more information about the CPI-C support provided by Personal Communications or Communications Server .

VCB Structure

```
typedef struct delete_cpic_side_info
{
    unsigned short   opcode;              /* verb operation code          */
    unsigned  char   reserv2;             /*  reserved                    */
    unsigned  char   format;              /*  format                      */
    unsigned short   primary_rc;          /* primary return code          */
    unsigned long    secondary_rc;        /* secondary return code        */
    unsigned  char   reserv2a[8];         /*  reserved                    */
    unsigned  char   sym_dest_name[8];    /*  Symbolic  destination  name */
} DELETE_CPIC_SIDE_INFO;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DELETE_CPIC_SIDE_INFO

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

sym_dest_name Symbolic destination name that identifies the side information entry. This is up to 8 bytes long, padded with spaces, in the locally displayable character set. The allowed characters are the uppercase letters (A to Z) and the digits 0–9.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_SYM_DEST_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_CPIC_SIDE_INFO

This verb returns the side information entry for a given symbolic destination name. The information is returned as a list. To obtain a specific side information entry, or a specific chunk of entries, the **sym_dest_name** field should be set. Otherwise this field should be set to all zeros.

VCB Structure

```
typedef struct query_cpic_side_info
{
    unsigned short   opcode;                 /* verb operation code          */
   unsigned  char    reserv2;                /*  reserved                     */
   unsigned  char    format;                 /*  format                       */
    unsigned short   primary_rc;             /* primary return code          */
    unsigned long    secondary_rc;           /* secondary return code        */
    unsigned char    *buf_ptr;               /* pointer to buffer            */
    unsigned long    buf_size;               /* buffer size                  */
    unsigned long    total_buf_size;         /* total buffer size required */
    unsigned short   num_entries;            /* number of entries            */
    unsigned short   total_num_entries;      /* total number of entries      */
    unsigned char    list_options;           /* listing options              */
   unsigned  char    reserv3;                /*  reserved                     */
    unsigned char    sym_dest_name[8];       /* Symbolic destination name    */
} QUERY_CPIC_SIDE_INFO;

typedef struct cpic_side_info_data
{
    unsigned short   overlay_size;           /* size of this entry           */
    unsigned char    sym_dest_name[8];       /* Symbolic destination name    */
   unsigned  char    reserv1[2];             /*  reserved                     */
   CPIC_SIDE_INFO_DEF_DATA    def_data;
} CPIC_SIDE_INFO_DATA;

typedef struct cpic_side_info
{
   unsigned  char    partner_lu_name[17];
                                            /* Fully qualified partner      */
                                            /* LU name                      */
   unsigned  char    reserved[3];            /*  Reserved                    */
    unsigned long    tp_name_type;           /* TP name type                 */
    unsigned char    tp_name[64];            /* TP name                      */
    unsigned char    mode_name[8];           /* Mode name                    */
   unsigned  long    conversation_security_type;
                                            /* Conversation security type */
   unsigned  char    security_user_id[CPIC_SECURITY_INFO_LEN];
                                            /* User ID                      */
   unsigned  char    security_password[CPIC_SECURITY_INFO_LEN];
                                            /*  Password                    */
} CPIC_SIDE_INFO;

typedef struct cpic_side_info_def_data
{
   unsigned  char    description[RD_LEN];
                                            /* resource description         */
    CPIC_SIDE_INFO    side_info;             /* CPIC side info               */
    unsigned char     user_data[32];         /* User defined data            */
} CPIC_SIDE_INFO_DEF_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_QUERY_CPIC_SIDE_INFO

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

buf_ptr Pointer to a buffer into which list information can be written.

buf_size Size of buffer supplied. The data returned will not exceed this size.

num_entries Maximum number of entries to return. The number of entries will not exceed this value. A value of zero means no limit.

list_options This indicates what should be returned in the list information. The **sym_dest_name** specified (see below) represents an index value that is used to specify the starting point of the actual information to be returned:

AP_FIRST_IN_LIST
The index value is ignored and the returned list starts from the first entry in the list.

AP_LIST_FROM_NEXT
The returned list starts from the next entry in the list after the one specified by the supplied index value.

AP_LIST_INCLUSIVE
The returned list starts from the entry specified by the index value.

sym_dest_name Symbolic destination name that identifies the side information entry. This is up to 8 bytes long, padded with spaces, in the locally displayable character set. The allowed characters are the uppercase letters (A to Z) and the digits 0-9.

Returned Parameters

If the verb executes successfully, the Program returns the following parameters:

primary_rc
AP_OK

buf_size Length of the information returned in the buffer.

total_buf_size
Returned value indicating the size of buffer that would have been required to return all the list information requested. This may be higher than **buf_size**.

num_entries
Number of entries actually returned.

total_num_entries
Total number of entries that could have been returned. This may be higher than **num_entries**.

cpic_side_info_data.overlay_size
The number of bytes in this entry, and hence the offset to the next entry returned (if any).

cpic_side_info_data.sym_dest_name
Symbolic destination name for the returned side information entry.

cpic_side_info_data.def_data
Defined CPI-C side information as supplied on DEFINE_CPIC_SIDE_INFO verb.

Note: CPIC calls may change the side information returned on this verb after the DEFINE_CPIC_SIDE_INFO has been processed by Personal Communications or Communications Server .

If the verb does not execute because of a state error, the Program returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_INVALID_SYM_DEST_NAME

If the verb does not execute because the node has not yet been started, the Program returns the following parameter:

primary_rc AP_NODE_NOT_STARTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_CPIC_SIDE_INFO

Chapter 11. Attach Manager Verbs

The Personal Communications or Communications Server Attach Manager is used to manage the launching of APPC or CPI-C programs. A description of the Attach Manager function is provided in *Personal Communications Client/Server Communications Programming*.

Personal Communications or Communications Server Node Operator Facility supports three verbs to control the Attach Manager. These verbs are available to any application program that uses Personal Communications or Communications Server Node Operator Facility.

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DISABLE_ATTACH_MANAGER

The Personal Communications or Communications Server Attach Manager is enabled by default when the node is started. The user can issue this verb to disable all dynamic loading, This verb resets a global flag that the Attach Manager checks before launching a transaction program.

VCB Structure

```
typedef struct disable_am
{
    unsigned short     opcode;          /* Verb operation code        */
    unsigned  char     reserv2;         /*  reserved                  */
    unsigned  char     format;          /*  format                    */
    unsigned short     primary_rc;      /* Primary return code        */
    unsigned long      secondary_rc;    /* Secondary return code      */
} DISABLE_AM;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_DISABLE_ATTACH_MGR

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Attach Manager returns the following parameter:

primary_rc AP_OK

If the verb does not execute because the node has not yet been started, the Attach Manager returns the following parameter:

primary_rc AP_NODE_NOT STARTED

If the verb does not execute because of a system error, the Attach Manager returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

ENABLE_ATTACH_MANAGER

If the Attach Manager has been disabled, it can be re-enabled by issuing the Personal Communications or Communications Server Node Operator Facility verb, ENABLE_AM. This sets a global flag that the Attach Manager checks before launching a Transaction Program.

VCB Structure

```
typedef struct enable_am
{
    unsigned short   opcode;          /* Verb operation code          */
    unsigned  char   reserv2;         /*  reserved                    */
    unsigned  char   format;          /*  format                      */
    unsigned short   primary_rc;      /* Primary return code          */
    unsigned long    secondary_rc;    /* Secondary return code        */
} ENABLE_AM
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_ENABLE_ATTACH_MGR

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the Attach Manager returns the following parameter:

primary_rc AP_OK

If the verb does not execute because the node has not yet been started, the Attach Manager returns the following parameter:

primary_rc AP_NODE_NOT STARTED

If the verb does not execute because of a system error, the Attach Manager returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

QUERY_ATTACH_MANAGER

The QUERY_ATTACH_MANAGER verb can be used to discover the status of the Attach Manager component, which can be started and stopped using the ENABLE_ATTACH_MANAGER and DISABLE_ATTACH_MANAGER commands.

VCB Structure

```
typedef struct query_am
{
        unsigned short    opcode;          /* Verb operation code          */
        unsigned  char    reserv2;         /*  reserved                    */
        unsigned  char    format;          /*  format                      */
        unsigned short    primary_rc;      /* primary return code          */
        unsigned  long    secondary_rc;    /*  secondary  return  code     */
        unsigned short    active;          /* status of the Attach Manager */
} QUERY_AM;
```

Supplied Parameters

opcode AP_QUERY_ATTACH_MGR

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

Returned Parameters

If the verb executes successfully, the following parameters are returned:

primary_rc AP_OK

active This field reports the status of the Attach Manager component:

AP_YES
The Attach Manager is active.

AP_NO
The Attach Manager is not active.

If the verb does not execute because of a parameter error, the following parameter is returned:

primary_rc AP_PARAMETER_CHECK

If the verb does not execute because the node has not yet been started, the Attach Manager returns the following parameter:

primary_rc AP_NODE_NOT STARTED

If the verb does not execute because of a system error, the Attach Manager returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

Part 2. Personal Communications and Communications Server Management Services API

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Chapter 12. Introduction to Management Services API

This part describes the management services API provided by Personal Communications or Communications Server .

Management Services Verbs

Personal Communications or Communications Server supports the following management services (MS) verbs, providing an application program with a method for reporting potential problems to management services focal points available in an SNA network.

ALERT_INDICATION

FP_INDICATION

MDS_MU_RECEIVED

NMVT_RECEIVED

SEND_MDS_MU

TRANSFER_MS_DATA

Entry Points

Personal Communications or Communications Server provides a library file that handles management services verbs.

Management services verbs have a straightforward language interface. Your program fills in fields in a block of memory called a *verb control block* Then your program calls the entry point and passes a pointer to the verb control block. When its operation is complete, management services (MS) API returns, having used and then modified the fields in the verb control block. Your program can then read the returned parameters from the verb control block. Following is a list of entry points for management services verbs:

WinMS()

WinAsyncMS()

WinAsyncMSEx()

WinMSCancelAsyncRequest()

WinMSCleanup()

WinMSStartup()

See Chapter 13, “Management Services Entry Points” on page 467 for detailed descriptions of the entry points.

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Verb Control Blocks (VCB)

Programming Note: The base operating system optimizes performance by executing some subsystems in the calling application's address space. This means that incorrect use of local descriptor table (LDT) selectors by application programs that have not been fully or correctly debugged can cause improper operation, or perhaps system failures. Accordingly, application programs should not perform pointer arithmetic operations that involve changing the LDT selector field of a pointer.

The segment used for the verb control block (VCB) must be a read/write data segment. Your program can either declare the VCB as a variable in your program, allocate it or suballocate it from a larger segment. It must be sufficiently large to contain all the fields for the verb your program is issuing.

An application program should not change any part of the verb control block after it has been issued until the verb completes. When management services finishes the execution of a verb, it copies a complete, modified VCB back onto the original block. Therefore, if your program declares a verb control block as a variable, consider declaring it in static storage rather than on the stack of an internal procedure.

Fill all reserved and unused fields in each VCB with zeros (X'00'). In fact, it might be more time-efficient to set the entire verb control block to zeros before your program assigns the values to the parameters. Setting reserved fields to zeros is particularly important.

Note: If the VCB is not read/write, or if it is not at least 10 bytes (that is, large enough to hold the management services primary and secondary return codes), management services cannot access it, and the base operating system abnormally ends the process. This termination is recognized as a *general protection fault*, processor exception trap D.

Management services returns the INVALID_VERB_SEGMENT primary return code when the VCB is too short or the incorrect type of segment is used.

Writing Management Services (MS) Programs

Personal Communications or Communications Server provides a dynamic link library (DLL) file, that handles Management Services verbs.

The DLL is reentrant; multiple application processes and threads can call the DLL concurrently.

Management Services verbs have a straightforward language interface. Your program fills in fields in a block of memory called a *verb control block* (VCB). Then it calls the Management Services DLL and passes a pointer to the verb control block. When its operation is complete, Management Services returns, having used and then modified the fields in the VCB. Your program can then read the returned parameters from the verb control block.

Table 3 on page 465 shows source module usage of supplied header files and libraries needed to compile and link Management Services programs. Some of the header files may include other required header files.

Table 3. Header Files and Libraries for Management Services

Operating System	Header File	Library	DLL Name
WINNT & WIN95	WINMS.H	WINMS32.LIB	WINMS32.DLL
WIN3.1	WINCSV.H	WINCSV.LIB	WINCSV.DLL
OS/2	ACSSVCC.H	ACSSVC.LIB	ACSSVC.DLL

SNA API Client Support

Included with Comunications Server are a set of clients for the WIN95, WINNT, WIN3.1, and OS/2 operating systems. These clients are referred to as SNA API clients in this book and only support a subset of the full management services verbs. Specifically **WINMS** is the only API supported on the Windows clients (95, NT, 3.1). The following is a list of the management services verbs supported:

TRANSFER_MS_DATA

SEND_MDS_MU

Chapter 13. Management Services Entry Points

This chapter describes the entry points for management services verbs.

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WinMS()

This provides a synchronous entry point for issuing the following management services API verbs:

SEND_MDS_MU

TRANSFER_MS_DATA

Syntax

void WINAPI WinMS(long vcb, unsigned short vcb_size);

Parameter	Description
vcb	Pointer to verb control block
vcb_size	Number of bytes in the verb control block

Returns

No return value. The **primary_rc** and **secondary_rc** fields in the verb control block indicate any error.

Remarks

This is the main synchronous entry point for the management services API. This call blocks until the verb completes.

WinMSCleanup()

This function terminates and deregisters an application from the management services API.

Syntax

```
BOOL WINAPI WinMSCleanup(void);
```

Returns

The return value specifies whether the deregistration was successful. If the value is not zero, the application was successfully deregistered. The application was not deregistered if a value of zero is returned.

Remarks

Use **WinMSCleanup()** to indicate deregistration of a management services application from the management services API.

WinMSCleanup unblocks any thread waiting in **WinMSGetIndication**. These return with WMSNOTREG (the application is not registered to receive indication). **WinMSCleanup** unregisters the application for all indications. **WinMSCleanup** returns any outstanding verb (synchronous or asynchronous) with the error AP_CANCELLED. However, the verb completes inside the node.

It is not a requirement to use **WinMSStartup** and **WinMSCleanup**. However, an application must be consistent in its use of these calls. You should use both of them or never use either of them.

Note: See also **WinMSStartup()**.

WinMSStartup()

This function allows an application to specify the version of management services API required and to retrieve the version of the API supported by the product. This function can be called by an application before issuing any further management services API calls to register itself.

Syntax

```
int WINAPI WinMSStartup(WORD wVersionRequired,
                        LPWMSDATA  msdata);
```

Parameter	Description
wVersionRequired	Specifies the version of management services API support required. The high-order byte specifies the minor version (revision) number; the low-order byte specifies the major version number.
msdata	Returns the version of management services API and a description of management services implementation.

Returns

The return value specifies whether the application was registered successfully and whether the management services API implementation can support the specified version number. If the value is zero, it was registered successfully and the specified version can be supported. Otherwise, the return value is one of the following values:

WMSSYSERROR
The underlying network subsystem is not ready for network communication.

WMSVERNOTSUPPORTED
The version of management services API support requested is not provided by this particular management services API implementation.

WMSBADPOINTER
Incorrect msdata parameter.

Remarks

WinMSStartup is intended to help with compatibility with future versions of the API. The current version supported is 1.0.

It is not a requirement to use **WinMSStartup** and **WinMSCleanup**. However, an application must be consistent in its use of these calls. You should use both of them or never use either of them.

Note: See also **WinMSCleanup()**.

WinMSRegisterApplication()

This function registers the application as an NMVT-level application, an MDS-level application, or an alert handler. Such registrations determine which unsolicited indications the application receives.

An NMVT-level application receives NMVT_RECEIVED indications.

An MDS-level application receives MDS_MU_RECEIVED indications and also FP_NOTIFICATION indications when focal-point status changes.

An alert handler receives ALERT_INDICATION indications.

Note: It is also possible to register to receive NMVTs with conversion to MDS MUs.

Applications that do not process these indications should not call **WinMSRegisterApplication**.

Syntax

```
BOOL WINAPI WinMSRegisterApplication(unsigned short reg_type,
                                     unsigned  char    *ms_appl_name,
                                      unsigned short vector_key,
                                     unsigned  char    mds_conv_reqd,
                                     unsigned  char    *ms_category,
                                      unsigned short max_rcv_size,
                                     unsigned  char    alert_dest,
                                      unsigned short *primary_rc,
                                     unsigned  long    *secondary_rc);
```

Parameter	Description
reg_type	Registration type WMSNMVTAPP — NMVT-level application (or MDS-level application registering to receive NMVTs) WMSMDSAPP — MDS-level application WMSALERTHANDLER — Alert handler
ms_appl_name	Management services application name. Valid names can be either an 8-byte alphanumeric type-1134 EBCDIC string, padded with trailing space (X'40') characters if necessary, or one of the management services discipline-specific application programs specified in Appendix D of *SNA Management Services Reference* padded with trailing space (X'40') characters. This name is used when **reg_type** is WMSNMVTAPP or WMSMDSAPP. The name is not applicable when **reg_type** is WMSALERTHANDLER.
vector_key	Management services major vector keys accepted by the application Permitted values are: X'YYYY' — specific major vector key AP_SPCF_KEYS — major vector keys X'8061' through X'8064' AP_ALL_KEYS — all major vector keys

This key is used when **reg_type** is WMSNMVTAPP. The key is not applicable when **reg_type** is WMSMDSAPP or WMSALERTHANDLER.

mds_conv_reqd Specifies whether the registering application is MDS-level and requires NMVTs sent to it to be converted to MDS MUs

(AP_YES or AP_NO)

This parameter is used when **reg_type** is WMSNMVTAPP. The parameter is not applicable when **reg_type** is WMSMDSAPP or WMSALERTHANDLER.

ms_category Specifies a management services category when the application desires information pertaining to the focal point for that category. The management services category can be either one of the category codes specified in the management services discipline-specific application programs table of Appendix D of *SNA Management Services Reference* padded with trailing space (X'40') characters or a user-defined category. User-defined category names should be an 8-byte alphanumeric type-1134 EBCDIC string, padded with trailing space (X'40') characters if necessary.

This parameter is used when **reg_type** is WMSMDSAPP. The parameter is not applicable when **reg_type** is WMSNMVTAPP or WMSALERTHANDLER.

max_rcv_size Maximum number of bytes the application is capable of receiving in one chunk. MDS MUs bigger that this size will be segmented, and each segment delivered in a separate MDS_MU_RECEIVED indication.

This parameter is used when **reg_type** is WMSMDSAPP. The parameter is not applicable when **reg_type** is WMSNMVTAPP or WMSALERTHANDLER.

alert_dest Specifies whether the application wishes to be the only destination of all alerts. If this is set to AP_YES then all alerts will be routed to the application, and will not be routed anywhere else. If set to AP_NO, alerts will be routed to the application and over the SNA network in the usual way.

This parameter is used when **reg_type** is WMSALERTHANDLER. The parameter is not applicable when **reg_type** is WMSNMVTAPP or WMSMDSAPP.

primary_rc Returned: primary return code

secondary_rc Returned: secondary return code

Returns

The function returns a value indicating whether the registration was successful. If the value is not zero, the registration was successful. If the value is zero, the registration was not successful.

Remarks

Applications can make multiple calls to register more than one class of indications.

Applications that call **WinMSRegisterApplication** must call **WinMSGetIndication** to receive indications that are queued for them.

Note: See also **WinMSUnregisterApplication** and **WinMSGetIndication**.

WinMSUnregisterApplication()

This function deregisters the application, reversing the effect of an earlier **WinMSRegisterApplication** call, and stopping further indications from being queued for the application.

Syntax

```
BOOL WINAPI WinMSUnregisterApplication(unsigned short reg_type,
                                       unsigned  char   *ms_appl_name,
                                       unsigned short *primary_rc,
                                       unsigned  long   *secondary_rc);
```

Parameter	Description
reg_type	Registration type. It can have one of the following values: WMSNMVTAPP NMVT-level application WMSMDSAPP MDS-level application WMSALERTHANDLER Alert handler
ms_appl_name	MS application name. Valid names can be either an 8-byte alphanumeric type-1134 EBCDIC string, padded with trailing space (X'40') characters if necessary, or one of the management services discipline-specific application programs specified in Appendix D of *SNA Management Services Reference* padded with trailing space (X'40') characters. This parameter is used when **reg_type** is WMSNMVTAPP or WMSMDSAPP. The parameter is not applicable when **reg_type** is WMSALERTHANDLER.
primary_rc	Returned: primary return code
secondary_rc	Returned: secondary return code

Returns

The function returns a value indicating whether the unregistration was successful. If the value is not zero, the unregistration was successful. If the value is zero, the unregistration was not successful.

Remarks

Each call to **WinMSUnregisterApplication** terminates a registration made by an earlier call to **WinMSRegisterApplication**. An application that has made multiple calls to **WinMSRegisterApplication** needs to make multiple calls to **WinMSUnregisterApplication** in order to terminate all its registrations.

WinMSUnregisterApplication and **WinMSCleanup** differ as follows:

WinMSUnregisterApplication terminates an earlier registration to receive indications, but does not prevent the application from making other management services API calls (for example, WinMS).

WinMSCleanup terminates use of the management services API.

Indications might already be queued for an application when the application calls **WinMSUnregisterApplication**. Any such indications remain queued, and the

application should call **WinMSGetIndication** to receive and process them. Once they have been unregistered, no new indications will be queued for the application.

Note: See also **WinMSRegisterApplication** and **WinMSGetIndication**.

WinMSGetIndication()

This allows the application to received unsolicited indications.

Syntax

```
int WINAPI WinMSGetIndication(long buffer,
                              unsigned short *buffer_size,
                              unsigned long  timeout);
```

Parameter	Description
buffer	Pointer to a buffer into which to receive the indication.
buffer_size	Size of buffer. Returned: the size of the indication.
timeout	Time to wait for indication in milliseconds.

Returns

The function returns a value indicating whether an indication was received.

0 Indication returned.

WMSTIMEOUT
Timeout waiting for indication.

WMSSYSNOTREADY
The underlying network subsystem is not ready for network communication.

WMSNOTREG
The application is not registered to receive indications.

WMSBADSIZE
The buffer is too small to receive the indication. Reissue the **WinMSGetIndication** call with a large enough buffer. The size of the indication is returned in the **buffer_size** parameter.

WMSBADPOINTER
Either the buffer or **buffer_size** parameter is not valid.

WMSSYSERROR
An unexpected system error has occurred.

Remarks

This is a blocking call, it returns in one of the following circumstances:

An indication is returned

The timeout expires

The application issues a **WinMSCleanup** call

The product is stopped

A system error occurs

Note: See also **WinMSRegisterApplication** and **WinMSUnregisterApplication**.

Chapter 14. Management Services Verbs

The management services API verbs provided byPersonal Communications or Communications Server enable an application to send alerts and MDS MU's, and to receive indications when the node receives MDS or NMVT data or issues an alert.

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TRANSFER_MS_DATA

This verb is used by NMVT-level applications to send unsolicited alerts and to respond to previously-received NMVT requests.

TRANSFER_MS_DATA is also used by MDS-level applications to send unsolicited alerts. This verb can be used by the application using the WinMS call.

VCB Structure

```
typedef struct ms_transfer_ms_data
{
    unsigned short     opcode;                 /* Verb operation code          */
    unsigned char      data_type;              /* Data type supplied by app */
    unsigned  char     format;                 /*  format                        */
    unsigned short     primary_rc;             /* Primary return code          */
    unsigned long      secondary_rc;           /* Secondary return code        */
    unsigned char      options;                /* Verb options                 */
    unsigned  char     reserv3;                /*  reserved                     */
    unsigned char      originator_id[8];       /* Originator ID                */
    unsigned char      pu_name[8];             /* Physical unit name           */
    unsigned  char     reserv4[4];             /*  reserved                    */
    unsigned short     dlen;                   /* Length of data               */
    unsigned  char     *dptr;                  /*  Data                        */
} MS_TRANSFER_MS_DATA;
```

Supplied Parameters

The application supplies the following parameters:

opcode SV_TRANSFER_MS_DATA

data_type Specifies the type of data enclosed. management services processes the data as described below. Allowed values:

SV_NMVT
The data contains a complete NMVT request unit. Management services converts the data to MDS_MU or CP_MSU format if the data contains an alert, and the alert is to be sent to an MDS-level or migration-level focal point. This is the type required when an application is responding to an NMVT_RECEIVED signal.

SV_ALERT_SUBVECTORS
The data contains management services subvectors in the SNA-defined format for an Alert major vector. Management services adds an NMVT header and an alert major vector header. Subsequently, management services converts the data to MDS_MU or CP_MSU format if the alert is to be sent to an MDS-level or migration-level focal point.

SV_USER_DEFINED
The data contains a complete NMVT request unit. Management services always logs the data, but does not send it.

SV_PDSTATS_SUBVECTORS
The data contains problem determination statistics. Management services always logs the data, and if an alert

handler has been registered, then management services sends it the data within an ALERT_INDICATION.

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

options Specifies optional processing on the data supplied on this verb. Note that management services processes the data primarily according to the **type** specified if there is any conflict between the **data_type** and the option specified. This parameter is a one-byte value, with individual bit settings indicating the options selected. If all options are specified, set this byte to zero.

Bit 0 is the most significant, and bit 7 is the least significant bit.
(Bits 1–3 are ignored if **data_type** is set to SV_USER_DEFINED.)
Bit 0: Adds Date/Time (X'01') subvector to the data if set to zero.
Bit 1: Adds Product Set ID (X'10') subvector to the data if set to zero. If the application supplies data that already contains a Product Set ID subvector, management services adds Personal Communications or Communications Server 's Product Set ID subvector immediately before the existing one.
Bit 2: Sends the data on an SNA session if set to zero. Management services sends the data on the default SSCP-PU session if the data does not contain an alert. If the data contains an alert, management services sends the data on either an SSCP-PU session, a CP-CP session or an LU-LU session, depending on which type of session Personal Communications or Communications Server uses to transmit alerts to the alert focal point.
Bit 3: Logs the data via the Personal Communications or Communications Server problem determination facility if set to zero.

Note: The following constants are provided in the management services header file and they refer to the individual bits specified above.

SV_TIME_STAMP_SUBVECTOR

SV_PRODUCT_SET_ID_SUBVECTOR

SV_SEND_ON_SESSION

SV_LOCAL_LOGGING

Bits 4–7: reserved.

originator_id Name of the component that issued the verb. This is an 8-byte string in a locally displayable character set. This field is only used by management services when logging the TRANSFER_MS_DATA.

pu_name Name of the physical unit to send the data to. This should be set to either an 8-byte alphanumeric type-A EBCDIC string, padded to the right with EBCDIC spaces, or set to all binary zeros if no **pu_name** is specified. Applications using TRANSFER_MS_DATA to respond to NMVT_RECEIVED signals should specify the **pu_name** received in the NMVT_RECEIVED signal. The data contained in TRANSFER_MS_DATA signals of type SV_NMVT that do not specify a **pu_name** will be sent over the default PU session if available. TRANSFER_MS_DATA signals containing alerts should not specify a **pu_name** unless the application expressly wishes the alert data to be sent to a specific PU. This will bypass the normal management services alert routing algorithm.

dlen Length of data.

dptr Pointer to data. If this is set to NULL, then management services assumes that the data is contiguous with (and begins immediately following) the VCB.

Returned Parameters

If the verb executes successfully, management services returns the following parameter:

primary_rc AP_OK

If the verb fails to execute because of a parameter error, management services returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc SV_INVALID_DATA_TYPE

SV_DATA_EXCEEDS_RU_SIZE
AP_INVALID_PU_NAME

If the verb fails to execute because of a state error, management services returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc SV_SSCP_PU_SESSION_NOT_ACTIVE

If the verb does not execute because of a system error, the Program management services returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

MDS_MU_RECEIVED

This verb indication is sent by management services to a registered MDS-level application when:

An MDS_MU has been received from a peer MDS-level application

An NMVT has been received, and

- an appropriate NMVT-level application has not registered
- The MDS-level application registered with a name that corresponds to the name carried within the management services major vector key in the incoming NMVT (management services performs the conversion from NMVT to MDS_MU).

VCB Structure

```
typedef struct ms_mds_mu_received
{
    unsigned short     opcode;              /* Verb operation code                */
    unsigned  char     reserv2;             /*  reserved                          */
    unsigned  char     format;              /*  format                            */
    unsigned short     primary_rc;          /* Primary return code                */
    unsigned long      secondary_rc;        /* Secondary return code              */
    unsigned  char     first_message;       /* First message for curr MDS_MU      */
    unsigned char      last_message;        /* Last message for curr MDS_MU       */
    unsigned char      pu_name[8];          /* Physical unit name                 */
    unsigned  char     reserv3[8];          /*  reserved                          */
    unsigned short     mds_mu_length;       /* Length of incoming MDS_MU          */
    unsigned char      *mds_mu;             /* MDS_MU data                        */
} MS_MDS_MU_RECEIVED;
```

Supplied Parameters

opcode AP_MDS_MU_RECEIVED

format Identifies the format of the VCB. This field is set to zero to specify the version of the VCB listed above.

first_message Flag indicating whether this is the first message for the MDS_MU (AP_YES or AP_NO). If the **max_rcv_size** specified in the **WinMSRegisterApplication** call is smaller than the length of the MDS_MU being delivered, the MDS_MU will be sent to the application in chunks.

last_message Flag indicating whether this is the last message for the MDS_MU (AP_YES or AP_NO).

pu_name Name of the physical unit from which the NMVT (which has been converted to an MDS_MU) originated. It is the responsibility of the application to respond to the incoming NMVT. The application uses SEND_MDS_MU to send the response. When sending responses the application must set the **pu_name** field of the SEND_MDS_MU to the **pu_name** supplied in the MDS_MU_RECEIVED signal. If the MDS_MU was received from the MDS level transport mechanism, the **pu_name** will be set to all binary zeros.

mds_mu_length Length of MDS_MU portion included with the signal.

mds_mu MDS_MU data. The data pointer is set to NULL, and the data is contiguous with (and begins immediately following) the VCB.

SEND_MDS_MU

This verb is used by a MDS-level application to send network management data other than alerts using the **WinMS** entry point. If an error occurs during the sending of the MDS_MU to the destination application, the error is reported back to the origin application in one of two ways. If the error is detected at the local node, the application will be notified via the return codes of the SEND_MDS_MU response. If the error is detected at a remote node, the error is reported by means of an error MDS_MU transported in an MDS_MU_RECEIVED VCB. Management services can convert the outgoing MDS_MU to an NMVT if the destination node is to be reached via an SSCP-PU session. The application does not need to know the identity of its local node. If the application supplies 8 EBCDIC blanks in the **netid** or **nau** or both subfields of the origin location name subvector of the MDS Routing Information GDS variable, Personal Communications or Communications Server will supply the appropriate values. If an application does not fill in either the **netid** or **nau** but supplies fewer than 8 blanks, Personal Communications or Communications Server will return a secondary return code of AP_INVALID_MDS_MU_FORMAT.

VCB Structure

```
typedef struct ms_send_mds_mu
{
    unsigned short     opcode;              /* Verb operation code          */
    unsigned  char     reserv2;             /*  reserved                    */
    unsigned  char     format;              /*  format                      */
    unsigned short     primary_rc;          /* Primary return code          */
    unsigned long      secondary_rc;        /* Secondary return code        */
    unsigned char      options;             /* Verb options                 */
    unsigned  char     reserv3;             /*  reserved                    */
    unsigned char      originator_id[8];    /* Originator ID                */
    unsigned char      pu_name[8];          /* Physical unit name           */
    unsigned  char     reserv4[4];          /*  reserved                    */
    unsigned short     dlen;                /* Length of data               */
    unsigned  char     *dptr;               /*  Data                        */
} MS_SEND_MDS_MU;
```

Supplied Parameters

opcode AP_SEND_MDS_MU

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

options Specifies optional processing on the data supplied on this verb. This parameter is a one-byte value, with individual bit settings indicating the options selected. If all options are specified, set this byte to zero.

Bit 0 is the most significant, and bit 7 is the least significant bit.
Bit 0: Adds Date/Time (X'01') subvector to the data if set to zero.
Bit 1: Adds Product Set ID (X'10') subvector to the data if set to zero. If the application supplies data that already contains a Product Set ID subvector, then management services adds Personal Communications or

Communications Server 's Product Set ID subvector immediately before the existing one.
Bit 2: reserved.
Bit 3: Logs the data via the Personal Communications or Communications Server problem determination facility if set to zero.

Note: The following constants are provided in the management services header file that refer to bits 0, 1, and 3 specified above.

SV_TIME_STAMP_SUBVECTOR

SV_PRODUCT_SET_ID_SUBVECTOR

SV_LOCAL_LOGGING

Bit 4: Specifies whether management services is to use default or direct routing to send the management services data to the destination application (AP_DEFAULT or AP_DIRECT).

Note: To set bit 4, use AP_DEFAULT or AP_DIRECT shifted appropriately (for example, AP_DIRECT<<3).

Bits 5–7: reserved.

originator_id Name of component that issued the verb. This field is only used by management services when logging the SEND_MDS_MU.

pu_name Name of the physical unit to send the data to. This should be set to either an 8-byte alphanumeric type-A EBCDIC string, padded to the right with EBCDIC spaces, or set to all binary zeros if no **pu_name** is specified. Applications using SEND_MDS_MU to respond to MDS_MU_RECEIVED indications that were converted from incoming NMVTs should specify the **pu_name** received in the MDS_MU_RECEIVED signal. MDS_MUs that are to be transported using the MDS transport facility should set the **pu_name** to all binary zeros.

dlen Length of data.

dptr Pointer to data. If this is set to NULL, management services assumes that the data is contiguous with (and begins immediately following) the VCB.

Returned Parameters

If the verb executes successfully, the Program management services returns the following parameter:

primary_rc AP_OK

If the verb fails to execute because of a parameter error, the Program management services returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_PU_NAME

AP_INVALID_MDS_MU_FORMAT
SV_INVALID_DATA_SIZE

If the verb fails to execute because of a state error, the Program management services returns the following parameters:

primary_rc AP_STATE_CHECK

secondary_rc AP_SSCP_PU_SESSION_NOT_ACTIVE

If the verb does not execute because of a system error, the Program management services returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

ALERT_INDICATION

This verb indication is used by management services to send alert major vectors to a registered alert handler or registered held alert handler that will process them.

VCB Structure

```
typedef struct ms_alert_indication
{
    unsigned  short     opcode;                 /*  AP_AlERT_INDICATION             */
    unsigned  char       reserv2;               /*  reserved                          */
    unsigned  char       format;                /*  format                            */
     unsigned short     primary_rc;             /* Primary return code              */
     unsigned long       secondary_rc;          /* Secondary return code            */
     unsigned short     alert_length;           /* Length of alert                  */
    unsigned  char       reserv3[6];            /*  reserved                          */
     unsigned char       *alert;                /* Alert data                        */
} MS_ALERT_INDICATION;
```

Supplied Parameters

opcode AP_ALERT_INDICATION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

alert_length Length of the alert data.

alert Pointer to the alert data. The data pointer is set to NULL, and the data is contiguous with (and begins immediately following) the VCB.

FP_NOTIFICATION

If an MDS-level application has been registered for a particular management services category and the status of a focal point for that category changes, then management services sends this verb signal to the application.

VCB Structure

```
typedef struct ms_fp_notification
{
    unsigned short     opcode;              /* Verb operation code          */
   unsigned  char      reserv2;             /*  reserved                    */
   unsigned  char      format;              /*  format                      */
    unsigned short     primary_rc;          /* Primary return code          */
    unsigned long      secondary_rc;        /* Secondary return code        */
    unsigned char      fp_routing;          /* Type of routing to focal pt */
   unsigned  char      reserv1;             /*  reserved                    */
    unsigned short     fp_data_length;      /* Length of incoming focal     */
                                            /* point data                   */
    unsigned char      *fp_data;            /* focal point data             */
} MS_FP_NOTIFICATION;
```

Supplied Parameters

opcode AP_FP_NOTIFICATION

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

fp_routing Type of routing that should be specified on the SEND_MDS_MU when sending a message to the focal point (AP_DEFAULT or AP_DIRECT).

fp_data_length Length of focal point data.

fp_data Focal point data containing a Focal Point Notification (X'E1') subvector and a Focal Point Identification (X'21') subvector. This data pointer is set to NULL, and the data is contiguous with (and begins immediately following) the VCB.

NMVT_RECEIVED

This verb signal is sent by management services to a registered NMVT-level application when an NMVT Is received from a remote node.

In routing incoming NMVTs, management services applies the following rules:

1. Try to route to an NMVT-level application registered with the major vector key carried on the incoming NMVT, else...
2. If the major vector key is one of X'8061' through X'8064', try to route to a registered NMVT-level AP_SPCF_KEYS application, else...
3. Try to route to an NMVT-level registered AP_ALL_KEYS application, else...
4. Try to route the NMVT (after conversion to an MDS_MU) to an MDS-level application, registered with the major vector key carried on the incoming NMVT, else...
5. If the major vector key is one of X'8061' through X'8064', try to route the NMVT (after conversion to an MDS_MU) to a registered MDS-level application, else...
6. Try to route (after conversion to an MDS_MU) to a registered AP_ALL_KEYS MDS-level application, else...
7. Negatively respond to the NMVT.

VCB Structure

```
typedef struct ms_nmvt_received
{
    unsigned short     opcode;          /* Verb operation code          */
   unsigned  char      reserv2;         /*  reserved                    */
   unsigned  char      format;          /*  format                      */
    unsigned short     primary_rc;      /* Primary return code          */
    unsigned long      secondary_rc;    /* Secondary return code        */
    unsigned char      pu_name[8];      /* Physical unit name           */
   unsigned  char      reserv3[6];      /*  reserved                    */
    unsigned short     nmvt_length;     /* Length of incoming NMVT      */
    unsigned char      *nmvt;           /* NMVT data                    */
} MS_NMVT_RECEIVED;
```

Supplied Parameters

opcode AP_NMVT_RECEIVED

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

pu_name Name of the physical unit from which the NMVT originated. It is the responsibility of the application to respond to the incoming NMVT. The application uses TRANSFER_MS_DATA to send the response. When sending responses, the application must set the **pu_name** field of the TRANSFER_MS_DATA to the **pu_name** supplied in the NMVT_RECEIVED signal.

nmvt_length Length of NMVT data.

nmvt Full NMVT, containing management services major vector of the types specified on the REGISTER_NMVT_APPLICATION. This data pointer is set to NULL, and the data is contiguous with (and begins immediately following) the VCB.

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Chapter 15. Introduction to ASCII Configuration

This part describes the ASCII configuration provided by Personal Communications or Communications Server . The ASCII configuration provides a method of creating, storing, and accessing configuration information. This method uses ASCII files instead of binary files to store configuration records. This lets users create and modify a configuration file without using the SNA Node Configuration user interface.

Keywords

Personal Communications or Communications Server provides an ASCII (ACG) file that contains all the configuration data to configure a particular node. The configuration data is presented as complex and simple keywords. A simple keyword is a configuration parameter in the format of keyword=value. A complex keyword is a grouping of simple keywords. The following is a list of keywords supported by Personal Communications or Communications Server .

ADJACENT_NODE

ANYNET_COMMON_PARAMETERS

ANYNET_SOCKETS_OVER_SNA

CONNECTION_NETWORK

CPIC_SIDE_INFO

DLUR_DEFAULTS

DOWNSTREAM_LU

DOWNSTREAM_PU_TEMPLATE

FOCAL_POINT

INTERNAL_PU

LINK_STATION

LOCAL_LU

LU_0_TO_3

LU_LU_PASSWORD

MODE

NODE

PARTNER_LU

PORT

SPLIT_STACK

TN3270E_DEF

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TP

USERID_PASSWORD

VERIFY

See Chapter 4, “Node Configuration Verbs” on page 29 for detailed descriptions of each verb.

ASCII Configuration Verify Utility

The ASCII configuration verify utility checks your configuration file to ensure that there are no errors. If there are errors, you must edit the file without going through the Personal Communications or Communications Server Configuration GUI.

Verifying a Configuration File

Personal Communications or Communications Server provides two utilities for verifying a configuration file.

Console verification (Command line) utility

Windows SDI verification utility

Console Verification

The Console verification method runs as a Windows DOS console application. You can start this by issuing the following command line syntax:

vacgcon <filename>

where <filename> is the **.ACG** file.

The verification is performed and a message is generated indicating if the verification was successful. Messages and errors are written to the DOS console screen. You can not scroll through any error messages written to the console. The output from the command line utility can be redirected to a file.

Windows SDI Verification

The Windows SDI verification utility runs as a Windows SDI application. You can start this by either selecting the Personal Communications or Communications Server Verification icon located within the Personal Communications or Communications Server folder, or by issuing the following command line syntax:

vacgwin <filename>

where <filename> is the **.ACG** file.

If you use the command option, the file is automatically opened and verified. If you select the icon, use the window menu or toolbar functions to verify the file. Do the following:

1. Select and open a configuration file
2. Verify the file
3. View any errors and messages.

Editing a Configuration File

If either verification utility (console or Windows SDI) generated errors, edit the **.ACG** configuration file using any ASCII text editor. To edit a configuration file:

From the windows menu:

1. Select **File**
2. Select **Edit a file**
3. Launch an ASCII editor with the configuration filename selected
4. Edit the file as needed
5. **Save** the file
6. **Re-verify** the file.

From the toolbar

1. Select the **Edit** icon (pencil)
2. Launch an ASCII editor with the configuration filename selected
3. Edit the file as needed
4. **Save** the file
5. **Re-verify** the file.

See the online help for specific details on how to use the selections on the menu or toolbar for the Windows SDI application.

Chapter 16. ASCII Configuration Keywords

This chapter:

Describes kinds and types of keywords

Shows the format of the keywords

Gives examples of the keywords.

Kinds and Types of Keywords

To help understand how to read and interpret the data in the ASCII configuration file, a description follows of the kinds and types of keywords.

Kinds of keywords

There are two kinds of keywords.

Simple keyword A keyword that does not contain other keywords; that is, it has no embedded keywords. It is of the form keywordname = value; where value is not a left parenthesis. In the following example, FQ_CP_NAME and NODE_TYPE are simple keywords, but NODE is not.

```
NODE=(
      FQ_CP_NAME=USIBMNM.NT265
      NODE_TYPE=END_NODE
)
```

Complex keyword Contains embedded simple or complex keywords. In the following example, PORT and PORT_LAN_SPECIFIC_DATA are complex keywords.

```
PORT=(
      PORT_NAME=LAN1_04
      DLC_NAME=LAN
      PORT_LAN_SPECIFIC_DATA=(
            ADAPTER_ID=LAN1
            ADAPTER_NAME=0001
      )
)
```

Types of Keywords

There are six types of simple keywords and they tell what value the simple keywords can have.

BOOLEANKEYWORD
A keyword that can only have a Boolean (0 or 1) value.

ENUMKEYWORD A keyword that has enumerated values. Valid values are listed in the ENUM_LIST.

HEXNUMBERKEYWORD
A keyword that has a hex number value. The valid range for the hex number is given by the RANGE.

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HEXSTRINGKEYWORD
A keyword that has a string of hex numbers as its value. The valid length of the hex string is given by the FIELD_LENGTH.

STRINGKEYWORD A keyword that has a string value. The valid length for the string is given by the FIELD_LENGTH.

UNSIGNEDNUMBERKEYWORD
A keyword that has an unsigned number value. The valid range for the number is given by the RANGE.

Other Keyword Fields and What They Mean

Many of the keywords support the following specifications:

@REQUIRED Determines whether a given keyword is required to be valid. 1—means it is required. 0—means it is not required. However, if a default value is specified, then it is automatically added.

@DEFAULT Specifies the default value for a given keyword. If the keyword is not present in the ASCII file, this default value is filled in and added to the ASCII file.

@COMPLETE_SYNTAX
Specifies the valid character values for a STRINGKEYWORD. For example, SNA_TYPE_A.

Keyword Formats

This section describes the keywords. A template is given that contains the definition of the keyword followed by a sample keyword with values filled in.

ADJACENT_NODE

Keyword Definition

The ADJACENT_NODE keyword relates to the DEFINE_ADJACENT_NODE verb. See “DEFINE_ADJACENT_NODE” on page 30 for a description of each field. Wildcard LU entries can be specified by coding the WILDCARD_LU keyword to 1 and specifying the wildcard name in the FQ_LU_NAME field. Partial wildcard names should end in *. To specify a full wildcard, the FQ_LU_NAME should be *.

```
ADJACENT_NODE = (
  @KEY_NAME=FQ_CP_NAME
  @CONVERSION_FUNCTION=ADJACENT_NODE_CONVERSIONS
    FQ_CP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
     )
    LU_ENTRY = (
        @MERGE_UNKEYED_COMPLEX_KEYWORDS = 0
        WILDCARD_LU = (
            @TYPE = BOOLEANKEYWORD
            @REQUIRED = 1
            @DEFAULT = 0

     )
    FQ_LU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @REQUIRED = 1
        @COMPLETE_SYNTAX = @ALPHANUM($#@.*)
     )
  )
)

*The end of Complex Keyword ADJACENT_NODE
```

Keyword Sample

The following is a sample of the ADJACENT_NODE keyword.

```
ADJACENT_NODE=(
      FQ_CP_NAME=USIBMNM.PARTNER
       LU_ENTRY = (
           WILDCARD_LU = 1
           FQ_LU_NAME = USIBMNM.PARTLU1
       )
       LU_ENTRY = (
           WILDCARD_LU = 0
           FQ_LU_NAME = USIBMNM.PARTLU*
       )
 )
```

ANYNET_COMMON_PARAMETERS

Keyword Definition

Refer to Communications Server Online Help for field descriptions of the ANYNET_COMMON_PARAMETERS keyword.

```
ANYNET_COMMON_PARAMETERS = (
    CONNWAIT_SECS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 30
    )
    CONN_RETRY_SECS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 300
    )
    DG_IDLE_TIMEOUT = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 90
    )
    INACTIVITY_TIMER_SECS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 30
    )
    SNASUFFIX = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = SNA.IBM.COM
    )
    SNA_IP_NODE_TYPE = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 1
    )
    UNACKED_DG_RETRY_SECS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 10
    )
    UNSENT_DG_RETRY_SECS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,257
        @DEFAULT = 3
    )
)

*The end of Complex Keyword ANYNET_COMMON_PARAMETERS
```

Keyword Sample

The following is a sample of the ANYNET_COMMON_PARAMETERS keyword.

```
ANYNET_COMMON_PARAMETERS=(
      CONNWAIT_SECS=30
      CONN_RETRY_SECS=300
      DG_IDLE_TIMEOUT=90
      INACTIVITY_TIMER_SECS=30
      SNASUFFIX=SNA.IBM.COM
      SNA_IP_NODE_TYPE=1
      UNACKED_DG_RETRY_SECS=10
      UNSENT_DG_RETRY_SECS=3
)
```

ANYNET_SOCKETS_OVER_SNA

Keyword Definition

Refer to Communications Server Online Help for field descriptions of the ANYNET_SOCKETS_OVER_SNA keyword.

```
ANYNET_SOCKETS_OVER_SNA = (
    CLASSA_ADDRESS = (
        @TYPE = STRINGKEYWORD
     )
    DEFAULT_MODE = (
        @TYPE = STRINGKEYWORD
     )
    DOMAIN_NAME = (
        @TYPE = STRINGKEYWORD
     )
    DOMAIN_NAME_SERVER_ADDRESS = (
        @TYPE = STRINGKEYWORD
        @MERGE_SIMPLE_KEYWORDS = 0
     )
    GW_ADAPTER_CONFIG_REQUIRED = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = NO
     )
    HOST_NAME = (
        @TYPE = STRINGKEYWORD
     )

INTERFACE = (
    INTERFACE_NAME = (
        @TYPE = STRINGKEYWORD
     )
    IP_ADDRESS = (
        @TYPE = STRINGKEYWORD
     )
    SUBNET_MASK = (
        @TYPE = STRINGKEYWORD
     )
)

*The end of Complex Keyword INTERFACE

IP_TO_LU_MAPPING = (
    IP_ADDRESS = (
        @TYPE = STRINGKEYWORD
     )
    LU_NAME = (
        @TYPE = STRINGKEYWORD
     )
    MAPPING_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           GENERATED = 0
           EXPLICITE = 1
```

```
        )
        @DEFAULT = GENERATED
    )

    NETID = (
        @TYPE = STRINGKEYWORD
    )
    SUBNET_MASK = (
        @TYPE = STRINGKEYWORD
    )
)

*The end of Complex Keyword IP_TO_LU_MAPPING

PORT_TO_MODE_MAPPING = (
    MODE_NAME = (
        @TYPE = STRINGKEYWORD
    )
    PORT_NUMBER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
    )
)
*The end of Complex Keyword PORT_TO_MODE_MAPPING

ROUTE_ENTRY = (
    DESTINATION_ADDRESS = (
        @TYPE = STRINGKEYWORD
    )
    DESTINATION_MASK = (
        @TYPE = STRINGKEYWORD
    )
    DIRECT_CONNECTION = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
    ROUTER_ADDRESS = (
        @TYPE = STRINGKEYWORD
    )
    ROUTE_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           DEFAULT = 0
           HOST = 1
           NETWORK = 2
        )
    )
)

*The end of Complex Keyword ROUTE_ENTRY

)

*The end of Complex Keyword ANYNET_SOCKETS_OVER_SNA
```

Keyword Sample

The following are samples of the ANYNET_SOCKETS_OVER_SNA keyword.

```
ANYNET_SOCKETS_OVER_SNA=(
        CLASSA_ADDRESS=125.0.0.0
        DEFAULT_MODE=BLANK
        GW_ADAPTER_CONFIG_REQUIRED=0
        INTERFACE=(
                INTERFACE_NAME=sna0
                IP_ADDRESS=9.37.54.3
                SUBNET_MASK=255.0.0.0
        )
        IP_TO_LU_MAPPING=(
                IP_ADDRESS=9.37.54.3
                LU_NAME=ANY
                MAPPING_TYPE=GENERATED
                NETID=USIBMNM
                SUBNET_MASK=255.0.0.0
        )
        PORT_TO_MODE_MAPPING=(
                MODE_NAME=#BATCH
                PORT_NUMBER=5
        )
        ROUTE_ENTRY=(
                DESTINATION_ADDRESS=0.0.0.0
                DESTINATION_MASK=0.0.0.0
                DIRECT_CONNECTION=0
                ROUTER_ADDRESS=9.67.10.3
                ROUTE_TYPE=DEFAULT
        )
)
```

CONNECTION_NETWORK

Keyword Definition

The CONNECTION_NETWORK keyword follows:

```
CONNECTION_NETWORK = (
    FQCN_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
     )
    PORT_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @MERGE_SIMPLE_KEYWORDS = 0
     )
)

*The end of Complex Keyword CONNECTION_NETWORK
```

Keyword Sample

The following is a sample of the CONNECTION_NETWORK keyword.

```
CONNECTION_NETWORK=(
      FQCN_NAME=USIBMNR.CONNET
      PORT_NAME=LAN0_04
)
```

CPIC_SIDE_INFO

Keyword Definition

The CPIC_SIDE_INFO keyword relates to the DEFINE_CPIC_SIDE_INFO verb. See “DEFINE_CPIC_SIDE_INFO” on page 449 for a description of each field.

```
CPIC_SIDE_INFO = (
    CONVERSATION_SECURITY_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NONE = 0
           SAME = 1
           PROGRAM = 2
           STRONG = 5
       )
        @DEFAULT = NONE
    )
    MODE_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    PARTNER_LU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    SECURITY_PASSWORD = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,10
    )
    SECURITY_USER_ID = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,10
    )
    SYM_DEST_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
    )
    TP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,64
    )
    TP_NAME_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           APPLICATION_TP = 0
           SNA_SERVICE = 1
       )
        @REQUIRED = 1
        @DEFAULT = APPLICATION_TP
    )
    USER_DATA = (
        @TYPE = STRINGKEYWORD
```

```
        @FIELD_LENGTH = 1,32
    )
)

*The end of Complex Keyword CPIC_SIDE_INFO
```

Keyword Sample

The following is a sample of the CPIC_SIDE_INFO keyword.

```
CPIC_SIDE_INFO=(
    SYM_DEST_NAME=APINGD
    CONVERSATION_SECURITY_TYPE=NONE
    MODE_NAME=#INTER
    PARTNER_LU_NAME=USIBMNM.PARTNER1
    TP_NAME=APINGD
    TP_NAME_TYPE=APPLICATION_TP
)
```

DLUR_DEFAULTS

Keyword Definition

The DLUR_DEFAULTS keyword relates to the DEFINE_DLUR_DEFAULTS verb. See “DEFINE_DLUR_DEFAULTS” on page 50 for a description of each field.

```
DLUR_DEFAULTS = (
    BKUP_DLUS_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    DEFAULT_PU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    DLUS_RETRY_LIMIT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,65535
    )
    DLUS_RETRY_TIMEOUT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,65535
    )
    FQ_DLUS_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
)

*The end of Complex Keyword DLUR_DEFAULTS
```

Keyword Sample

The following is a sample of the DLUR_DEFAULTS keyword.

```
DLUR_DEFAULTS=(
      BKUP_DLUS_NAME=USIBMNR.DLURBACK
      DEFAULT_PU_NAME=NT265
      DLUS_RETRY_LIMIT=3
      DLUS_RETRY_TIMEOUT=5
      FQ_DLUS_NAME=USIBMNM.DLURSRV
)
```

DOWNSTREAM_LU

Keyword Definition

The DOWNSTREAM_LU keyword relates to the DEFINE_DOWNSTREAM_LU verb. See “DEFINE_DOWNSTREAM_LU” on page 52 for a description of each field.

```
DOWNSTREAM_LU = (
    DSLU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    DSPU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    HOST_LU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    NAU_ADDRESS = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,255
    )
)

*The end of Complex Keyword DOWNSTREAM_LU
```

Keyword Sample

The following is a sample of the DOWNSTREAM_LU keyword.

```
DOWNSTREAM_LU=(
      DSLU_NAME=GR08005
      DSPU_NAME=GR08
      HOST_LU_NAME=PUBLIC
      NAU_ADDRESS=5
)
```

DSPU_TEMPLATE

Keyword Definition

The DSPU_TEMPLATE keyword relates to the DEFINE_DSPU_TEMPLATE verb. See “DEFINE_DSPU_TEMPLATE” on page 57 for a description of each field.

```
DSPU_TEMPLATE = (
    MAX_INSTANCE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
    )
    NUMBER_OF_DSLU_TEMPLATES = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
    )
    TEMPLATE_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )

DSLU_TEMPLATE = (
    HOST_LU = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    MAX_NAU = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
    )
    MIN_NAU = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
    )
)

*The end of Complex Keyword DSLU_TEMPLATE


*The end of Complex Keyword DSPU_TEMPLATE
```

Keyword Sample

The following is a sample of the DSPU_TEMPLATE keyword.

```
DSPU_TEMPLATE=(
      TEMPLATE_NAME=DOWN
      MAX_INSTANCE=0
      NUMBER_OF_DSLU_TEMPLATES=1
      DSLU_TEMPLATE=(
            HOST_LU=PUBLIC
            MAX_NAU=5
            MIN_NAU=1
)
```

FOCAL_POINT

Keyword Definition

The FOCAL_POINT keyword relates to the DEFINE_FOCAL_POINT verb. See "DEFINE_FOCAL_POINT" on page 60 for a description of each field.

```
FOCAL_POINT = (
    BKUP_FP_FQCP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    BKUP_MS_APPL_NAME = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED%
    )
    FP_FQCP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
        @REQUIRED = 1
    )
    MS_APPL_NAME = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
    )
    MS_CATEGORY = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
    )
)

*The end of Complex Keyword FOCAL_POINT
```

Keyword Sample

The following is a sample of the FOCAL_POINT keyword.

```
FOCAL_POINT=(
      MS_CATEGORY=23F0F1F7
      BKUP_FP_FQCP_NAME=USIBMNR.BACKUP
      BKUP_MS_APPL_NAME=23F0F1F6
      FP_FQCP_NAME=USIBMNR.FOCAL
      MS_APPL_NAME=23F0F1F6
)
```

INTERNAL_PU

Keyword Definition

The INTERNAL_PU keyword relates to the DEFINE_INTERNAL_PU verb. See "DEFINE_INTERNAL_PU" on page 63 for a description of each field.

```
INTERNAL_PU = (
    BKUP_DLUS_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    FQ_DLUS_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    NODE_ID = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
    )
    PU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
    STARTUP = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
)

*The end of Complex Keyword INTERNAL_PU
```

Keyword Sample

The following is a sample of the INTERNAL_PU keyword.

```
INTERNAL_PU=(
      PU_NAME=NT265
      NODE_ID=05D00000
      STARTUP=1
)
```

LINK_STATION

Keyword Definition

The LINK_STATION keyword relates to the DEFINE_LS verb. See “DEFINE_LS” on page 68 for a description of each field.

The LINK_STATION keyword should contain one of the Link_Station_*_Specific_Data keywords. Which Link_Station_*_Specific_Data keyword to use is dependent on the value of PORT_NAME. For example, if the value of PORT_NAME refers to a LAN port, then a LINK_STATION_LAN_SPECIFIC_DATA keyword should be included.

```
LINK_STATION = (
    ACTIVATE_AT_STARTUP = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
    ADJACENT_NODE_ID = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    ADJACENT_NODE_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           APPN_NODE = 0
           NETWORK_NODE = 2
           END_NODE = 3
           BACK_LEVEL_LEN_NODE = 5
           HOST_XID3 = 6
           HOST_XID0 = 7
           DSPU_XID = 8
           DSPU_NO_XID = 9
       )
        @REQUIRED = 1
        @DEFAULT = APPN_NODE
    )
    AUTO_ACTIVATE_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
    )
    BKUP_DLUS_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED%
    )
    CP_CP_SESS_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
    )
    DEFAULT_NN_SERVER = (
        @TYPE = BOOLEANKEYWORD
    )
    DEST_ADDRESS = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 0,32
        @REQUIRED = 1
```

```
 )
ETHERNET_FORMAT = (
    @TYPE = BOOLEANKEYWORD
    @REQUIRED = 1
    @DEFAULT = 0
 )
DISABLE_REMOTE_ACT = (
    @TYPE = BOOLEANKEYWORD
    @REQUIRED = 1
    @DEFAULT = 0
 )
DLUS_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,17
    @COMPLETE_SYNTAX = %FULLY_QUALIFIED%
 )
DSPU_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,8
 )
DSPU_SERVICES = (
    @TYPE = ENUMKEYWORD
       @ENUM_LIST = (
        NONE = 0
        PU_CONCENTRATION = 1
        DLUR = 2

    )
    @REQUIRED = 1
    @DEFAULT = NONE
 )
FQ_ADJACENT_CP_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,17
    @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
 )
HOST_TYPE = (
    @TYPE = ENUMKEYWORD
       @ENUM_LIST = (
        SNA = 0
        HNA = 64
        FNA = 128
 )
HPR_LINK_LVL_ERROR = (
    @TYPE = BOOLEANKEYWORD
 )
HPR_SUPPORT = (
    @TYPE = BOOLEANKEYWORD
    @DEFAULT = 0
 )
LIMITED_RESOURCE = (
    @TYPE = ENUMKEYWORD
       @ENUM_LIST = (
        NO = 0
        YES = 1
        INACTIVITY = 2
    )
    @REQUIRED = 1
```

```
)
LINK_DEACT_TIMER = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
)
LINK_SPEC_DATA_LEN = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @DEFAULT = 0
)
LINK_STATION_ROLE = (
    @TYPE = ENUMKEYWORD
      @ENUM_LIST = (
       NEGOTIABLE = 0
       PRIMARY = 1
       SECONDARY = 2
       USE_ADAPTER_DEFAULTS = 255
)
LS_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,8
    @REQUIRED = 1
)
MAX_IFRM_RCVD = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,127
)
MAX_SEND_BTU_SIZE = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
)
NODE_ID = (
    @TYPE = HEXSTRINGKEYWORD
    @FIELD_LENGTH = 1,8
)
PORT_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,8
    @REQUIRED = 1
)
PU_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,8
    @COMPLETE_SYNTAX = %SNA_TYPE_A%
)
SOLICIT_SSCP_SESSION = (
    @TYPE = BOOLEANKEYWORD
)
SUPPRESS_CP_NAME = (
    @TYPE = ENUMKEYWORD
      @ENUM_LIST = (
       NO = 0
       YES = 128
)
TARGET_PACING_COUNT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 1,32767
)
TG_NUMBER = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,20
```

```
        @DEFAULT = 0
    )
    USE_DEFAULT_TG_CHARS = (
        @TYPE = BOOLEANKEYWORD
    )

LINK_STATION_ANYNET_SPECIFIC_DATA = (
    PARTNER_ADDRESS_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           USE_CP_NAME = 0
           USE_BLOCK_AND_PU_ID = 1
        )
        @DEFAULT = USE_CP_NAME

)

*The end of Complex Keyword LINK_STATION_ANYNET_SPECIFIC_DATA

LINK_STATION_LAN_SPECIFIC_DATA = (
    TEST_RETRY_INTERVAL = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 5,30
        @DEFAULT = 8
    )
    TEST_RETRY_LIMIT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 3,30
        @DEFAULT = 5
    )
    XID_RETRY_INTERVAL = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 2,20
        @REQUIRED = 1
        @DEFAULT = 4
    )
    XID_RETRY_LIMIT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 3,30
        @DEFAULT = 5
)

*The end of Complex Keyword LINK_STATION_LAN_SPECIFIC_DATA

LINK_STATION_SDLC_SPECIFIC_DATA = (
    AUTO_REACTIVATE_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
    BACKUP_PHONE_NUMBER = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,62
    )
    CONNECT_RETRY_COUNT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,127
        @DEFAULT = 10
    )
```

```
    CONNECT_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,30
        @DEFAULT = 2
    )
    FRAMING_STANDARD = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           SNA_OVER_ASYNC = 0
           ADVANTIS = 1
           HAYES_AUTOSYNC = 2
       )
        @DEFAULT = SNA_OVER_ASYNC
    )
    INACTIVITY_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 40,160
        @DEFAULT = 80
    )
    PORT_SPEED = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 2400,115200
        @DEFAULT = 57600
    )
    PRIMARY_PHONE_NUMBER = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,62
    )
    RESPONSE_RETRY_COUNT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,127
        @DEFAULT = 10
    )
    RESPONSE_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 2,20
        @DEFAULT = 4
    )

    USE_NRZI_ENCODING = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
)

*The end of Complex Keyword LINK_STATION_SDLC_SPECIFIC_DATA

LINK_STATION_X25_SPECIFIC_DATA = (
    ADDITIONAL_FACILITIES = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,110
    )
    CALL_USER_GROUP_FORMAT = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NONE = 0
           BASIC = 1
           EXTENDED = 2
```

```
    )
    CALL_USER_GROUP_INDEX = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,6
    )
    CONNECTION_ID = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,16
    )
    CONNECTION_TYPE = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            PVC = 0
            SVC = 1
       )
        @DEFAULT = PVC
    )
    LOGICAL_CHANNEL_NUMBER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 5,9
    )
    NETWORK_USER_ID = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,42
    )
    PACKET_SIZE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 16,4096
        @DEFAULT = 128
    )
    REMOTE_CONFORMANCE = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            1980_COMPLIANCE = 1980
            1984_COMPLIANCE = 1984
            1988_COMPLIANCE = 1988
       )
        @DEFAULT = 1984_COMPLIANCE
    )
    REQUEST_REVERSE_CHARGING = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
    WINDOW_SIZE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,7
        @DEFAULT = 2
    )

X25_DESTINATION_ADDRESS = (
    DTE_ADDRESS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,16
    )
    DTE_ADDRESS_EXTENSION = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,42
```

```
        )
)

*The end of Complex Keyword X25_DESTINATION_ADDRESS

)

*The end of Complex Keyword LINK_STATION_X25_SPECIFIC_DATA


*The end of Complex Keyword LINK_STATION
```

Keyword Sample

The following are samples of the LINK_STATION keyword.

```
LINK_STATION=(
        LS_NAME=LINK0000
        ACTIVATE_AT_STARTUP=0
        ADJACENT_NODE_TYPE=APPN_NODE
        AUTO_ACTIVATE_SUPPORT=1
        CP_CP_SESS_SUPPORT=1
        DEFAULT_NN_SERVER=0
        DEST_ADDRESS=40000000000004
        DISABLE_REMOTE_ACT=0
        DSPU_SERVICES=NONE
        HPR_LINK_LVL_ERROR=0
        HPR_SUPPORT=0
        LIMITED_RESOURCE=NO
        LINK_DEACT_TIMER=0
        LINK_STATION_ROLE=USE_ADAPTER_DEFAULTS
        MAX_IFRM_RCVD=0
        MAX_SEND_BTU_SIZE=65535
        NODE_ID=05D00000
        PORT_NAME=LAN0_04
        SOLICIT_SSCP_SESSION=0

        SUPPRESS_CP_NAME=NO
        TARGET_PACING_COUNT=1
        TG_NUMBER=0
        USE_DEFAULT_TG_CHARS=1
        LINK_STATION_LAN_SPECIFIC_DATA=(
                TEST_RETRY_INTERVAL=8
                TEST_RETRY_LIMIT=5
                XID_RETRY_INTERVAL=8
                XID_RETRY_LIMIT=5
        )
)
LINK_STATION=(
        LS_NAME=LINK0001
        ACTIVATE_AT_STARTUP=0
        ADJACENT_NODE_TYPE=DSPU_XID
        AUTO_ACTIVATE_SUPPORT=0
        CP_CP_SESS_SUPPORT=1
        DEFAULT_NN_SERVER=0
        DEST_ADDRESS=40000000000104
        DISABLE_REMOTE_ACT=0
```

```
        DSPU_NAME=LINK0001
        DSPU_SERVICES=PU_CONCENTRATION
        HPR_LINK_LVL_ERROR=0
        HPR_SUPPORT=0
        LIMITED_RESOURCE=NO
        LINK_DEACT_TIMER=0
        LINK_STATION_ROLE=USE_ADAPTER_DEFAULTS
        MAX_IFRM_RCVD=0
        MAX_SEND_BTU_SIZE=65535
        NODE_ID=05D00000
        PORT_NAME=LAN0_04
        SOLICIT_SSCP_SESSION=0
        STARTUP=1
        SUPPRESS_CP_NAME=NO
        TARGET_PACING_COUNT=1
        TG_NUMBER=0
        USE_DEFAULT_TG_CHARS=1
        LINK_STATION_LAN_SPECIFIC_DATA=(
                TEST_RETRY_INTERVAL=8
                TEST_RETRY_LIMIT=5
                XID_RETRY_INTERVAL=8
                XID_RETRY_LIMIT=5
        )
)
```

LOCAL_LU

Keyword Definition

The LOCAL_LU keyword relates to the DEFINE_LOCAL_LU verb. See "DEFINE_LOCAL_LU" on page 65 for a description of each field.

```
LOCAL_LU = (
    LU_ALIAS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
    )
    LU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
    LU_SESSION_LIMIT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,65535
        @DEFAULT = 0
    )
    NAU_ADDRESS = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,255
    )
    PU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
    ROUTE_TO_CLIENT = (
        @TYPE = BOOLEANKEYWORD
    )
)

*The end of Complex Keyword LOCAL_LU
```

Keyword Sample

The following is a sample of the LOCAL_LU keyword.

```
LOCAL_LU=(
      LU_NAME=LOCLU62
      LU_ALIAS=LOCALIAS
      LU_SESSION_LIMIT=0
      NAU_ADDRESS=0
      ROUTE_TO_CLIENT=0
)
```

LU_LU_PASSWORD

Keyword Definition

The LU_LU_PASSWORD keyword relates to the DEFINE_LU_LU_PASSWORD verb. See “DEFINE_LU_LU_PASSWORD” on page 434 for a description of each field.

The LU_PAIR keyword value is composed of the local LU name and fully qualified partner LU name separated by a comma.

```
LU_LU_PASSWORD = (
    LU_PAIR = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,24
        @REQUIRED = 1
        @COMPLETE_SYNTAX = @SEG(1, (,), %SNA_TYPE_A% && @LENGTH<=8)
         && @SEG(2,(,), %FULLY_QUALIFIED_SNA_TYPE_A%)
     )
    PASSWORD = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
     )
)

*The end of Complex Keyword LU_LU_PASSWORD
```

Keyword Sample

The following is a sample of the LU_LU_PASSWORD keyword.

```
LU_LU_PASSWORD=(
      LU_PAIR=NT265,USIBMNM.PARTLU
      PASSWORD=460C7761C854E0E6
)
```

LU_0_TO_3

Keyword Definition

The LU_0_TO_3 keyword relates to the DEFINE_LU_0_TO_3 verb. See “DEFINE_LU_0_TO_3” on page 80 for a description of each field.

Note: The following simple keywords and field are only supported by Communications Server :

APPLICATION_TYPE

ASSOC_PRINTER

CLASS_TYPE

```
LU_0_TO_3 = (
    APPLICATION_TYPE = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            UNASSIGNED = 0
            TN3270E = 257
    )
    ASSOC_PRINTER = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    CLASS_TYPE = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            TN_UNASSIGNED = 0
            TN_IMPLICIT_WORKSTATION = 1
            TN_EXPLICIT_WORKSTATION = 2
            TN_IMPLICIT_PRINTER = 3
            TN_EXPLICIT_PRINTER = 4
            TN_ASSOC_PRINTER = 5
    )
    LU_MODEL = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            3270_DISPLAY_MODEL_2 = 2
            3270_DISPLAY_MODEL_3 = 3
            3270_DISPLAY_MODEL_4 = 4
            3270_DISPLAY_MODEL_5 = 5
            RJE_WKSTN = 32
            PRINTER = 128
            UNKNOWN = 0
       )
        @REQUIRED = 1
        @DEFAULT = 3270_DISPLAY_MODEL_2
    )
    LU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
```

```
    )
    NAU_ADDRESS = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,255
        @REQUIRED = 1
    )
    POOL_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
    PRIORITY = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NETWORK = 3
           HIGH = 2
           MEDIUM = 1
           LOW = 0
        )
        @REQUIRED = 1
        @DEFAULT = MEDIUM
    )
    PU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
)

*The end of Complex Keyword LU_0_TO_3
```

Keyword Sample

The following is a sample of the LU_0_TO_3 keyword.

```
LU_0_TO_3=(
      LU_NAME=LUA2

      LU_MODEL=3270_DISPLAY_MODEL_2
      NAU_ADDRESS=2
      PRIORITY=MEDIUM
      PU_NAME=NT265
)
```

MODE

Keyword Definition

The MODE keyword relates to the DEFINE_MODE verb. See “DEFINE_MODE” on page 88 for a description of each field.

```
MODE = (
    AUTO_ACT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,1
        @REQUIRED = 1
        @DEFAULT = 0
    )
    COMPRESSION = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            PROHIBITED = 0
            REQUESTED = 1
       )
        @REQUIRED = 1
        @DEFAULT = PROHIBITED
    )
    COS_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
    CRYPTOGRAPHY = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            NONE = 0
            MANDATORY = 1
       )
        @REQUIRED = 1
        @DEFAULT = NONE
    )
    DEFAULT_RU_SIZE = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
    MAX_NEGOTIABLE_SESSION_LIMIT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,32767
        @REQUIRED = 1
        @DEFAULT = 128
    )
    MAX_RU_SIZE_UPPER_BOUND = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 256,16384
        @REQUIRED = 1
    )
    MIN_CONWINNERS_SOURCE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
```

```
        @RANGE = 0,32767
        @REQUIRED = 1
        @DEFAULT = 16
    )
    MODE_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
    )
    PLU_MODE_SESSION_LIMIT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,32767
        @REQUIRED = 1
        @DEFAULT = 32
    )
    RECEIVE_PACING_WINDOW = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,63
        @REQUIRED = 1
        @DEFAULT = 1
    )
)

*The end of Complex Keyword MODE
```

Keyword Sample

The following are samples of the MODE keyword.

```
MODE=(
      MODE_NAME=BLANK
      AUTO_ACT=0
      COMPRESSION=PROHIBITED
      COS_NAME=#CONNECT
      CRYPTOGRAPHY=NONE
      DEFAULT_RU_SIZE=1
      MAX_NEGOTIABLE_SESSION_LIMIT=8
      MAX_RU_SIZE_UPPER_BOUND=1024
      MIN_CONWINNERS_SOURCE=4
      PLU_MODE_SESSION_LIMIT=8
      RECEIVE_PACING_WINDOW=3
)
MODE=(
      MODE_NAME=#INTER
      AUTO_ACT=0
      COMPRESSION=REQUESTED
      COS_NAME=#INTER
      CRYPTOGRAPHY=NONE
      DEFAULT_RU_SIZE=1
      MAX_NEGOTIABLE_SESSION_LIMIT=8
      MAX_RU_SIZE_UPPER_BOUND=4096
      MIN_CONWINNERS_SOURCE=4
      PLU_MODE_SESSION_LIMIT=8
      RECEIVE_PACING_WINDOW=20
)
```

NODE

Keyword Definition

The NODE keyword relates to the START_NODE verb. See “START_NODE” on page 550 for a description of each field.

```
NODE = (
    ANYNET_SUPPORT = (
        @TYPE = ENUMKEYWORD
    @ENUM_LIST = (
            ANYNET_SUPPORTED = 0
            ACCESS_NODE = 1
            GATEWAY = 2
       )
        @REQUIRED = 1
        @DEFAULT = ANYNET_SUPPORTED
    )
    CP_ALIAS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    DEFAULT_PREFERENCE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
            NATIVE = 0
            NONNATIVE = 1
            NATIVE_THEN_NONNATIVE = 2
            NONNATIVE_THEN_NATIVE = 3
            USE_DEFAULT_PREFERENCE = 255
       )
        @REQUIRED = 1
        @DEFAULT = NATIVE
    )
    DISCOVERY_GROUP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    DISCOVERY_SUPPORT = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
            NO = 0
            DISCOVERY_CLIENT = 1
            DISCOVERY_SERVER = 2
       )
        @REQUIRED = 1
        @DEFAULT = DISCOVERY_CLIENT
    )
    FQ_CP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
      NODE_ID = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,8
```

```
        @REQUIRED = 1
        @DEFAULT = 05D00000
    )
    NODE_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NETWORK_NODE = 2
           END_NODE = 3
        )
        @REQUIRED = 1
        @DEFAULT = END_NODE
    )
    REGISTER_WITH_CDS = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
    REGISTER_WITH_NN = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
)

*The end of Complex Keyword NODE
```

Keyword Sample

The following is a sample of the NODE keyword.

```
NODE=(
      ANYNET_SUPPORT=ACCESS_NODE
      CP_ALIAS=NT265
      DEFAULT_PREFERENCE=NATIVE
      DISCOVERY_GROUP_NAME=<NONE>
      DISCOVERY_SUPPORT=DISCOVERY_CLIENT
      FQ_CP_NAME=USIBMNM.NT265
      NODE_ID=05D00000
      NODE_TYPE=END_NODE
      REGISTER_WITH_CDS=1
      REGISTER_WITH_NN=1
)
```

PARTNER_LU

Keyword Definition

The PARTNER_LU keyword relates to the DEFINE_PARTNER_LU verb. See “DEFINE_PARTNER_LU” on page 92 for a description of each field.

```
PARTNER_LU = (
    ADJACENT_CP_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    CONV_SECURITY_VERIFICATION = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 1
    )
    FQ_PLU_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,17
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %FULLY_QUALIFIED_SNA_TYPE_A%
    )
    MAX_MC_LL_SEND_SIZE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,32767
        @DEFAULT = 32767
    )
    PARALLEL_SESSION_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 1
    )
    PARTNER_LU_ALIAS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    PREFERENCE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NATIVE = 0
           NONNATIVE = 1
           NATIVE_THEN_NONNATIVE = 2
           NONNATIVE_THEN_NATIVE = 3
           USE_DEFAULT_PREFERENCE = 255
       )
        @REQUIRED = 1
        @DEFAULT = USE_DEFAULT_PREFERENCE
    )
)

*The end of Complex Keyword PARTNER_LU
```

Keyword Sample

The following is a sample of the PARTNER_LU keyword.

```
PARTNER_LU=(
      FQ_PLU_NAME=USIBMNM.DLURSRV
      CONV_SECURITY_VERIFICATION=1
      MAX_MC_LL_SEND_SIZE=32767
      PARALLEL_SESSION_SUPPORT=1
      PARTNER_LU_ALIAS=DLURSRV
      PREFERENCE=USE_DEFAULT_PREFERENCE
)
```

PORT

Keyword Definition

The PORT keyword relates to the DEFINE_PORT verb. See “DEFINE_PORT” on page 95 for a description of each field.

The PORT keyword should contain one of the Port_*_Specific_Data_ keywords. Which Port_*_Specific_Data keyword to use is dependent on the value of DLC_NAME. For example, a PORT keyword with DLC_NAME=LAN should include a PORT_LAN_SPECIFIC_DATA keyword.

OEM port specific data is not configurable through the ASCII configuration.

```
PORT = (
    DLC_DATA = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,32
    )
    DLC_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
    )
    IMPLICIT_CP_CP_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
    )
    IMPLICIT_DEACT_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
    )
    IMPLICIT_DSPU_SERVICES = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
            NONE = 0
            PU_CONCENTRATION = 1
            DLUR = 2
       )
        @REQUIRED = 1
        @DEFAULT = NONE
    )
    IMPLICIT_DSPU_TEMPLATE = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    IMPLICIT_LIMITED_RESOURCE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
            NO = 0
            YES = 1
            INACTIVITY = 2
       )
    IMPLICIT_HPR_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
    )
    LINK_STATION_ROLE = (
```

```
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NEGOTIABLE = 0
           PRIMARY = 1
           SECONDARY = 2
           MSEC = 4
           USE_PORT_DEFAULTS = 255
      )
      LS_XMIT_RCV_CAP = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           TWS = 1
           TWA = 2
      )
      MAX_IFRM_RCVD = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,127
      )
      MAX_RCV_BTU_SIZE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
      )
        PORT_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
        @REQUIRED = 1
       )
      PORT_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           NONSWITCHED = 1
           SWITCHED = 2
           SATF = 4
      )


  PORT_LAN_SPECIFIC_DATA = (
      ACK_DELAY = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 30,1000
        @REQUIRED = 1
        @DEFAULT = 100
      )
      ACK_TIMEOUT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 500,10000
        @REQUIRED = 1
        @DEFAULT = 3000
      )
      ADAPTER_NUMBER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,7
        @DEFAULT = 0
      )
      BUSY_STATE_TIMEOUT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 10,60
        @REQUIRED = 1
        @DEFAULT = 15
```

```
)
IDLE_STATE_TIMEOUT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 10,120
    @REQUIRED = 1
    @DEFAULT = 30
)
LOCAL_SAP = (
    @TYPE = HEXNUMBERKEYWORD
    @RANGE = 04,FC
    @DEFAULT = 04
)
OUTSTANDING_TRANSMITS = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 2,64
    @REQUIRED = 1
    @DEFAULT = 16
)
POLL_TIMEOUT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 500,10000
    @REQUIRED = 1
    @DEFAULT = 3000
)
POOL_SIZE = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 2,64
    @REQUIRED = 1
    @DEFAULT = 32
)
REJECT_RESPONSE_TIMEOUT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 5,30
    @REQUIRED = 1
    @DEFAULT = 10
)
TEST_RETRY_INTERVAL = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 5,30
    @REQUIRED = 1
    @DEFAULT = 8
)
TEST_RETRY_LIMIT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 3,30
    @REQUIRED = 1
    @DEFAULT = 5
)
XID_RETRY_INTERVAL = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 5,60
    @REQUIRED = 1
    @DEFAULT = 8
)
XID_RETRY_LIMIT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 3,30
    @REQUIRED = 1
```

```
        @DEFAULT = 5
    )
)

*The end of Complex Keyword PORT_LAN_SPECIFIC_DATA

PORT_SDLC_SPECIFIC_DATA = (
    ACCEPT_INCOMING_CALLS = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 0
    )
    CONNECT_RETRY_COUNT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,127
        @REQUIRED = 1
        @DEFAULT = 10
    )
    CONNECT_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,30
        @REQUIRED = 1
        @DEFAULT = 2
    )
    FRAMING_STANDARD = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           SNA_OVER_ASYNC = 0
           ADVANTIS = 1
           HAYES_AUTOSYNC = 2
       )
        @REQUIRED = 1
        @DEFAULT = SNA_OVER_ASYNC
    )
    FULL_DUPLEX_SUPPORT = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 0
    )
    INACTIVITY_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 40,160
        @REQUIRED = 1
        @DEFAULT = 80
    )
    IRQ_LEVEL = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,15
        @REQUIRED = 1
        @DEFAULT = 3
    )
    MODEM_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,256
    )
    MULTIDROP_PRIMARY_SERVER = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
```

```
        @DEFAULT = 0
    )
    PORT_SPEED = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 2400,115200
        @REQUIRED = 1
        @DEFAULT = 57600
    )
    RESPONSE_RETRY_COUNT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,127
        @REQUIRED = 1
        @DEFAULT = 10
    )
    RESPONSE_TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 2,20
        @REQUIRED = 1
        @DEFAULT = 4
    )
    SHARED_RAM_ADDRESS = (
        @TYPE = HEXNUMBERKEYWORD
        @RANGE = C0000,FC000
     )
    STATION_POLL_COUNT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,10
        @REQUIRED = 1
        @DEFAULT = 1
    )
    TRANSMISSION_FLAGS = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,10
        @REQUIRED = 1
        @DEFAULT = 1
    )
    USE_CONSTANT_RTS = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
    USE_NRZI_ENCODING = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 0
    )
)
*The end of Complex Keyword PORT_SDLC_SPECIFIC_DATA

PORT_TWINAX_SPECIFIC_DATA = (
    ADAPTER_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           OTHER_TWINAX_ADAPTER = 0
           5250E_DISPLAY_STATION_EMULATION_ADAPTER = 1
           5250_AT_COMMUNICATION_ADAPTER = 2
           5250_EMULATION_PCMCIA_ADAPTER = 3
           5250_PCMCIA_ADAPTER_CARD = 4
```

```
                SYSTEM_36_WORKSTATION_EMULATION_ADAPTER_A = 5
                5250_EMULATION_ADAPTER_A = 6
                5205_EMULATION_PCI_ADAPTER = 7
                IBM_5250_EXPRESS_ISA_ADAPTER = 8
                IBM_5250_EXPRESS_PC_CARD = 9
                IBM_5250_EXPRESS_PCI_ADAPTER = 10
                NONE = -1
            )
            @DEFAULT = NONE
        )
        IO_ADDRESS = (
            @TYPE = HEXNUMBERKEYWORD
            @RANGE = 240A,27FA
            @DEFAULT = 271A
        )
        IRQ_LEVEL = (
            @TYPE = UNSIGNEDNUMBERKEYWORD
            @RANGE = 3,7
            @DEFAULT = 5
        )

        MEMORY_ADDRESS = (
            @TYPE = HEXNUMBERKEYWORD
            @RANGE = C0000,DC000
            @DEFAULT = DC000
        )
)

*The end of Complex Keyword PORT_TWINAX_SPECIFIC_DATA

PORT_X25_SPECIFIC_DATA = (
        ACCEPT_INCOMING_CALLS = (
            @TYPE = BOOLEANKEYWORD
            @DEFAULT = NO
        )
        ALTERNATE_REMOTE_PHONE_NUMBER = (
            @TYPE = STRINGKEYWORD
            @FIELD_LENGTH = 1,64
        )
        COMPLIANCE = (
            @TYPE = ENUMKEYWORD
               @ENUM_LIST = (
                1980_COMPLIANCE = 1980
                1984_COMPLIANCE = 1984
                1988_COMPLIANCE = 1988
            )
            @DEFAULT = 1984_COMPLIANCE
        )
        DEFAULT_WINDOW_SIZE = (
            @TYPE = UNSIGNEDNUMBERKEYWORD
            @RANGE = 1,7
            @DEFAULT = 2
        )
        DIAL_TYPE = (
            @TYPE = ENUMKEYWORD
               @ENUM_LIST = (
                PULSE = 80
                TONE = 84
```

```
    )
    @DEFAULT = TONE
)
FRAME_INACTIVITY_TIMEOUT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,255
    @DEFAULT = 30
)
FRAME_RETRANSMISSION_TIMEOUT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 1,60
    @DEFAULT = 3
)
FRAME_SEQUENCE = (
    @TYPE = ENUMKEYWORD
      @ENUM_LIST = (
       MODULO_8 = 8
       MODULO_128 = 128
   )
    @DEFAULT = MODULO_8
)
FRAME_TRANSMISSION_RETRY_COUNT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 1,255
    @DEFAULT = 20
)
FRAME_WINDOW_SIZE = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 1,7
    @DEFAULT = 7
)

INSERT_CALLING_ADDRESS = (
    @TYPE = BOOLEANKEYWORD
)
IN_ONLY_SVC_COUNT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,60000
    @DEFAULT = 0
)
IN_ONLY_SVC_START = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,60000
    @DEFAULT = 0
)
LOCAL_DTE_ADDRESS = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,16
)
MAX_PIU_SIZE = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 265,4115
    @DEFAULT = 2048
)
MODEM_NAME = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,256
)
```

```
NETWORK_CONNECTION_TYPE = (
    @TYPE = ENUMKEYWORD
      @ENUM_LIST = (
       LEASED = 0
       SWITCHED = 1
   )
    @DEFAULT = SWITCHED
)
OUT_ONLY_SVC_COUNT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,60000
    @DEFAULT = 0
)
OUT_ONLY_SVC_START = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,60000
    @DEFAULT = 0
)
PACKET_SIZE = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 16,4096
    @DEFAULT = 128
)
PORT_SPEED = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 2400,115200
    @DEFAULT = 57600
)
PVC_COUNT = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,60000
    @DEFAULT = 0
)
PVC_START = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 0,60000
    @DEFAULT = 0
)
REMOTE_PHONE_NUMBER = (
    @TYPE = STRINGKEYWORD
    @FIELD_LENGTH = 1,64
)
SEQUENCING = (
    @TYPE = ENUMKEYWORD
      @ENUM_LIST = (
       MODULO_8 = 8
       MODULO_128 = 128
   )
    @DEFAULT = MODULO_8
)
SHARED_RAM_ADDRESS = (
    @TYPE = HEXNUMBERKEYWORD
    @RANGE = C0000,FC000
)
TRANSMISSION_FLAGS = (
    @TYPE = UNSIGNEDNUMBERKEYWORD
    @RANGE = 1,10
    @DEFAULT = 1
```

```
    )
    TWO_WAY_SVC_COUNT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,60000
        @DEFAULT = 0
    )
    TWO_WAY_SVC_START = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,60000
        @DEFAULT = 0
    )
    USE_CONSTANT_RTS = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 1
    )
    USE_NRZI_ENCODING = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
    USE_X32_PROTOCOL = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
    X32_IDENTITY = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,34
    )
    X32_SIGNATURE = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,34
    )
INCOMING_CALL_FILTER = (
 @MERGE_SIMPLE_KEYWORDS = 0

    ACCEPT_CHARGES = (
        @TYPE = BOOLEANKEYWORD
        @DEFAULT = 0
    )
    DTE_ADDRESS = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 0,16
    )
    DTE_ADDRESS_EXTENSION = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 0,8
    )

)
*The end of Complex Keyword INCOMING_CALL_FILTER
)

*The end of Complex Keyword PORT_X25_SPECIFIC_DATA

)

*The end of Complex Keyword PORT
```

Keyword Sample

The following are samples of the PORT Keyword.

```
PORT=(
      PORT_NAME=ANYNET
      DLC_NAME=ANYNET
      IMPLICIT_DEACT_TIMER=0
      IMPLICIT_DSPU_SERVICES=NONE
      IMPLICIT_HPR_SUPPORT=0
      IMPLICIT_LIMITED_RESOURCE=NO
      MAX_IFRM_RCVD=127
      MAX_RCV_BTU_SIZE=9216
      MAX_SEND_BTU_SIZE=9216

      PORT_TYPE=SATF
)
PORT=(
      PORT_NAME=LAN0_04
      DLC_DATA=00000000000004
      DLC_NAME=LAN
      IMPLICIT_DEACT_TIMER=0
      IMPLICIT_DSPU_SERVICES=NONE
      IMPLICIT_HPR_SUPPORT=1
      IMPLICIT_LIMITED_RESOURCE=NO
      MAX_IFRM_RCVD=8
      MAX_RCV_BTU_SIZE=65535
      MAX_SEND_BTU_SIZE=65535

      PORT_TYPE=SATF
      PORT_LAN_SPECIFIC_DATA=(
            ACK_DELAY=100
            ACK_TIMEOUT=1000
            ADAPTER_ID=LAN0
            ADAPTER_NAME=0000
            BUSY_STATE_TIMEOUT=15
            IDLE_STATE_TIMEOUT=30
            OUTSTANDING_TRANSMITS=16
            POLL_TIMEOUT=3000
            REJECT_RESPONSE_TIMEOUT=10
            TEST_RETRY_INTERVAL=8
            TEST_RETRY_LIMIT=5
            XID_RETRY_INTERVAL=8
            XID_RETRY_LIMIT=5
      )
)
```

SHARED_FOLDERS

Keyword Definition

The SHARED_FOLDERS keyword contains all of the options that are used by shared folders.

```
SHARED_FOLDERS = (
    EXTENSION_LIST = (
        @MERGE_SIMPLE_KEYWORDS = 0
        EXTENSION = (
            @TYPE = STRINGKEYWORD
            @FIELD_LENGTH = 1,255
    )
)
    CACHE_SIZE = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
            @REQUIRED = 1
            @DEFAULT = 256
    )
)

*The end of Complex Keyword SHARED_FOLDERS.
```

Keyword Sample

The following is a sample of the SHARED_FOLDERS keyword.

```
SHARED_FOLDERS=(
      EXTENSION_LIST=(
          EXTENSION=TXT
          EXTENSION=BAT
    )
     CACHE_SIZE=256
)
```

SPLIT_STACK

Keyword Definition

Refer to Communications Server Online Help for field descriptions of the SPLIT_STACK keyword.

```
SPLIT_STACK = (
    POOL_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
     )
    STARTUP = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
     )
)

*The end of Complex Keyword SPLIT_STACK
```

Keyword Sample

The following is a sample of the SPLIT_STACK keyword.

```
SPLIT_STACK=(
      STARTUP=1
)
```

TN3270E_DEF

Keyword Definition

Refer to Communications Server Online Help for field descriptions of the TN3270E_DEF keyword.

```
TN3270E_DEF = (
    AUTO_LOGOFF = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 0
    )
    DEFAULT_POOL_NAME = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,8
    )
    FREQUENCY = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,65535
        @REQUIRED = 1
        @DEFAULT = 60
    )
    KEEPALIVE_TYPE = (
        @TYPE = ENUMKEYWORD
          @ENUM_LIST = (
           TN_NONE = 0
           TN_NOP = 1
           TN_TIMING_MARK = 2
       )
        @REQUIRED = 1
        @DEFAULT = TN_NONE
    )
    LOGOFF = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,65535
        @REQUIRED = 1
        @DEFAULT = 30
    )
    PORT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,65535
        @REQUIRED = 1
        @DEFAULT = 23
    )
    TIMER = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 1,65535
        @REQUIRED = 1
        @DEFAULT = 10
    )
)

*The end of Complex Keyword TN3270E_DEF
```

Keyword Sample

The following is a sample of the TN3270E_DEF keyword.

```
TN3270E_DEF=(
      AUTO_LOGOFF=1
      DEFAULT_POOL_NAME=POOL1
      FREQUENCY=60
      KEEPALIVE_TYPE=TN_NOP
      LOGOFF=30
      PORT=23
      TIMER=10
)
```

TP

Keyword Definition

The TP keyword relates to the DEFINE_TP verb. See “DEFINE_TP” on page 102 for a description of each field.

Note: The following simple keyword is only supported by Communications Server :

API_CLIENT_USE

```
TP = (
   API_CLIENT_USE  (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 0
    )
    CONVERSATION_TYPE = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            BASIC = 0
            MAPPED = 1
            EITHER = 2
       )
        @REQUIRED = 1
        @DEFAULT = EITHER
    )
    DUPLEX_SUPPORT = (
        @TYPE = ENUMKEYWORD
           @ENUM_LIST = (
            HALF_DUPLEX = 0
            FULL_DUPLEX = 1
            EITHER_DUPLEX = 2
       )
        @REQUIRED = 1
        @DEFAULT = EITHER_DUPLEX
    )
    DYNAMIC_LOAD = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 1
    )
    INCOMING_ALLOCATE_TIMEOUT = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,65535
        @REQUIRED = 1
        @DEFAULT = 30
    )
    LOAD_TYPE = (
        @TYPE = BOOLEANKEYWORD
        @REQUIRED = 1
        @DEFAULT = 0
    )
    PARAMETERS = (
```

```
            @TYPE = STRINGKEYWORD
            @FIELD_LENGTH = 1,32
        )
        PATHNAME = (
            @TYPE = STRINGKEYWORD
            @FIELD_LENGTH = 1,80
        )
        PIP_ALLOWED = (
            @TYPE = BOOLEANKEYWORD
            @REQUIRED = 1
            @DEFAULT = 1
        )
        QUEUED = (
            @TYPE = BOOLEANKEYWORD
            @REQUIRED = 1
            @DEFAULT = 0
        )
        RECEIVE_ALLOCATE_TIMEOUT = (
            @TYPE = UNSIGNEDNUMBERKEYWORD
            @RANGE = 0,65535
            @REQUIRED = 1
            @DEFAULT = 3600
        )
        SECURITY_RQD = (
            @TYPE = BOOLEANKEYWORD
            @REQUIRED = 1
            @DEFAULT = 1
        )
        SYNC_LEVEL = (
            @TYPE = ENUMKEYWORD
              @ENUM_LIST = (
                NONE = 0
                CONFIRM_SYNC_LEVEL = 1
                EITHER = 2
                SYNCPT_REQUIRED = 3
                SYNCPT_NEGOTIABLE = 4
              )
            @REQUIRED = 1
            @DEFAULT = EITHER
        )
        TP_INSTANCE_LIMIT = (
            @TYPE = UNSIGNEDNUMBERKEYWORD
            @RANGE = 0,65535
            @REQUIRED = 1
            @DEFAULT = 0
        )
        TP_NAME = (
            @TYPE = STRINGKEYWORD
            @FIELD_LENGTH = 1,64
            @REQUIRED = 1
        )
        TP_NAME_FORMAT = (
            @TYPE = BOOLEANKEYWORD
            @REQUIRED = 1
            @DEFAULT = 0
        )
    )
```

*The end of Complex Keyword TP

Keyword Sample

The following is a sample of the TP keyword.

```
TP=(
        TP_NAME=MYTP
        CONVERSATION_TYPE=EITHER
        DUPLEX_SUPPORT=EITHER_DUPLEX
        DYNAMIC_LOAD=1
        INCOMING_ALLOCATE_TIMEOUT=30
        LOAD_TYPE=0
        PATHNAME=d:\tps\mytp.exe
        PIP_ALLOWED=1
        QUEUED=0
        RECEIVE_ALLOCATE_TIMEOUT=3600
        SECURITY_RQD=1
        SYNC_LEVEL=EITHER
        TP_INSTANCE_LIMIT=0
)
```

USERID_PASSWORD

Keyword Definition

The USERID_PASSWORD keyword relates to the DEFINE_USERID_PASSWORD verb. See “DEFINE_USERID_PASSWORD” on page 436 for a description of each field.

```
USERID_PASSWORD = (
    PASSWORD = (
        @TYPE = HEXSTRINGKEYWORD
        @FIELD_LENGTH = 1,10
        @REQUIRED = 1
     )
    USER_ID = (
        @TYPE = STRINGKEYWORD
        @FIELD_LENGTH = 1,10
        @REQUIRED = 1
        @COMPLETE_SYNTAX = %SNA_TYPE_A%
     )
)

*The end of Complex Keyword USERID_PASSWORD
```

Keyword Sample

The following is a sample of the USERID_PASSWORD keyword.

```
USERID_PASSWORD=(
      USER_ID=MYUSER
      PASSWORD=A098C824DC22B856748B
)
```

VERIFY

Keyword Definition

The VERIFY keyword is required for product configuration. This keyword should not be modified or deleted by the user.

```
VERIFY = (
    CFG_MODIFICATION_LEVEL = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,100
     )
    CFG_VERSION_LEVEL = (
        @TYPE = UNSIGNEDNUMBERKEYWORD
        @RANGE = 0,10
     )
)

*The end of Complex Keyword VERIFY
```

Keyword Sample

The following is a sample of the VERIFY keyword.

```
VERIFY=(
      CFG_MODIFICATION_LEVEL=12
      CFG_VERSION_LEVEL=1
)
```

START_NODE

Note: The following verb has not been previously documented in this book, but is referenced in this chapter.

The START_NODE verb starts the node using the CP create parameters specified.

Note: There are other reserved fields not included in this description.

VCB Structure

```
typedef struct start_node
{
        unsigned short   opcode;                  /* verb operation code          */
        unsigned  char   reserv2;                 /*  reserved                    */
        unsigned  char   format;                  /*  format                      */
        unsigned short   primary_rc;              /* primary return code          */
        unsigned long    secondary_rc;            /* secondary return code        */
        CP_CREATE_PARMS cp_create_parms;          /* mode name                    */
} START_NODE;

typedef struct cp_create_parms
{
        unsigned char    node_type;               /* node type                    */
        unsigned char    fqcp_name[17];           /* fully qualified CP name      */
        unsigned char    cp_alias[8];             /* CP alias                     */
        unsigned char    node_id[4];              /* node ID                      */
        unsigned char    reg_with_nn;             /* register resources with NNS  */
        unsigned char    reg_with_cds;            /* resource registration with CDS */
        unsigned char    discovery_support;       /* is Discovery supported?      */
        unsigned  char   discovery_group_name[8];
                                                  /* Group name for Discovery     */
        unsigned char    default_preference       /* default routing preference   */
        unsigned char    anynet_supported;        /* level of AnyNet support      */
} CP_CREATE_PARMS;
```

Supplied Parameters

The application supplies the following parameters:

opcode AP_START_NODE

format Identifies the format of the VCB. Set this field to zero to specify the version of the VCB listed above.

cp_create_parms.node_type
One of the following node types.

AP_END_NODE
AP_LEN_NODE

AP_NETWORK_NODE

cp_create_parms.fqcp_name
Node's fully qualified (17 bytes long) control point name. This name is composed of two type-A EBCDIC character strings concatenated by an EBCDIC dot, and is right-padded with EBCDIC spaces. (Each name can have a maximum length of 8 bytes with no embedded spaces.)

cp_create_parms.cp_alias
Locally used CP alias. This is an 8-byte string in a locally displayable character set. All 8 bytes are significant and must be set.

cp_create_parms.reg_with_nn
End Node only. Specifies whether resources will be registered with the Network Node Server (AP_YES or AP_NO). If this field is set to AP_YES, then the end node's network node server only forwards directed locates to it. If it is not set, the network node server forwards all broadcast searches to the end node. Registration failure does not affect successful completion of the START_NODE verb.

cp_create_parms.reg_with_cds
End Node. Specifies whether the Network Node Server is allowed to register End Node resources with a Central Directory Server (AP_YES or AP_NO). (This field is ignored if **reg_with_nn** is set to AP_NO.)

Network Node. Specifies whether local or domain resources can be optionally registered with Central Directory Server (AP_YES or AP_NO). Registration failure does not affect successful completion of the START_NODE verb.

cp_create_parms.discovery_support
Specifies whether Discovery functions are to be utilized by this node.

AP_NO
No Discovery functions are to be used by this node.

AP_YES
Discovery functions are to be used by this node. Only ports which support Discovery are used in sending and receiving searches. (see DEFINE_PORT).

If **node_type** is AP_END_NODE, then Discovery client function is used to try to dynamically configure and activate a link to a Network node server when necessary.

If **node_type** is AP_NETWORK_NODE, then Discovery server function is used to respond to searches from clients.

cp_create_parms.discovery_group_name
Specifies the group name to be used on Discovery functions utilized by the node. If this field is set to all zeroes, then the default group name is used.

cp_create_parms.default_preference
Specifies the preferred method of routing when initiating sessions to partner LUs for which AP_USE_DEFAULT_PREFERENCE is specified. (See DEFINE_PARTNER_LU). This field can take the following values:

AP_NATIVE
Use native (APPN) routing protocols only.

AP_NONNATIVE
Use non-native (AnyNet) protocols only.

AP_NATIVE_THEN_NONNATIVE
Try native (APPN) protocols, and if the partner LU cannot be located then retry session activation using non-native (AnyNet) protocols.

AP_NONNATIVE_THEN_NATIVE
Try non-native (AnyNet) protocols, and if the partner LU cannot be located then retry session activation using native (APPN) protocols.

Note: The latter three values are only meaningful when an AnyNet DLC is available to the Node Operator Facility, and there is an AnyNet link station defined. (See Defined_LS).

cp_create_parms.anynet_supported
Specifies the level of support for the Anynet DLC. This field can take the following values:

AP_NONE
No ANYNET function is supported. The field **default_preference** must take the value AP_NATIVE.

AP_ACCESS_NODE
This node supports ANYNET access node functions.

AP_GATEWAY
This node supports ANYNET gateway functions. This value is only valid if **node_type** is AP_NETWORK_NODE.

Returned Parameters

If the verb executes successfully, the Program returns the following parameter:

primary_rc AP_OK

If the verb does not execute because of a parameter error, the Program returns the following parameters:

primary_rc AP_PARAMETER_CHECK

secondary_rc AP_INVALID_ISR_THRESHOLDS

AP_INVALID_CP_NAME
AP_INVALID_NODE_TYPE
AP_INVALID_PU_CONC_NOT_SUPPORTED
AP_INVALID_DLUR_NOT_SUPPORTED
AP_INVALID_HPR_NOT_SUPPORTED
AP_INVALID_ANYNET_NOT_SUPPORTED

If the verb does not execute because the node is stopping, the Program returns the following parameter:

primary_rc AP_NODE_STOPPING

If the verb does not execute because of a system error, the Program returns the following parameter:

primary_rc AP_UNEXPECTED_SYSTEM_ERROR

START_NODE

Part 4. Appendixes

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Appendix A. IBM APPN MIB Tables

The following table gives details on implementing the tables from the IBM APPN management information block (MIB), as defined by RFC1593. The table defines:

Node Operator Facility QUERY verb used to implement each MIB table
Input parameter settings
Any filtering operations required

(The mapping between the returned parameters and the MIB tables variables can be derived from the definition of the Node Operator Facility QUERY verbs). Personal Communications or Communications Server does not currently support the ibmappnNodePortDlcTraceTable and the ibmappnLsStatusTable MIB tables.

IBM MIB Table	Node Operator Facility Verb and MIB Table Variables	Input Parameter Settings
ibmappnNodePortTable	QUERY_PORT	**port_name** ibmappnNodePortName
ibmappnNodePortIpTable	(Note 1)	
ibmappnNodePortDlsTable	QUERY_PORT (select entries with **dlc_type** of AP_SDLC)	**port_name** ibmappnNodePortDlsName
ibmappnNodePortTrTable	QUERY_PORT	**port_name** ibmappnNodePortTrName
ibmappnNodeLsTable	QUERY_LS	**ls_name** ibmappnNodeLsName
ibmappnNodeLsIpTable	(Note 1)	
ibmappnNodeLsDlsTable	QUERY_LS (select entries with **dlc_type** of AP_SDLC)	**ls_name** ibmappnNodeLsDlsName
ibmappnNodeLsTrTable	QUERY_LS	**ls_name** ibmappnNodeLsTrName
ibmappnNnTopoRouteTable	QUERY_COS	**cos_name** ibmappnNnTopoRouteCos
ibmappnNnAdjNodeTable	QUERY_ADJACENT_NN	**adj_nncp_name** ibmappnNnAdjNodeAdjName
ibmappnNnTopologyTable	QUERY_NN_TOPOLOGY_NODE	**node_name** ibmappnNnNodeName **node_type** AP_LEARN_NODE **frsn** 0
ibmappnNnTgTopologyTable	QUERY_NN_TOPOLOGY_TG	**owner** ibmappnNnTgOwner **owner_type** AP_LEARN_NODE **dest** ibmappnNnTgDest **dest_type** AP_LEARN_NODE **tg_num** ibmappnNnTgNum **frsn** 0
ibmappnNnTopologyFRTable	QUERY_NN_TOPOLOGY_NODE	**node_name** ibmappnNnFRNode **node_type** AP_LEARN_NODE **frsn** ibmappnNnFRFrsn
ibmappnNnTgTopologyFRTable	QUERY_NN_TOPOLOGY_TG	**owner** ibmappnNnTgFROwner **owner_type** AP_LEARN_NODE **dest** ibmappnNnTgFRDest **dest_type** AP_LEARN_NODE **tg_num** ibmappnNnTgFRNum **frsn** ibmappnNnTgFRFrsn
ibmappnLocalTgTable	QUERY_LOCAL_TOPOLOGY	**dest** ibmappnLocalTGDest **dest_type** AP_LEARN_NODE **tg_num** ibmappnLocalTgNum

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IBM MIB Table	Node Operator Facility Verb and MIB Table Variables	Input Parameter Settings
ibmappnLocalEnTable	QUERY_LOCAL_TOPOLOGY (select entries with unique **dest**) (Note 2)	**dest** ibmappnLocalEnName **dest_type** AP_END_NODE **dest_type** AP_LEARN_NODE
ibmappnLocalEnTgTable	QUERY_LOCAL_TOPOLOGY (Note 3)	**dest** ibmappnLocalEnTgOrigin **dest_type** AP_LEARN_NODE **tg_num** ibmappnLocalEnTgNum
ibmappnDirTable	QUERY_DIRECTORY_LU	**lu_name** ibmappnDirLuName
ibmappnCosModeTable	QUERY_MODE_TO_COS_MAPPING	**mode_name** ibmappnCosModeName
ibmappnCosNameTable	QUERY_COS	**cos_name** ibmappnCosName

Notes:

1. Personal Communications or Communications Server does not support IP as a DLC type.
2. Entries with the same **dest** are ordered consecutively by QUERY_LOCAL_TOPOLOGY.
3. The ibmappnLocalEnTgTable views TGs from the attached end node's perspective (that is, as a TG from the end node). However, a network node compliant with the current level of the APPN architecture only stores end node TG information for TGs between itself and directly attached end nodes. Therefore all the entries in this table have ibmappnLocalEnTgDest set to the name of the local node (ibmappnNodeCpName).

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Glossary

This glossary includes terms and definitions from:

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The *Information Technology Vocabulary* developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.

The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.

Internet Request for Comments: 1208, *Glossary of Networking Terms*

Internet Request for Comments: 1392, *Internet Users' Glossary*

The *Object-Oriented Interface Design: IBM Common User Access Guidelines*, Carmel, Indiana: Que, 1992.

The following cross-references are used in this glossary:

Contrast with: This refers to a term that has an opposed or substantively different meaning.
Synonym for: This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the glossary.
Synonymous with: This is a backward reference from a defined term to all other terms that have the same meaning.
See: This refers the reader to multiple-word terms that have the same last word.
See also: This refers the reader to terms that have a related, but not synonymous, meaning.
Deprecated term for: This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

A

accept. (1) In a VTAM application program, to establish a session with a logical unit (LU) in response to a CINIT request from a system services control point (SSCP). The session-initiation request may begin when a terminal user logs on, a VTAM application program issues a macroinstruction, or a VTAM operator issues a command. See also *acquire*. (2) An SMP process that moves distributed code and MVS-type programs to the distribution libraries.

ACCESS. In the Simple Network Management Protocol (SNMP), the clause in a Management Information Base (MIB) module that defines the minimum level of support that a managed node provides for an object.

ACF. Advanced Communications Function.

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

acknowledgment. (1) The transmission, by a receiver, of acknowledge characters as an affirmative response to a sender. (T) (2) An indication that an item sent was received.

acquire. (1) In VTAM, to take over resources that were formerly controlled by an access method in another domain or to resume control of resources that were controlled by that domain but released. Contrast with *release*. See also *resource takeover*. (2) In a VTAM application program, to initiate and establish a session with another logical unit (LU). The acquire process begins when the application program issues a macroinstruction. See also *accept*.

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

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

active application. The application subsystem currently in an extended recovery facility (XRF) session with a terminal user. See *alternate application*.

ACTLU. Activate logical unit. In SNA, a command used to start a session on a logical unit.

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

adapter. (1) A hardware component that must be installed in the personal computer to connect to the SDLC, LAN, asynchronous, DFT, or other communication attachment (possibly connecting through a modem). (2) A part that electrically or physically connects a device to a computer or to another device.

adaptive pacing. Synonym for *adaptive session-level pacing*.

adaptive session-level pacing. A form of session-level pacing in which session components exchange pacing windows that may vary in size during the course of a session. This allows transmission within a network to adapt dynamically to variations in availability and demand of buffers on a session-by-session basis. Session-level pacing occurs within independent stages along the session path according to local congestion at the intermediate and endpoint nodes. Synonymous with *adaptive pacing* and *adaptive session pacing*. Contrast with *fixed session-level pacing*.

adaptive session pacing. Synonym for *adaptive session-level pacing*.

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

address space. (1) A set of addresses used to uniquely identify network accessible units, sessions, adjacent link stations, and links in a node for each network in which the node participates. An APPN node has one address space for intranode routing and one for each transmission group on which it can send message units. (2) In MPTN architecture, the set of all legal transport addresses that may be formed according to the rules of a given address type. These rules include the maximum number of characters that can be in the address and the permissible characters. Each transport protocol has its own set of rules. Since addresses in one protocol may also be legitimate in another protocol, MTPN qualifies all transport addresses with an address type.

adjacent link station (ALS). (1) In SNA, a link station directly connected to a given node by a link connection over which network traffic can be carried.

Note: Several secondary link stations that share a link connection do not exchange data with each other and therefore are not adjacent to each other.

(2) With respect to a specific node, a link station partner in an adjacent node.

adjacent nodes. Two nodes connected together by at least one path that connects no other node. (T)

Administrative Domain. A collection of hosts and routers, and the interconnecting networks, managed by a single administrative authority.

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

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

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

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

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

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

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

advanced program-to-program communication (APPC). (1) (2) An LU 6.2 logical unit protocol implementation of SNA that lets interconnected systems

share programming tasks. The general facility characterizing the LU 6.2 architecture and its various implementations in products. (3) Sometimes used to refer to the LU 6.2 architecture and its product implementations as a whole, or to an LU 6.2 product feature in particular, such as an APPC application programming interface.

AIX. Advanced Interactive Executive.

alert. (1) A message sent to a management services focal point in a network to identify a problem or an impending problem. (2) In SNA management services (SNA/MS), a high priority event that warrants immediate attention.

alert focal point. The system in a network that receives and processes (logs, displays, and optionally forwards) alerts. An alert focal point is a subset of a problem management focal point.

allocate. (1) An LU 6.2 application programming interface (API) verb used to assign a session to a conversation for the conversation's use. (2) Contrast with *deallocate*.

all points addressable (APA). In computer graphics, pertaining to the ability to address and display or not display each picture element (pel) on a display surface.

Already-Verified indicator. An indication in the Attach function management header that a conversation request on a session between two logical units is being sent with a user ID, but without a password, because the ID-password confirmation has already been verified.

ALS. Adjacent link station.

alternate application. The subsystem that is prepared to take over a particular active application's extended recovery facility (XRF) sessions with terminal users in case the application fails. See *active application*.

AND operation. Synonym for *conjunction*.

ANR. Automatic network routing.

any-mode. In VTAM, the following:

The form of a RECEIVE request that obtains input from any one (unspecified) session

The form of an ACCEPT request that completes the establishment of a session by accepting any one (unspecified) queued CINIT request.

Contrast with *specific-mode*. See *continue-any mode*.

AP. Alternate printer.

APA. All points addressable.

API. Application programming interface.

APPC. Advanced program-to-program communication.

APPL. Application program.

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

application program. (1) A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

application programming interface (API). (1) (2) A defined programming language interface between an IBM system control program or an IBM-licensed program and the program user. The set of programming language constructs or statements that can be coded in an application program to obtain the specific functions and services provided by an underlying operating system or service program. (3) In VTAM, the language structure used in control blocks so that application programs can reference them and be identified to VTAM.

application transaction program. A program written for or by a user to process the user's application; in an SNA network, a user of a type 6.2 logical unit. Contrast with *service transaction program*.

Apply. A push button that carries out the selected choices in a window without closing the window.

APPN. Advanced Peer-to-Peer Networking.

APPN end node. See *Advanced Peer-to-Peer Networking (APPN) end node*.

APPN network. See *Advanced Peer-to-Peer Networking (APPN) network*.

APPN network node. See *Advanced Peer-to-Peer Networking (APPN) network node*.

APPN node. See *Advanced Peer-to-Peer Networking (APPN) node*.

argument. A parameter passed between a calling program and a called program.

ASCII (American National Standard Code for Information Interchange). The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), that is used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters. (A)

asynchronous (ASYNC). (1) Pertaining to two or more processes that do not depend upon the occurrence of specific events such as common timing signals. (T) (2) Without regular time relationship; unexpected or unpredictable with respect to the execution of program instructions.

asynchronous operation. Simultaneous operations of software or hardware. In software, an operation, such as a request for session establishment or data transfer, in which the application program is allowed to continue execution while the operation is performed. The access method informs the application program after the operation is completed. Contrast with *synchronous operation*.

asynchronous request. In VTAM, a request for an asynchronous operation. Contrast with *synchronous request*.

asynchronous transfer mode (ATM). A transfer mode in which the information is organized into cells; it is asynchronous in the sense that the recurrence of cells containing information from an individual user is not necessarily periodic.

ATM. Asynchronous transfer mode.

attach. (1) In programming, to create a task that can be executed asynchronously with the execution of the mainline code. (2) To connect a device logically to a ring network.

attachment. A communication link used by Personal Communications or Communications Server to connect a personal computer to a host system, consisting of an adapter and controlling software.

automatic network routing (ANR). In High-Performance Routing (HPR), a highly efficient routing protocol that minimizes cycles and storage requirements for routing network layer packets through intermediate nodes on the route.

autotask. (1) An unattended NetView operator station task that does not require a terminal or a logged-on user. Autotasks can run independently of VTAM and are typically used for automated console operations. (2) Contrast with *logged-on operator*.

available. In VTAM, pertaining to a logical unit that is active, connected, enabled, and not at its session limit.

available time. From the point of view of a user, the time during which a functional unit can be used. (I) (A)

B

back-level. Pertaining to an earlier release of an IBM product, which may not support a particular, current function.

backup focal point. A focal point that provides management services support for a particular category for a node in the event of a communications failure with the primary focal point. Both assigned focal points (explicit and implicit) and default focal points can have backup counterparts. Contrast with *primary focal point*.

basic conversation. An LU 6.2 conversation type specified by the allocating transaction program. Transaction programs using basic conversation have available to them a wider variety of LU 6.2 functions, but they are responsible for more of their own error recovery and must manage details of the data stream used on the conversation. Contrast with *mapped conversation*.

basic transmission unit (BTU). (1) In SNA, the unit of data and control information passed between path control components. A BTU can consist of one or more path information units (PIUs). (2) See also *blocking of PIUs*.

bid. In the contention form of invitation or selection, an attempt by the computer or by a station to gain control of a line in order to transmit data.

bidder. See *bidder session*.

bidder session. The half-session defined at session activation as having to request and receive permission from the other half-session to begin a bracket. Contrast with *first-speaker session*. Synonym for *contention-loser session*.

binary. Pertaining to the base two system of numbers. The binary digits are 0 and 1. Executable files are generally in binary format rather than the character string format that text files are composed of.

BIND. In SNA, a request to activate a session between two logical units (LUs). See also *session activation request*. Contrast with *UNBIND*.

BIND pacing. A technique by which the address space manager (ASM) at one node controls the rate of transmission of BIND requests of a sending ASM at another node. BIND pacing can be used to prevent BIND standoff, in which each of two nodes has reserved most of its resources for sessions it is attempting to initiate through the other and thus rejects any BINDs received from the other.

bis. German (Federal Republic) preliminary standard.

bit. Either of the digits 0 or 1 when used in the binary numeration system. (T)

BIU segment. In SNA, the portion of a basic information unit (BIU) that is contained within a path information unit (PIU). It consists of either (a) a request/response header (RH) followed by all or a part of a request/response unit (RU) or (b) a part of an RU. Synonymous with *segment*.

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

blocking of PIUs. In SNA, an optional function of path control that combines multiple path information units (PIUs) in a single basic transmission unit (BTU).

Note: When blocking is not done, a BTU consists of one PIU.

boundary function (BF). (1) In SNA, a capability of a subarea node to provide protocol support for attached peripheral nodes, such as: (a) interconnecting subarea path control and peripheral path control elements, (b) performing session sequence numbering for low-function peripheral nodes, and (c) providing session-level pacing support. (2) In SNA, the component that provides these capabilities.

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

broadcast. (1) Transmission of the same data to all destinations. (T) (2) Simultaneous transmission of data to more than one destination. (3) Contrast with *multicast*.

broadcast Locate search. Synonym for *broadcast search*.

broadcast search. The simultaneous propagation of a search request to all network nodes in an APPN network. This type of search may be used when the location of a resource is unknown to the requester. Contrast with *directed search*. Synonymous with *broadcast Locate search*.

BTU. Basic transmission unit.

buffer. (1) A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another. (A) (2) A portion of storage used to hold input or output data temporarily.

bus. (1) A facility for transferring data between several devices located between two end points, only one device being able to transmit at a given moment. (T) (2) A computer configuration in which processors are interconnected in series.

bypass. To eliminate a station or an access unit from a ring network by allowing the data to flow in a path around it.

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

C

cache. (1) A special-purpose buffer storage, smaller and faster than main storage, used to hold a copy of instructions and data obtained from main storage and likely to be needed next by the processor. (T) (2) A buffer storage that contains frequently accessed instructions and data; it is used to reduce access time. (3) An optional part of the directory database in network nodes where frequently used directory information may be stored to speed directory searches. (4) To place, hide, or store in a cache.

call. (1) The action of bringing a computer program, a routine, or a subroutine into effect, usually by specifying the entry conditions and jumping to an entry point. (I) (A) (2) In data communication, the actions necessary to make a connection between two stations on a switched line. (3) In communications, a conversation between two users. (4) To transfer control to a procedure, program, routine, or subroutine. (5) To attempt to contact a user, regardless of whether the attempt is successful.

calling. (1) The process of transmitting selection signals in order to establish a connection between data stations. (I) (A) (2) In X.25 communications, pertaining to the location or user that makes a call.

Cancel. A push button that removes a window without applying any changes made in that window.

card. (1) An electronic circuit board that is plugged into a slot in a system unit. (2) A plug-in circuit assembly. (3) See also *adapter*. (4) In NetView for AIX, see *event card*.

case-sensitive. Pertaining to the ability to distinguish between uppercase and lowercase letters.

CDS. (1) Control data set. (2) Configuration data set. (3) Central directory server.

central directory. A repository for storing resource location information centrally registered by network nodes or cached as the result of network searches.

central directory server (CDS). A network node that provides a repository for information on network resource locations; it also reduces the number of network searches by providing a focal point for queries and broadcast searches and by caching the results of network searches to avoid later broadcasts for the same information.

chain. (1) A group of logically linked user data records processed by LU 6.2. (2) A group of request units delimited by begin-chain and end-chain. Responses are always single-unit chains. See *RU chain*.

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

channel-attached. (1) Pertaining to the attachment of devices directly by input/output channels to a host processor. (2) Pertaining to devices attached to a controlling unit by cables, rather than by telecommunication lines. (3) Contrast with *link-attached*. (4) Synonymous with *local*.

character set. A finite group of characters defined for a keyboard or output device.

child. Pertaining to a secured resource, either a file or library, that uses the user list of a parent resource. A child resource can have only one parent resource. A child is a process, started by a parent process, that shares the resources of the parent process. Contrast with *parent*.

CICS. Customer Information Control System.

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

C language. A language used to develop software applications in compact, efficient code that can be run on different types of computers with minimal change.

class. (1) In object-oriented design or programming, a group of objects that share a common definition and that therefore share common properties, operations, and behavior. Members of the group are called instances of the class. (2) In the AIX operating system, pertaining to the I/O characteristics of a device. System devices are classified as block or character devices.

class of service (COS). A set of characteristics (such as route security, transmission priority, and bandwidth) used to construct a route between session partners. The class of service is derived from a mode name specified by the initiator of a session.

cleanup. In SNA products, a network services request, sent by a system services control point (SSCP) to a logical unit (LU), that causes a particular LU-LU session with that LU to be ended immediately without requiring the participation of either the other LU or its SSCP.

client. (1) A functional unit that receives shared services from a server. (T) (2) A user. (3) In an AIX distributed file system environment, a system that is dependent on a server to provide it with programs or access to programs. (4) Synonymous with *requester*.

client/server. In communications, the model of interaction in distributed data processing in which a program at one site sends a request to a program at another site and awaits a response. The requesting program is called a client; the answering program is called a server.

CNOS. Change number of sessions.

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

command prompt. A displayed character or string of characters that indicates that a user may enter a command to be processed.

common operations services (COS). The portion of SNA management services that pertains to the major vectors for limited remote operations control.

Common Programming Interface for Communications (CPI-C). An evolving application programming interface (API), embracing functions to meet the growing demands from different application environments and to achieve openness as an industry standard for communications programming. CPI-C provides access to interprogram services such as (a) sending and receiving data, (b) synchronizing processing between programs, and (c) notifying a partner of errors in the communication.

Common User Access (CUA) architecture. Guidelines for the dialog between a human and a workstation or terminal.

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

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

Communications Manager/2. See *Communications Server* and *Personal Communications and Communications Server product family*. The function of the Communications Manager/2 product has been incorporated into the Personal Communications and Communications Server product family.

Communications Server. An IBM licensed program that supports the development and use of application programs involving two or more connected systems or workstations. The Communications Server provides multiple concurrent connectivities using different protocols to connect the application programs to other systems and workstations. It supports several application programming interfaces (APIs) that may be called concurrently and are designed for client/server and distributed application programs. The Communications Server includes the necessary interfaces for network management.

compile. (1) To translate all or part of a program expressed in a high-level language into a computer program expressed in an intermediate language, an assembly language, or a machine language. (T) (2) To prepare a machine language program from a computer program written in another programming language by making use of the overall logic structure of the program, or generating more than one computer instruction for each symbolic statement, or both, as well as performing the function of an assembler. (A) (3) To translate a source program into an executable program (an object program). (4) To translate a program written in a high-level programming language into a machine language program.

component. Hardware or software that is part of a functional unit.

computer. A functional unit that can perform substantial computations, including numerous arithmetic operations and logic operations without human intervention during a run. In information processing, the term computer usually describes a digital computer. A computer may consist of a stand-alone unit or may consist of several interconnected units. (T)

configuration. (1) The manner in which the hardware and software of an information processing system are organized and interconnected. (T) (2) The devices and programs that make up a system, subsystem, or network. (3) In Personal Communications or Communications Server , the arrangement of personal computers connected to one or more host systems by one or more attachment types. Examples are: SDLC, LAN, ASYNCH, X.25, or DFT.

configure. To describe to a system the devices, optional features, and programs installed on the system.

congestion. See *network congestion*.

conjunction. The Boolean operation whose result has the Boolean value 1 if and only if each operand has the Boolean value 1. (I) (A) Synonymous with *AND operation*.

connected. In VTAM, the state of a physical unit (PU) or a logical unit (LU) that has an active physical path to the host processor containing the system services control point (SSCP) that controls the respective PU or LU.

connection. (1) In data communication, an association established between functional units for conveying information. (I) (A) (2) In SNA, the network path that links together two logical units (LUs) in different nodes to enable them to establish communications. (3) In TCP/IP, the path between two protocol applications that provides reliable data stream delivery service. In the Internet, a connection extends from a TCP application on one system to a TCP application on another system.

connection network. (1) A representation within an APPN network of a shared-access transport facility (SATF), such as a token ring, that allows nodes identifying their connectivity to the SATF by a common virtual routing node to communicate without having individually defined connections to one another. (2) Synonymous with *link connection network*.

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

contention. In a session, a situation in which both NAUs attempt to initiate the same action at the same time, such as when both attempt to send data in a half-duplex protocol (half-duplex contention), or both attempt to start a bracket (bracket contention). At session initiation, one NAU is defined to be the contention winner; its action will take precedence when contention occurs. The contention loser must get explicit or implicit permission from the contention winner to begin its action.

contention-loser session. (1) To an NAU, a session for which it was defined during session initiation to be the contention loser. (2) Synonymous with *bidder session*.

contention polarity. The role of each LU when contention occurs for use of a session. One LU is the contention winner and the other LU is the contention loser.

contention-winner session. (1) To an NAU, a session for which it was defined during session initiation to be the contention winner. (2) Synonymous with *first-speaker session*.

continue-any mode. In VTAM, the state of a session or conversation that allows its input to satisfy a RECEIVE request issued in any-mode. While this state exists, input on the session or conversation can also satisfy RECEIVE requests issued in specific-mode. For conversations, continue-any mode is further qualified as either buffer continue-any or logical record continue-any. This specifies whether VTAM is to receive the data in terms of logical records or buffers. Contrast with *continue-specific mode*.

continue-specific mode. In VTAM, the state of a session or conversation that allows its input to satisfy only RECEIVE requests issued in specific-mode. Contrast with *continue-any mode*.

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

control data set (CDS). In NPM, an SMP data set used in the NPM installation process.

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

control point (CP). (1) A component of an APPN or LEN node that manages the resources of that node. In an APPN node, the CP is capable of engaging in CP-CP sessions with other APPN nodes. In an APPN network node, the CP also provides services to adjacent end nodes in the APPN network. (2) A component of a node that manages resources of that node and optionally provides services to other nodes in the network. Examples are a system services control point (SSCP) in a type 5 subarea node, a network node control point (NNCP) in an APPN network node, and an end node control point (ENCP) in an APPN or LEN end node. An SSCP and an NNCP can provide services to other nodes.

control point management services unit (CP-MSU). The message unit that contains management services data and flows between management services function sets. This message unit is in general data stream (GDS) format. See also *management services unit (MSU)* and *network management vector transport (NMVT)*.

Control Program (CP). In VM/ESA, a component that manages the resources of a single computer so multiple computing systems appear to exist. Each of these apparent systems, or virtual machines, is the functional equivalent of an IBM System/370, 370-XA, or ESA computer.

control vector. One of a general class of RU substructures that has variable length, is carried within some enclosing structure, and has a one-byte key used as an identifier.

conversation. A logical connection between two transaction programs using an LU 6.2 session. Conversations are delimited by brackets to gain exclusive use of a session.

conversation-level security. See *session-level security*. See also *end-user verification*.

coordinated universal time (UTC). The time scale, based on the Système International (SI) second, as defined and recommended by the Comité Consultatif International de la Radio (CCIR) and maintained (using an atomic clock) by the Bureau International des Poids et Mesures (BIPM).

Note: The Système International is based on three fundamental units of measure—the meter, the kilogram, and the second—and is sometimes called the “MKS system” because of these units.

For most practical purposes, coordinated universal time (UTC) is equivalent to the mean solar time at the prime meridian (0 degrees longitude) of Greenwich, England, known as *Greenwich mean time (GMT)*. Synonymous with *Z time* and *Zulu time*.

Copy. A choice that places a copy of a selected object onto the clipboard.

correlator. Information that identifies a relation among things. An example is a variable field of a response that identifies the corresponding request.

COS. Class of service.

CP. (1) Control point. (2) In VM, Control Program.

CP-CP sessions. The parallel sessions between two control points, using LU 6.2 protocols and a mode name of CPSVCMG, on which network services requests and replies are exchanged. Each CP of a given pair has one

contention-winner session and one contention-loser session with the other.

CPI-C. Common Programming Interface for Communications.

CP-MSU. Control point management services unit.

CP name. A network-qualified name of a control point (CP), consisting of a network ID qualifier identifying the network (or name space) to which the CP's node belongs, and a unique name within the scope of that network ID identifying the CP. Each APPN or LEN node has one CP name, assigned to it at system-definition time.

cross-domain. In SNA, pertaining to control or resources involving more than one domain.

CUA. Common User Access.

Customer Information Control System (CICS). An IBM licensed program that enables transactions entered at remote terminals to be processed concurrently by user-written application programs. It includes facilities for building, using, and maintaining databases.

D

DACTLU. Deactivate logical unit.

DACTPU. Deactivate physical unit.

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

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

database. (1) A collection of data with a given structure for accepting, storing, and providing, on demand, data for multiple users. (T) (2) A collection of interrelated data organized according to a database schema to serve one or more applications. (T) (3) A collection of data fundamental to a system. (A) (4) A collection of data fundamental to an enterprise. (A)

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

Notes:

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

data flow control (DFC). In SNA, a request/response unit (RU) category used for requests and responses exchanged between the data flow control layer in one half-session and the data flow control layer in the session partner.

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

data host node. In a communication management configuration, a type 5 host node that is dedicated to processing applications and does not control network resources, except for its channel-attached or communication adapter-attached devices. Synonymous with *data host*. Contrast with *communication management configuration host node*.

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

data link control (DLC). A set of rules used by nodes on a data link (such as an SDLC link or a token ring) to accomplish an orderly exchange of information.

data link control (DLC) layer. In SNA, the layer that consists of the link stations that schedule data transfer over a link between two nodes and perform error control for the link. Examples of data link control are SDLC for serial-by-bit link connection and data link control for the System/370 channel.

Note: The DLC layer is usually independent of the physical transport mechanism and ensures the integrity of data that reaches the higher layers.

data link level. (1) In the hierarchical structure of a data station, the conceptual level of control or processing logic between high level logic and the data link that maintains control of the data link. The data link level performs such functions as inserting transmit bits and deleting receive bits; interpreting address and control fields; generating, transmitting, and interpreting commands and responses; and computing and interpreting frame check sequences. See also *packet level* and *physical level*. (2) In X.25 communications, synonym for *frame level*.

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

data types. In the NetView program, a description of the organization of panels. Data types are alerts, events, and statistics. Data types are combined with resource types and display types to describe the NetView program's display organization. See also *display types* and *resource types*.

DBCS. Double-byte character set.

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

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

default. Pertaining to an attribute, condition, value, or option that is assumed when none is explicitly specified. (I)

definite response (DR). In SNA, a protocol requested in the form-of-response-requested field of the request header that directs the receiver of the request to return a response unconditionally, whether positive or negative, to that request chain. Contrast with *exception response* and *no response*.

definition statement. (1) In VTAM, the statement that describes an element of the network. (2) In NCP, a type of instruction that defines a resource to the NCP. (3) See also *macroinstruction*. (4) See Figure 1, Figure 2, and Figure 3.

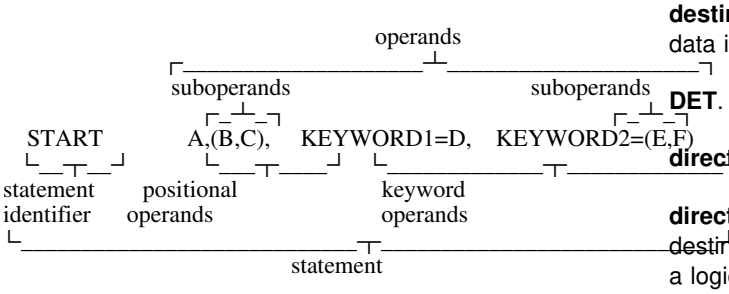

Figure 1. Example of a Language Statement

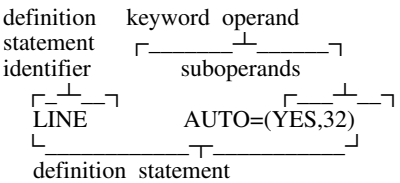

Figure 2. Example of an NCP Definition Statement

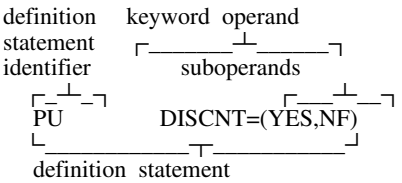

Figure 3. Example of a VTAM Definition Statement

DEL. The delete character. (A)

Delete. A choice that removes a selected object. The space it occupied is usually filled by the remaining object or objects in the window.

dependent LU. See *SSCP-dependent LU*.

dependent LU requester (DLUR). An APPN end node or an APPN network node that owns dependent LUs, but requests that a dependent LU server provide the SSCP services for those dependent LUs.

dependent LU server (DLUS). An APPN network node that provides SSCP services for a dependent LU in its own or another APPN network. Contrast with *dependent LU requester*.

destination. (1) Any point or location, such as a node, station, or a particular terminal, to which information is to be sent. (2) An external logical unit (LU) or application program to which messages or other data are directed.

destination address. A code that identifies the location to which information is to be sent.

destination node. The node to which a request or data is sent.

DET. Device entry table.

directed Locate search. Synonym for *directed search*.

directed search. A search request sent to a specific destination node known to contain a resource, such as a logical unit, to verify the continued presence of the resource at the destination node and to obtain the node's connectivity information for route calculation. Contrast with *broadcast search*. Synonymous with *directed Locate search*.

directory. (1) A table of identifiers and references to the corresponding items of data. (I) (A) (2) A named hierarchical grouping of files in a file system. (3) A database in an APPN node that lists names of resources (in particular, logical units) and records the CP name of the node where each resource is located. See *distributed directory database* and *local directory database*.

directory services (DS). A control point component of an APPN node that maintains knowledge of the location of network resources.

direct routing. In Internet communications, the transmission of an Internet Protocol (IP) datagram when the destination and the source reside on the same IP network or IP subnet.

disable. To make nonfunctional.

disabled. Pertaining to a state of a processing unit that prevents the occurrence of certain types of interruptions.

discovery. In data communication, the automatic detection of network topology changes (for example, new and deleted nodes or new and deleted interfaces).

display. A visual presentation of data. (I) (A)

display levels. Synonym for *display types*.

display types. In the NetView program, a concept to describe the organization of panels. Display types are defined as total, most recent, user action, and detail. Display types are combined with resource types and data types to describe NetView's panel organization. See also *data types* and *resource types*. Synonymous with *display levels*.

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

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

DLC. Data link control.

DLL. Dynamic link library.

DLUR. Dependent LU requester.

DLUS. Dependent LU server.

domain. (1) That part of a computer network in which the data processing resources are under common control. (T) (2) A set of servers that allocate shared network resources within a single logical system. (3) In SNA, see *end node domain*, *network node domain*, and *system services control point (SSCP) domain*. (4) In Open Systems Interconnection (OSI), a part of a distributed system or a set of managed objects to which a common policy applies. (5) See *Administrative Domain* and *domain name*.

domain name. In the Internet suite of protocols, a name of a host system. A domain name consists of a sequence of subnames separated by a delimiter character. For example, if the fully qualified domain name (FQDN) of a host system is ralvm7.vnet.ibm.com, each of the following is a domain name:

ralvm7.vnet.ibm.com

vnet.ibm.com

ibm.com

domain operator. In a multiple-domain network, the person or program that controls operation of resources controlled by one system services control point (SSCP). See also *network operator*.

DOS session. A session in which a personal computer operates as a stand-alone computer, running under Disk Operating System (DOS). See *host session*.

double-byte character set (DBCS). A set of characters in which each character is represented by 2 bytes. Languages such as Japanese, Chinese, and Korean, which contain more symbols than can be represented by 256 code points, require double-byte character sets. Because each character requires 2 bytes, the typing, display, and printing of DBCS characters requires hardware and programs that support DBCS. Contrast with *single-byte character set (SBCS)*.

downstream. In the direction of data flow from the host to the user. Contrast with *upstream*.

drain. To honor pending allocation requests before deactivating sessions with a partner logical unit. This applies to LU 6.2 only.

DS. Directory services.

duplex. Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full-duplex*. Contrast with *half-duplex*.

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

dynamic link library (DLL). A file containing executable code and data bound to a program at load time or run time, rather than during linking. The code and data in a dynamic link library can be shared by several applications simultaneously.

E

EBCDIC. Extended binary-coded decimal interchange code. A coded character set of 256 8-bit characters.

echo. (1) In computer graphics, the immediate notification of the current values provided by an input device to the operator at the display console. (I) (A) (2) In word processing, to print or display each character or line as it is keyed in. (3) In data communication, a reflected signal on a communications channel. For example, on a communications terminal, each signal is displayed twice, once when entered at the local terminal and again when returned over the communications link. This allows the signals to be checked for accuracy.

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

emulator. A program that allows a device to operate as if it were a different type of device. Personal Communications or Communications Server , for example, allows supported personal computers and printers to operate as if they were 3270-series workstations.

EN. End node.

enabled. (1) Pertaining to a state of the processing unit that allows the occurrence of certain types of interruptions. (2) Pertaining to the state in which a transmission control unit or an audio response unit can accept incoming calls on a line.

ENCP. End-node control point.

encryption. In computer security, the process of transforming data into an unintelligible form in such a way that the original data either cannot be obtained or can be obtained only by using a decryption process.

end node (EN). (1) See *Advanced Peer-to-Peer Networking (APPN) end node* and *low-entry networking (LEN) end node*. (2) In communications, a node that is frequently attached to a single data link and cannot perform intermediate routing functions.

end node domain. An end node control point, its attached links, and its local LUs.

end-user verification. For logical unit (LU) 6.2, checking the identification of users by means of identifiers and passwords on attach function-management headers (FMHs). See *partner-LU verification*. See also *conversation-level security*.

entry point (EP). (1) The address or label of the first instruction executed on entering a computer program, routine, or subroutine. A computer program, routine, or subroutine may have a number of different entry points, each perhaps corresponding to a different function or purpose. (I) (A) (2) In SNA, a type 2.0, type 2.1, type 4, or type 5 node that provides distributed network management support. It sends network management data about itself and the resources it controls to a focal point for centralized processing, and it receives and executes focal-point initiated commands to manage and control its resources.

EP. Entry point.

ER. Explicit route.

ERP. Error recovery procedures.

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

error recovery procedures (ERP). (1) Procedures designed to help isolate and, where possible, to recover from errors in equipment. The procedures are often used in conjunction with programs that record information on machine malfunctions. (2) A set of routines that attempt to recover from transmission errors.

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

event. An occurrence of significance to a task; for example, an SNMP trap, the opening of a window or a submap, or the completion of an asynchronous operation.

event card. In NetView for AIX, a graphical representation, resembling a card, of the information contained in an event sent by an agent to a manager reflecting a change in the status of one of the agent's managed nodes.

exception. An abnormal condition such as an I/O error encountered in processing a data set or a file.

exception response (ER). In SNA, a protocol requested in the form-of-response-requested field of a request header that directs the receiver to return a response only if the request is unacceptable as received or cannot be processed; that is, a negative response, but not a positive response, can be returned. Contrast with *definite response* and *no response*.

exchange identification (XID). A specific type of basic link unit that is used to convey node and link characteristics between adjacent nodes. XIDs are exchanged between link stations before and during link activation to establish and negotiate link and node characteristics, and after link activation to communicate changes in these characteristics.

execute. To perform the actions specified by a program or a portion of a program. (T)

expedited flow. In SNA, a data flow designated in the transmission header (TH) that is used to carry network control, session control, and various data flow control request/response units (RUs); the expedited flow is separate from the normal flow (which carries primarily end-user data) and can be used for commands that affect the normal flow. Contrast with *normal flow*.

Note: The normal and expedited flows move in both the primary-to-secondary and secondary-to-primary directions. Requests and responses on a given flow, whether normal or expedited, usually are processed sequentially within the path, but the expedited flow traffic may be moved ahead of the normal-flow traffic within the path at queuing points in the half-sessions and for half-session support in boundary functions.

explicit focal point. An assigned focal point for which the set of nodes to be included in its sphere of control is defined locally. An explicit focal point initiates the management services capabilities exchange that brings a node into its sphere of control. Contrast with *implicit focal point*.

explicit route (ER). In SNA, a series of one or more transmission groups that connect two subarea nodes. An explicit route is identified by an origin subarea address, a destination subarea address, an explicit route number, and a reverse explicit route number. Contrast with *virtual route (VR)*.

extended binary-coded decimal interchange code (EBCDIC). The standard code, using a character set consisting of 8-bit coded characters, used by Personal Communications or Communications Server for information interchange between personal computers and a host system. See also *American National Standard Code for Information Interchange*.

E1. See *T1*.

F

fault. An accidental condition that causes a functional unit to fail to perform its required function. (I) (A)

field. (1) An area in a record or panel used to contain data. (2) In the IBM 3270 data stream, a group of consecutive positions on a presentation space having similar characteristics that are defined by a field attribute byte at the beginning of the field. (3) An identifiable area in a window. Examples of fields are: an entry field, into which a user can type or place text, and a field of radio button choices, from which a user can select one choice.

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

filter. A device or program that separates data, signals, or material in accordance with specified criteria. (A)

first speaker. See *first-speaker session*.

first-speaker session. The half-session defined at session activation as (a) able to begin a bracket without requesting permission from the other half-session to do so and (b) winning contention if both half-sessions attempt to begin a bracket simultaneously. Synonym for *contention-winner session*. Contrast with *bidder session*.

fixed pacing. Synonym for *fixed session-level pacing*.

fixed session-level pacing. A form of session-level pacing in which the data transfer rate is controlled using fixed pacing-window sizes, which are initialized at session-activation time. Synonymous with *fixed pacing*. Contrast with *adaptive session-level pacing*.

flag. (1) To mark an information item for selection for further processing. (T) (2) A character that signals the occurrence of some condition, such as the end of a word. (A) (3) A character or bit sequence that marks an occurrence or boundary, such as the end of a word or the beginning or end of a data transmission block.

flow. In NetDA/2, the amount of traffic that can pass through a node, connection, or route in both directions during a given period of time.

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

FMD. Function management data.

FNA. Free network address.

focal point (FP). See *management services focal point (MSFP)*.

foreign host. Synonym for *remote host*.

FP. Focal point.

FQDN. Fully qualified domain name.

FQPCID. Fully qualified procedure correlator identifier.

frame. (1) In Open Systems Interconnection architecture, a data structure pertaining to a particular area of knowledge and consisting of slots that can accept the values of specific attributes and from which inferences can be drawn by appropriate procedural attachments. (T) (2) The unit of transmission in some local area networks, including the IBM Token-Ring Network. It includes delimiters, control characters, information, and checking characters. (3) In SDLC, the vehicle for every command, every response, and all information that is transmitted using SDLC procedures. (4) A data structure (data frame) composed of fields meeting the field specifications of a type of communication protocol. Frames are used to control data transfer across a data link. (5) In SDLC, a sequence of bits delimited by an opening and closing flag. In X.25 packet switching data networks, frames are composed of 8-bit byte sequences delimited by beginning and ending flags; the frames in X.25 control various functions, data transfer, and transmission checking.

frame level. Synonymous with *data link level*.

full-duplex (FDX). Synonym for *duplex*.

fully qualified domain name (FQDN). In the Internet suite of protocols, the name of a host system that includes all of the subnames of the domain name. An example of a fully qualified domain name is ralvm7.vnet.ibm.com. See also *host name*.

fully qualified name. (1) In SNA, synonym for *network-qualified name*. (2) In the Internet suite of protocols, see *fully qualified domain name (FQDN)*..

fully qualified procedure correlator identifier (FQPCID). A network-unique identifier that is used for the following:

Correlating messages sent between nodes, such as correlating a Locate search request with its replies
Identifying a session for problem determination and resolution
Identifying a session for accounting, auditing, and performance monitoring purposes

This identifier is normally assigned at the node that contains the LU for which a procedure or session is initiated, except when that node is an end node, in which case its network node server may assign it. The FQPCID consists of a fixed-length correlator concatenated with the network-qualified name of the control point that generated the correlator.

function call. An expression that moves the path of execution from the current function to a specified function and evaluates to the return value provided by the called function. A function call contains the name of the function to which control moves and a parenthesized list of values.

function management data (FMD). An RU category used for end-user data exchanged between logical units (LUs) and for requests and responses exchanged between network services components of LUs, PUs, and control points.

G

GDS. General data stream.

general data stream (GDS). The data stream used for conversations in LU 6.2 sessions.

general data stream (GDS) variable. A type of RU substructure that is preceded by an identifier and a length field and includes either application data, user control data, or SNA-defined control data.

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

generic unbind. Synonym for *session deactivation request*.

GMT. Greenwich mean time.

Greenwich mean time (GMT). The mean solar time at the prime meridian (0 degrees longitude) of Greenwich, England. Greenwich mean time is sometimes called *Z time* or *Zulu time*.

Note: Although *Greenwich mean time (GMT)* and *coordinated universal time (UTC)* are sometimes used interchangeably, they are not synonyms. Greenwich mean time is an approximate time. Because the second is no longer defined in terms of astronomical phenomena, the preferred name for this time scale is *coordinated universal time (UTC)*.

group ID (GID). (1) In RACF, a string of one to eight characters that identifies a group. The first character must be A through Z, #, $, or @. The rest can be A through Z, #, $, @, or 0 through 9. (2) In the AIX operating system, a number that corresponds to a specific group name. The group ID can often be

substituted in commands that take a group name as a value.

H

half-duplex (HD, HDX). In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*.

handle. In the Advanced DOS and OS/2 operating systems, a binary value created by the system that identifies a drive, directory, and file so that the file can be found and opened.

header. (1) System-defined control information that precedes user data. (2) The portion of a message that contains control information for the message such as one or more destination fields, name of the originating station, input sequence number, character string indicating the type of message, and priority level for the message.

header file. Synonym for *include file*.

Help. A choice that gives a user access to helpful information about objects, choices, tasks, and products. A Help choice can appear on a menu bar or as a push button.

hexadecimal. (1) Pertaining to a selection, choice, or condition that has 16 possible different values or states. (I) (2) Pertaining to a fixed-radix numeration system, with radix of 16. (I) (3) Pertaining to a system of numbers to the base 16; hexadecimal digits range from 0 through 9 and A through F, where A represents 10 and F represents 15.

high-level language (HLL). A programming language that does not reflect the structure of any particular computer or operating system.

highlighting. Emphasizing a display element or segment by modifying its visual attributes. (I) (A)

High-Performance Routing (HPR). An addition to APPN that enhances data-routing performance and session reliability.

High-Performance Routing (HPR) node. An APPN end node or network node that includes High-Performance Routing support.

hop. (1) In APPN, a portion of a route that has no intermediate nodes. It consists of only a single transmission group connecting adjacent nodes. (2) To the routing layer, the logical distance between two nodes in a network.

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

host ID. In the Internet suite of protocols, that part of the IP address that defines the host system on the network. The length of the host ID depends on the type of network or network class (A, B, or C).

host name. In the Internet suite of protocols, the name given to a machine. Sometimes, “host name” is used to mean *fully qualified domain name (FQDN)*; other times, it is used to mean the most specific subname of a fully qualified domain name. For example, if ralvm7.vnet.ibm.com is the fully qualified domain name, either o f the following may be considered the host name:

ralvm7.vnet.ibm.com

ralvm7

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

host session. A logical connection that enables a personal computer to communicate with a host system. A session can be identified by LU address, LT number, or session ID. See *DOS session*. See also *logical terminal*.

host system. In Personal Communications or Communications Server , the computer linked to one or more personal computers by the SDLC, LAN, ASYNCH, X.25, or DFT attachment.

HPR. High-Performance Routing.

I

ICP. Internet Control Protocol.

ID. (1) Identifier. (2) Identification.

implicit focal point. An assigned focal point for which the nodes to be included in its sphere of control (SOC) are defined at the SOC nodes. The management services capabilities exchange that brings a node into the sphere of control of an implicit focal point is initiated by the SOC node. Contrast with *explicit focal point*.

inactive. (1) Not operational. (2) Pertaining to a node or device not connected or not available for connection to another node or device. (3) Contrast with *active*.

inbound. In communications, data that is received from the network.

include file. A text file that contains declarations used by a group of functions, programs, or users. Synonymous with *header file*.

information (I) format. A format used for information transfer.

information (I) frame. A frame in I format used for numbered information transfer.

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

INITIATE. A network services request sent from a logical unit (LU) to a system services control point (SSCP) requesting that an LU-LU session be established.

installation. (1) InPersonal Communications or Communications Server , the process of loading microcode from the Personal Communications or Communications Server diskettes. (2) In system development, preparing and placing a functional unit in position for use. (T) (3) A particular computing system, including the work it does and the people who manage it, operate it, apply it to problems, service it, and use the results it produces.

instance. In the AIX operating system, a concrete realization of an abstract object class. An instance of a widget or a gadget is a specific data structure that contains detailed appearance and behavioral information that is used to generate a specific graphical object on-screen at run time.

INT. Internal trace table.

interactive. Pertaining to the exchange of information between a user and a computer.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, signal characteristics, or other characteristics, as appropriate. The concept includes the specification of the connection of two devices having different functions. (T) (2) Hardware, software, or both, that links systems, programs, or devices.

intermediate session routing (ISR). A type of routing function within an APPN network node that provides session-level flow control and outage reporting for all sessions that pass through the node but whose end points are elsewhere.

Internet Control Protocol (ICP). The VIrtual NEtworking System (VINES**) protocol that provides exception notifications, metric notifications, and PING support. See also *RouTing update Protocol (RTP)*.

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

IP. Internet Protocol.

IPL. Initial program load.

ISR. Intermediate session routing.

L

LAN. Local area network.

latency. The time interval between the instant at which an instruction control unit initiates a call for data and the instant at which the actual transfer of the data starts. (T)

LDT. Local descriptor table.

LEN. Low-entry networking.

LEN end node. See *low-entry networking (LEN) end node*.

LEN node. A node that supports independent LU protocols but does not support CP-CP sessions. It may be a peripheral node attached to a boundary node in a subarea network, an end node attached to an APPN network node in an APPN network, or a peer-connected node directly attached to another LEN node or APPN end node. See also *low-entry networking (LEN) end node*.

LFSID. Local-form session identifier.

limited resource. A connection facility that causes a session traversing it to be terminated if no session activity is detected for a specified period of time. See also *limited-resource session*.

limited-resource link. A link defined by the node operator to be a limited resource, that is, a resource to remain active only when being used. Limited-resource links are deactivated if no session activity has been detected for a specified period of time. See also *limited-resource session*.

limited-resource session. A session that traverses a limited-resource link. This session is terminated if no session activity is detected for a specified period of time.

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

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

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

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

link-attached. (1) Pertaining to devices that are connected to a controlling unit by a data link. (2) Contrast with *channel-attached*. (3) Synonymous with *remote*.

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

link connection network. Synonym for *connection network*.

link connection segment. A portion of the configuration that is located between two resources listed consecutively in the service point command service (SPCS) query link configuration request list.

link level. (1) A part of Recommendation X.25 that defines the link protocol used to get data into and out of the network across the full-duplex link connecting the subscriber's machine to the network node. LAP and LAPB are the link access protocols recommended by the CCITT. (2) See *data link level*.

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

link station. (1) The hardware and software components within a node representing a connection to an adjacent node over a specific link. For example, if node A is the primary end of a multipoint line that connects to three adjacent nodes, node A will have three link stations representing the connections to the adjacent nodes. (2) In VTAM, a named resource within an APPN or a subarea node that represents the connection to another APPN or subarea node that is attached by an APPN or a subarea link. In the resource hierarchy in a subarea network, the link station is subordinate to the subarea link. (3) See also *adjacent link station (ALS)*.

link station role. In SNA, the role that a local node assumes for a given link. Possible roles are primary (or controlling), secondary, or negotiable.

link status (LS). Information maintained by local and remote modems.

load. (1) To bring all or part of a computer program into memory from auxiliary storage so that the computer can run the program. (2) To place a diskette into a diskette drive.

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

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

local descriptor table (LDT). In the OS/2 operating system, a table that contains access information about the code and data segments for which a process has addressability.

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

local-form session identifier (LFSID). A dynamically assigned value used at a type 2.1 node to identify traffic for a particular session using a given transmission group (TG). The LFSID is encoded in the ODAI, OAF′, and DAF′ fields of the transmission headers that accompany session messages exchanged over the TG.

local LU. A logical unit not distributed over the LAN, but controlled by a gateway personal computer. This is normally a physical device such as a workstation, printer, or terminal.

local topology database. A database in an APPN or LEN node containing an entry for each transmission group (TG) having at least one end node for an endpoint. In an end node, the database has one entry

for each TG connecting to the node. In a network node, the database has an entry for each TG connecting the network node to an end node. Each entry describes the current characteristics of the TG that it represents. A network node has both a local and a network topology database while an end node has only a local topology database.

Locate. Synonym for *Locate/CD-Initiate*.

Locate/CD-Initiate. (1) An abbreviated term for a message exchanged between APPN nodes that contains one of the following sets of general data stream (GDS) variables:

A Locate, a Find Resource, and a Cross-Domain Initiate GDS variable used for a network search request
A Locate, a Found Resource, and a Cross-Domain Initiate GDS variable used for a search reply when a network resource has been located

These message structures correspond to the CP components that perform the search of the distributed network directory and establish the session. The Locate GDS variable contains information used to control the delivery of the search messages in the network. The Find and Found GDS variables contain information used in the directories: origin cache data (control point information) and search arguments (destination LU name), and located resource information, respectively. The Cross-Domain Initiate GDS variable contains endpoint TG vector information to be used in selecting the route for the session. The length of the Locate/CD-Initiate message is limited to 1024 bytes. (2) Synonymous with *Locate* and *Locate search message*.

Locate search message. Synonym for *Locate/CD-Initiate.*

logged-on operator. (1) A NetView operator station task that requires a terminal and a logged-on user. (2) Contrast with *autotask*.

logical terminal. (1) A destination with a name that is related to one or more physical terminals. (2) The definition of a specific 3270 or 5250 emulation session.

logical unit (LU). A type of network accessible unit that enables users to gain access to network resources and communicate with each other.

low-entry networking (LEN). A capability of nodes to attach directly to one another using basic peer-to-peer protocols to support multiple and parallel sessions between logical units.

low-entry networking (LEN) end node. A LEN node receiving network services from an adjacent APPN network node.

low-entry networking (LEN) node. A node that provides a range of end-user services, attaches directly to other nodes using peer protocols, and derives network services implicitly from an adjacent APPN network node, that is, without the direct use of CP-CP sessions.

LS. Link status.

LU. Logical unit.

LU-LU session. A logical connection between two logical units (LUs) in an SNA network that typically provides communication between two users.

LUS. Logical unit services.

LU type. The classification of an LU in terms of the specific subset of SNA protocols and options it supports for a given session, namely:

The mandatory and optional values allowed in the session activation request
The usage of data stream controls, function management headers (FMHs), request unit parameters, and sense data values
Presentation services protocols such as those associated with FMH usage

LU types 0, 1, 2, 3, 4, 6.1, 6.2, and 7 are defined.

LU 6.2. (1) A type of logical unit that supports general communication between programs in a distributed processing environment. LU 6.2 is characterized by (a) a peer relationship between session partners, (b) efficient utilization of a session for multiple transactions, (c) comprehensive end-to-end error processing, and (d) a generic application programming interface (API) consisting of structured verbs that are mapped into a product implementation. (2) A type of LU that supports sessions between two applications in a distributed data processing environment using the SNA general data stream, which is a structured-field data stream, or a user-defined data stream.

LU 6.2 verb. A syntactical unit in the LU 6.2 application programming interface representing an operation.

M

MAC. Medium access control.

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

produced from the macro definition replace the macroinstruction in the program. (3) See also *definition statement*.

maintenance analysis procedure (MAP). A maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of a failure.

MAN. Metropolitan area network.

Management Information Base (MIB). (1) A collection of objects that can be accessed by means of a network management protocol. (2) A definition for management information that specifies the information available from a host or gateway and the operations allowed. (3) In OSI, the conceptual repository of management information within an open system.

management services (MS). (1) One of the types of network services in control points (CPs) and physical units (PUs). Management services are the services provided to assist in the management of SNA networks, such as problem management, performance and accounting management, configuration management, and change management. (2) Services that assist in the management of systems and networks in areas such as problem management, performance management, business management, operations management, configuration management, and change management.

management services focal point (MSFP). For any given management services discipline (for example, problem determination or response time monitoring), the control point that is responsible for that type of network management data for a sphere of control. This responsibility may include collecting, storing, or displaying the data, or all of these. (For example, a problem determination focal point is a control point that collects, and that may store or display, problem determination data.)

management services unit (MSU). A generic term for major-vector encoded management services data, regardless of the method used to transport the data. Thus, the management services unit includes major vectors transported within the network management vector transport (NMVT), the control point management services unit (CP-MSU), or the multiple-domain support message unit (MDS-MU).

manager. (1) In systems management, a user that, for a particular interaction, has assumed a manager role. (2) An entity that monitors or controls one or more managed objects by (a) receiving notifications regarding the objects and (b) requesting management operations to modify or query the objects. (3) A system that assumes a manager role.

map. In NetView for AIX, a database represented by a set of related submaps that provide a graphical and hierarchical presentation of a network and its systems.

MAP. Maintenance analysis procedure.

mapped conversation. An LU 6.2 conversation type specified by the allocating transaction program. Transaction programs using a mapped conversation can exchange messages of arbitrary format regardless of the underlying data stream. System-defined or user-defined mappers can perform data transformation for the transaction programs. See also *conversation*. Contrast with *basic conversation*.

mapping. The process of converting data that is transmitted in one format by the sender into the data format that can be accepted by the receiver.

Maximize. A choice that enlarges a window to its largest possible size.

MB. Megabyte.

MDS. Multiple-domain support.

MDS-MU. Multiple-domain support message unit.

medium. (1) A physical carrier of electrical energy. (2) A physical material in or on which data may be represented.

medium access control (MAC). In LANs, the sublayer of the data link control layer that supports medium-dependent functions and uses the services of the physical layer to provide services to the logical link control (LLC) sublayer. The MAC sublayer includes the method of determining when a device has access to the transmission medium.

medium access control (MAC) protocol. In a local area network, the protocol that governs access to the transmission medium, taking into account the topological aspects of the network, in order to enable the exchange of data between data stations. (T)

medium access control (MAC) sublayer. In a local area network, the part of the data link layer that applies a medium access method. The MAC sublayer supports topology-dependent functions and uses the services of the physical layer to provide services to the logical link control sublayer. (T)

megabyte (MB). (1) For processor storage, real and virtual storage, and channel volume, 220 or 1 048 576 bytes. (2) For disk storage capacity and communications volume, 1 000 000 bytes.

memory. All of the addressable storage space in a processing unit and other internal storages that is used to execute instructions. (T)

menu. (1) A list of options displayed to the user by a data processing system, from which the user can select an action to be initiated. (T) (2) In text processing, a list of choices displayed to the user by a text processor from which the user can select an action to be initiated. (T) (3) A list of choices that can be applied to an object. A menu can contain choices that are not available for selection in certain contexts. Those choices are indicated by reduced contrast.

message. (1) An assembly of characters and sometimes control codes that is transferred as an entity from an originator to one or more recipients. A message consists of two parts: envelope and content. (T) (2) A communication sent from a person or program to another person or program.

message unit (MU). In SNA, the unit of data processed by any layer; for example, a basic information unit (BIU), a path information unit (PIU), or a request/response unit (RU).

metric. In Internet communications, a value, associated with a route, which is used to discriminate between multiple exit or entry points to the same autonomous system. The route with the lowest metric is preferred.

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

MIB. (1) MIB module. (2) Management Information Base.

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

mixed-media multilink transmission group (MMMLTG). See *transmission group (TG)*.

MLTG. Multilink transmission group.

MMMLTG. Mixed-media multilink transmission group.

mode. See *mode name*.

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

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

module. A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example, the input to or output from an assembler, compiler, linkage editor, or executive routine. (A)

MS. Management services.

MSFP. Management services focal point.

MSG. Console messages.

MSU. Management services unit.

MU. Message unit.

multicast. (1) Transmission of the same data to a selected group of destinations. (T) (2) A special form of broadcast in which copies of a packet are delivered to only a subset of all possible destinations. (3) Contrast with *broadcast*.

multilink transmission group (MLTG). See *transmission group (TG)*.

multiple-domain support (MDS). A technique for transporting management services data between management services function sets over LU-LU and CP-CP sessions. See also *multiple-domain support message unit (MDS-MU)*.

multiple-domain support message unit (MDS-MU). The message unit that contains management services data and flows between management services function sets over the LU-LU and CP-CP sessions used by multiple-domain support. This message unit, as well as the actual management services data that it contains, is in general data stream (GDS) format. See also *control point management services unit (CP-MSU)*, *management services unit (MSU)*, and *network management vector transport (NMVT)*.

Multiple Virtual Storage (MVS). See *MVS*.

MVS. Multiple Virtual Storage. Implies MVS/390, MVS/XA, and MVS/ESA.

N

native. In MPTN architecture, pertaining to the relationship between a transport user and a transport provider that are both based on the same transport protocol.

NAU. (1) Network accessible unit. (2) Network addressable unit.

NC. Network control.

negative response (NR). In SNA, a response indicating that a request did not arrive successfully or was not processed successfully by the receiver. Contrast with *positive response*.

negotiation. The process of deciding what packet size to transmit between a network and a 3710 Network Controller.

NETID. See *network identifier*.

NetView-NetView task (NNT). The task under which a cross-domain NetView operator session runs. See *operator station task*.

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

network accessible unit (NAU). A logical unit (LU), physical unit (PU), control point (CP), or system services control point (SSCP). It is the origin or the destination of information transmitted by the path control network. Synonymous with *network addressable unit*.

network address. (1) According to ISO 7498-3, a name, unambiguous within the OSI environment, that identifies a set of network service access points. (2) An address, consisting of subarea and element fields, that identifies a link, a link station, or a network addressable unit. Subarea nodes use network addresses; peripheral nodes use local addresses. (3) In SNA, an address consisting of subarea and element fields that identifies a link, gateway, or network addressable unit (NAU). (4) In a subarea network, an address, consisting of subarea and element fields, that identifies a link, link station, physical unit, logical unit, or system services control point. Subarea nodes use network addresses; peripheral nodes use local addresses or local-form session identifiers (LFSIDs). The boundary function in the subarea node to which a peripheral node is attached transforms local addresses or LFSIDs to network addresses and vice versa. Contrast with *network name*.

network addressable unit (NAU). Synonym for *network accessible unit*.

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

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

network congestion. An undesirable overload condition caused by traffic in excess of what a network can handle.

network control (NC). In SNA, a request/response unit (RU) category used for requests and responses exchanged between physical units (PUs) for such purposes as activating and deactivating explicit and virtual routes and sending load modules to adjust peripheral nodes. See also *data flow control*, *function management data*, and *session control*.

network control block (NCB). A part of the network control program that controls the resources used by the communication network in a LAN attachment.

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

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

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

network identifier. (1) In TCP/IP, that part of the IP address that defines a network. The length of the network ID depends on the type of network class (A, B, or C). (2) A 1- to 8-byte customer-selected name or an 8-byte IBM-registered name that uniquely identifies a specific subnetwork. (3) In MPTN architecture, the address qualifier of a transport provider address that identifies a group of nodes according to the network in which they reside.

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

network management vector transport (NMVT). A management services request/response unit (RU) that flows over an active session between physical unit management services and control point management services (SSCP-PU session).

network name. The symbolic identifier by which users refer to a network accessible unit, a link, or a link station within a given subnetwork. In APPN networks, network names are also used for routing purposes. Contrast with *network address*.

network node (NN). See *Advanced Peer-to-Peer Networking (APPN) network node*.

network node domain. An APPN network-node control point, its attached links, the network resources for which it answers directory search requests (namely, its local LUs and adjacent LEN end nodes), the adjacent APPN end nodes with which it exchanges directory search requests and replies, and other resources (such as a local storage device) associated

with its own node or an adjacent end node for which it provides management services.

network node server. An APPN network node that provides network services for its local LUs and client end nodes.

network operator. (1) A person who controls the operation of all or part of a network. (2) In a multiple-domain network, a person or program responsible for controlling all domains. (3) See also *domain operator*.

network-qualified name. In SNA, a name that uniquely identifies a specific resource (such as an LU or a CP) within a specific network. It consists of a network identifier and a resource name, each of which is a 1- to 8-byte symbol string. Synonymous with *fully qualified name*.

network topology database. The representation of the current connectivity between the network nodes within an APPN network. It includes (a) entries for all network nodes and the transmission groups interconnecting them and (b) entries for all virtual routing nodes to which network nodes are attached.

NMVT. Network management vector transport.

NN. Network node.

NNCP. Network node control point.

node. (1) In a network, a point at which one or more functional units connect channels or data circuits. (I) (2) Any device, attached to a network, that transmits and receives data. (3) An endpoint of a link or a junction common to two or more links in a network. Nodes can be processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities.

node name. In VTAM, the symbolic name assigned to a specific major or minor node during network definition.

node type. A designation of a node according to the protocols it supports or the role it plays in a network. Node type was originally denoted numerically (as 1, 2.0, 2.1, 4, and 5) but is now characterized more specifically by protocol type (APPN network node, LEN node, subarea node, and interchange node, for example) because type 2.1 nodes and type 5 nodes support multiple protocol types and roles.

nonnative. In MPTN architecture, pertaining to the relationship between a transport user and a transport provider that are based on different transport protocols.

no response. In SNA, a protocol requested in the form-of-response-requested field of the request header that directs the receiver of the request not to return any response, regardless of whether or not the request is received and processed successfully. Contrast with *definite response* and *exception response*.

normal flow. In SNA, a data flow designated in the transmission header (TH) that is used primarily to carry end-user data. The rate at which requests flow on the normal flow can be regulated by session-level pacing. Normal and expedited flows move in both the primary-to-secondary and secondary-to-primary directions. Contrast with *expedited flow*.

notification. An unscheduled, spontaneously generated report of an event that has occurred.

NOTIFY. A network services request that is sent by a system services control point (SSCP) to a logical unit (LU) to inform the LU of the status of a procedure requested by the LU.

O

ODAI. Origin-Destination Assignor indicator, a bit in a FID2 transmission header used to divide the address space so that an address space manager (ASM) in one node may use all possible combinations of OAF′, DAF′ with the ODAI having one setting and the ASM in the adjacent node may use all possible combinations of OAF′, DAF′ with the ODAI having the complementary setting.

Off. A choice that appears in the cascaded menu from the Refresh choice. It sets the refresh function to off.

offset. The number of measuring units from an arbitrary starting point in a record, area, or control block, to some other point.

OIA. Operator information area.

OK. A push button that accepts the information in a window and closes it. If the window contains changed information, those changes are applied before the window is closed.

On. A choice that appears in a cascaded menu from the Refresh choice. It immediately refreshes the view in a window.

open. (1) A break in an electrical circuit. (2) To make an adapter ready for use.

Open. A choice that leads to a window in which users can select the object they want to open.

operable time. The time during which a functional unit would yield correct results if it were operated. (I) (A) Synonymous with *uptime*.

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

operating time. That part of operable time during which a functional unit is operated. (A)

operation. In object-oriented design or programming, a service that can be requested at the boundary of an object. Operations include modifying an object or disclosing information about an object.

operator. (1) In a language statement, the lexical entity that indicates the action to be performed on operands. See also *definition statement*. (2) A person or program responsible for managing activities controlled by a given piece of software such as MVS, the NetView program, or IMS. (3) A person who operates a device. (4) A person who keeps a system running. (5) See also *autotask*, *logged-on operator*, *network operator*, and *operator station task*.

operator information area (OIA). The area near the bottom of the display area where terminal or system status information is displayed.

operator station task (OST). The NetView task that establishes and maintains the online session with the network operator. There is one operator station task for each network operator who logs on to the NetView program. See *NetView-NetView task*.

origin. An external logical unit (LU) or application program from which a message or other data originates. See also *destination*.

OS. Operating system.

outbound. In communications, data that is transmitted to the network.

overlay. A collection of predefined data, such as lines, shading, text, boxes, or logos, that can be merged with variable data on a page while printing.

P

PAC. Privilege Attribute Certificate.

pacing. (1) A technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion. (2) See *receive pacing*, *send pacing*, *session-level pacing*, and *virtual route (VR) pacing*. (3) See also *flow control*.

pacing group. Synonym for *pacing window*.

pacing response. In SNA, an indicator that signifies the readiness of a receiving component to accept another pacing group. The indicator is carried in a response header (RH) for session-level pacing and in a transmission header (TH) for virtual route pacing.

pacing window. (1) The path information units (PIUs) that can be transmitted on a virtual route before a virtual-route pacing response is received, indicating that the virtual route receiver is ready to receive more PIUs on the route. (2) The requests that can be transmitted on the normal flow in one direction on a session before a session-level pacing response is received, indicating that the receiver is ready to accept the next group of requests. (3) Synonymous with *pacing group*.

packet internet groper (PING). (1) In Internet communications, a program used in TCP/IP networks to test the ability to reach destinations by sending the destinations an Internet Control Message Protocol (ICMP) echo request and waiting for a reply. (2) In communications, a test of reachability.

packet level. (1) The packet format and control procedures for exchange of packets containing control information and user data between data terminal equipment (DTE) and data circuit-terminating equipment (DCE). See also *data link level* and *physical level*. (2) A part of Recommendation X.25 that defines the protocol for establishing logical connections between two DTEs and for transferring data on these connections.

page. (1) In a virtual storage system, a fixed-length block that has a virtual address and is transferred as a unit between real storage and auxiliary storage. (I) (A) (2) The information displayed at the same time on the screen of a display device. (3) To replace the information displayed on the screen with prior or subsequent information from the same file.

parallel. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (T) (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (A) (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (A) (4) Pertaining to the simultaneity of two or more processes. (A) (5) Pertaining to the simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word, using separate facilities for the various parts. (A) (6) Contrast with *serial*.

parallel sessions. Two or more concurrently active sessions between the same two network accessible units (NAUs) using different pairs of network addresses or local-form session identifiers. Each session can have independent session parameters.

parallel transmission groups. Multiple transmission groups between adjacent nodes, with each group having a distinct transmission group number.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (I) (A) (2) In Basic CUA architecture, a variable used in conjunction with a command to affect its result. (3) An item in a menu for which the user specifies a value or for which the system provides a value when the menu is interpreted. (4) Data passed to a program or procedure by a user or another program, namely as an operand in a language statement, as an item in a menu, or as a shared data structure.

parent. A process that has spawned a child process using the fork primitive. Contrast with *child*.

parse. To analyze the operands entered with a command and create a parameter list for the command processor from the information.

partner-LU verification. For logical unit (LU) 6.2, a three-flow exchange between two LUs with each LU using an LU-LU password and the Data Encryption Standard (DES) algorithm. The three-flow exchange is the LU-LU verification. See *end-user verification*.

password. (1) A value used in authentication or a value used to establish membership in a set of people having specific privileges. (2) A unique string of characters known to a computer system and to a user, who must specify the character string to gain access to a system and to the information stored within it. (3) In computer security, a string of characters known to the computer system and a user, who must specify it to gain full or limited access to a system and to the data stored within it.

path. (1) In a network, any route between any two nodes. A path may include more than one branch. (T) (2) The series of transport network components (path control and data link control) that are traversed by the information exchanged between two network accessible units. See also *explicit route (ER)*, *route extension (REX)*, and *virtual route (VR)*. 9 1'.

path control (PC). The function that routes message units between network accessible units in the network and provides the paths between them. It converts the basic information units (BIUs) from transmission control (possibly segmenting them) into path information units (PIUs) and exchanges basic transmission units containing one or more PIUs with data link control. Path control differs by node type: some nodes (APPN nodes, for example) use locally generated session identifiers for routing, and others (subarea nodes) use network addresses for routing.

path information unit (PIU). A message unit consisting of a transmission header (TH) alone, or a TH followed by a basic information unit (BIU) or a BIU segment.

PC. (1) Personal computer. (2) Path control. (3) Personal Communications or Communications Server .

PCID. Procedure-correlation identifier.

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

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

persistent verification. In VTAM, a security function that enables two logical units to verify the identity of each other for the initial conversation on a session and to assume that future conversations are verified for the duration of the session.

Personal Communications or Communications Server product family. A group of IBM licensed programs that emulate 3270 and 5250 terminals and that run on several operating systems such as OS/2, DOS, and Windows.

personal computer (PC). (1) A microcomputer primarily intended for stand-alone use by an individual. (T) (2) A desktop, floor-standing, or portable microcomputer that usually consists of a system unit, a display monitor, a keyboard, one or more diskette drives, internal fixed-disk storage, and an optional printer. PCs are designed primarily for stand-alone operation but may be connected to mainframes or networks.

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

physical level. In X.25, the mechanical, electrical, functional, and procedural media used to activate, maintain, and deactivate the physical link between the data terminal equipment (DTE) and the data circuit-terminating equipment (DCE). See *data link level* and *packet level*.

physical unit (PU). (1) The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP via an SSCP-PU session. An SSCP activates a session with the physical unit in order

to indirectly manage, through the PU, resources of the node such as attached links. This term applies to type 2.0, type 4, and type 5 nodes only. (2) See also *peripheral PU* and *subarea PU*.

physical unit (PU) services. In SNA, the components within a physical unit (PU) that provide configuration services and maintenance services for SSCP-PU sessions.

PING. Packet internet groper.

PIP. Program initialization parameters.

pipe. To direct data so that the output from one process becomes the input to another process.

PLU. Primary logical unit.

pointer. (1) A data element that indicates the location of another data element. (T) (2) An identifier that indicates the location of an item of data. (A)

point-to-point. Pertaining to data transmission between two locations without the use of any intermediate display station or computer.

polling. (1) On a multipoint connection or a point-to-point connection, the process whereby data stations are invited, one at a time, to transmit. (I) (2) Interrogation of devices for such purposes as to avoid contention, to determine operational status, or to determine readiness to send or receive data. (A)

pop. To remove an item from the top of a pushdown list. Contrast with *push*.

POP. Post Office Protocol.

port. (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. (3) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter; however, there can be more than one port on an adapter. There may be one or more ports controlled by a single DLC process. (4) In the Internet suite of protocols, a 16-bit number used to communicate between TCP or the User Datagram Protocol (UDP) and a higher-level protocol or application. Some protocols, such as File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP), use the same well-known port number in all TCP/IP implementations. (5) An abstraction used by transport protocols to distinguish among multiple destinations within a host machine. (6) Synonymous with *socket*.

port number. In Internet communications, the identification of an application entity to the transport service.

positive response. In SNA, a response indicating that a request was received and processed. Contrast with *negative response*.

Post Office Protocol (POP). A protocol used for exchanging network mail and accessing mailboxes.

Prepare. A presentation services header that flows as part of commit processing, indicating the partner has begun the first phase of the two-phase commit process.

presentation space ID (PSID). In Communications Manager/2, synonym for *short name*.

primary focal point. A focal point understood to be the preferred source of management services support for a particular category. Contrast with *backup focal point*.

primary logical unit (PLU). In SNA, the logical unit (LU) that sends the BIND to activate a session with its partner LU. Contrast with *secondary logical unit (SLU)*.

Privilege Attribute Certificate (PAC). In a Distributed Computing Environment (DCE), a certified set of access privileges that can be presented by a user or an administrator to establish access rights to objects.

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

procedure. (1) In a programming language, a block, with or without formal parameters, whose execution is invoked by means of a procedure call. (I) (2) The description of the course of action taken for the solution of a problem. (A)

procedure-correlation identifier (PCID). In SNA, a value used to correlate all requests and replies associated with a given procedure.

process. (1) To perform operations on data in a process. (I) (A) (2) In data processing, the course of events that occurs during the execution of all or part of a program. (T) (3) A course of the events defined by its purpose or by its effect, achieved under given conditions. (4) Any operation or combination of operations on data. (5) A function being performed or waiting to be performed.

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

product-set identification (PSID). (1) In SNA, a technique for identifying the hardware and software

products that implement a network component. (2) A management services common subvector that transports the information described in definition (1).

profile. Data that describes the significant characteristics of a user, a group of users, or one or more computer resources.

program. (1) A sequence of instructions suitable for processing by a computer. Processing may include the use of an assembler, a compiler, an interpreter, or a translator to prepare the program for execution, as well as to execute it. (I) (2) In programming languages, a logical assembly of one or more interrelated modules. (I) (3) To design, write, and test computer programs. (I) (A)

program initialization parameters (PIP). The initial parameter values passed to a target program as input or used to set up the process environment.

programmable operator facility (PROP). A VM facility that allows remote control of a virtual machine by intercepting messages directed for that machine and taking preprogrammed action.

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

PROP. Programmable operator facility.

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

PSID. Presentation space ID.

PTF. Program temporary fix.

PU. Physical unit.

push. To add an item to the top of a pushdown list. Contrast with *pop*.

pushdown list. (1) A list constructed and maintained so that the next data element to be retrieved is the most recently stored. (T) (2) Synonymous with *stack*.

PUT. Program update tape.

PU type. (1) Deprecated term for *node type*. (2) The type of physical unit in a node.

Q

queue. (1) A list constructed and maintained so that the next data element to be retrieved is the one stored first. (T) (2) A line or list of items waiting to be processed; for example, work to be performed or messages to be displayed. (3) To arrange in or form a queue.

R

Rapid Transport Protocol (RTP). A connection-oriented, full-duplex transport protocol for carrying session traffic over High-Performance Routing (HPR) routes. See also *automatic network routing (ANR)* and *Rapid Transport Protocol (RTP) connection*.

Rapid Transport Protocol (RTP) connection. A connection between two High-Performance Routing (HPR) nodes that may traverse one or more intermediate HPR nodes and links. The connection endpoints provide error recovery and adaptive rate-based flow control for the connection traffic, and nondisruptive switching of the underlying physical path in the case of route outage. The intermediate HPR nodes minimize their routing overhead using automatic network routing (ANR) protocols, which rely on header information to permit efficient source routing and prioritized transmission along the RTP connection.

RAR. Route addition resistance.

reassembly. In communications, the process of putting segmented packets back together after they have been received.

receive pacing. In SNA, the pacing of message units that a component is receiving. Contrast with *send pacing*.

record. A set of data treated as a unit. (T)

release. (1) A distribution of a new product or new function and APAR fixes for an existing product. Normally, programming support for the prior release is discontinued after some specified period of time following availability of a new release. The first version of a product is announced as Release 1, Modification Level 0. (2) In VTAM, to relinquish control of resources (communication controllers or physical units). See also *resource takeover*. Contrast with *acquire*.

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

remote host. Any host on a network except the host at which a particular operator is working. Synonymous with *foreign host*.

request. A message unit that signals initiation of a particular action or protocol. For example, Initiate-Self is a request for activation of an LU-LU session.

requester. A computer that accesses shared network resources through a server. Synonym for *client*.

request header (RH). The control information that precedes a request unit (RU). See also *request/response header (RH)*.

request/response header (RH). Control information associated with a particular RU. The RH precedes the request/response unit (RU) and specifies the type of RU (request unit or response unit).

request/response unit (RU). A generic term for a request unit or a response unit. See *request unit (RU)* and *response unit (RU)*.

request unit (RU). A message unit that contains control information, end-user data, or both.

reset. On a virtual circuit, reinitialization of data flow control. At reset, all data in transit are eliminated.

resource. Any facility of a computing system or operating system required by a job or task, and including main storage, input/output devices, the processing unit, data sets, and control or processing programs.

resource registration. The process of identifying names of resources, such as LUs, to a network node server or a central directory server.

resource sequence number (RSN). A value that identifies an update of a resource in a network topology database.

resource takeover. In VTAM, an action initiated by a network operator to transfer control of resources from one domain to another without breaking the connections or disrupting existing LU-LU sessions on the connection. See also *acquire* and *release*.

resource types. In the NetView program, a concept to describe the organization of panels. Resource types are defined as central processing unit, channel, control unit, and I/O device for one category; and communication controller, adapter, link, cluster controller, and terminal for another category. Resource types are combined with data types and display types to describe display organization. See also *data types* and *display types*.

response. (1) In data communication, a reply represented in the control field of a response frame. It advises the primary or combined station of the action taken by the secondary or other combined station to one or more commands. (2) See also *command*.

response header (RH). (1) A header, optionally followed by a response unit (RU), that indicates whether the response is positive or negative and that may contain a pacing response. (2) See also *negative response*, *pacing response*, and *positive response*.

response unit (RU). A message unit that acknowledges a request unit. It may contain prefix information received in a request unit. If positive, the response unit may contain additional information (such as session parameters in response to BIND SESSION). If negative, the response unit contains sense data defining the exception condition.

return code. (1) A code used to influence the execution of succeeding instructions. (A) (2) A value returned to a program to indicate the results of an operation requested by that program.

REX. Route extension.

RH. Request/response header.

ring. See *ring network*.

ring network. A network configuration in which devices are connected by unidirectional transmission links to form a closed path.

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

route addition resistance (RAR). A value that indicates a network node's capacity to perform intermediate session routing.

routed. Pronounced “route-d.” See *route daemon*.

route daemon. A program that runs under 4BSD UNIX** to propagate route information among machines on a local area network. Also referred to as *routed* (pronounced “route-d”).

route extension (REX). In SNA, the path control network components, including a peripheral link, that make up the portion of a path between a subarea node and a network addressable unit (NAU) in an adjacent peripheral node. See also *explicit route (ER)*, *path*, and *virtual route (VR)*.

Route Selection control vector (RSCV). A control vector that describes a route within an APPN network.

The RSCV consists of an ordered sequence of control vectors that identify the TGs and nodes that make up the path from an origin node to a destination node.

routine. A program, or part of a program, that may have some general or frequent use. (T)

routing. (1) The process of determining the path to be used for transmission of a message over a network. (T) (2) The assignment of the path by which a message is to reach its destination. (3) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

RouTing update Protocol (RTP). The VIrtual NEtworking System (VINES) protocol that maintains the routing database and allows the exchange of routing information between VINES nodes. See also *Internet Control Protocol (ICP)*.

RQD. Request discontact.

RSCV. Route Selection control vector.

RSN. Resource sequence number.

RTP. Rapid Transport Protocol.

RTP connection. See *Rapid Transport Protocol (RTP) connection*.

RU. Request/response unit.

RU chain. In SNA, a set of related request/response units (RUs) that are consecutively transmitted on a particular normal or expedited data flow. The request RU chain is the unit of recovery: if one of the RUs in the chain cannot be processed, the entire chain is discarded. Each RU belongs to only one chain, which has a beginning and an end indicated by means of control bits in request/response headers within the RU chain. Each RU can be designated as first-in-chain (FIC), last-in-chain (LIC), middle-in-chain (MIC), or only-in-chain (OIC). Response units and expedited-flow request units are always sent as only-in-chain.

S

SAP. (1) Service access point. (2) Service Advertising Protocol.

SBCS. Single-byte character set.

SC. Session control.

SDLC. Synchronous Data Link Control.

secondary logical unit (SLU). In SNA, the logical unit (LU) that contains the secondary half-session for a particular LU-LU session. An LU may contain secondary and primary half-sessions for different active LU-LU sessions. Contrast with *primary logical unit (PLU)*.

secondary logical unit (SLU) key. A key-encrypting key used to protect a session cryptography key during its transmission to the secondary half-session.

segment. (1) A section of cable between components or devices. A segment may consist of a single patch cable, several patch cables that are connected, or a combination of building cable and patch cables that are connected. (2) In Internet communications, the unit of transfer between TCP functions in different machines. Each segment contains control and data fields; the current byte-stream position and actual data bytes are identified along with a checksum to validate received data. (3) Synonym for *BIU segment*. (4) See also *link connection segment*.

select. To explicitly identify one or more objects to which a subsequent choice will apply.

selection. The process of explicitly identifying one or more objects to which a subsequent choice will apply.

send pacing. In SNA, the pacing of message units that a component is sending. Contrast with *receive pacing*.

sequence number. (1) In communications, a number assigned to a particular frame or packet to control the transmission flow and receipt of data. (2) A numerical value assigned by VTAM to each message exchanged between two nodes. The value (one for messages sent from the application program to the logical unit and another for messages sent from the logical unit to the application program) increases by one for each successive message transmitted unless it is reset by the application program with a set and test sequence numbers (STSN) indicator.

serial. (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (T) (2) Pertaining to the sequential or consecutive occurrence of two or more related activities in a single device or channel. (A) (3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts. (A) (4) Contrast with *parallel*.

server. (1) A functional unit that provides shared services to workstations over a network; for example, a file server, a print server, a mail server. (T) (2) In a network, a data station that provides facilities to other

stations; for example, a file server, a print server, a mail server. (A) (3) In the AIX operating system, an application program that usually runs in the background and is controlled by the system program controller. (4) In the Enhanced X-Windows** Toolkit, a program that provides the basic windowing mechanism. It handles interprocess communication (IPC) connections from clients, demultiplexes graphics requests onto screens, and multiplexes input back to clients.

service access point (SAP). (1) In Open Systems Interconnection (OSI) architecture, the point at which the services of a layer are provided by an entity of that layer to an entity of the next higher layer. (T) (2) A logical point made available by an adapter where information can be received and transmitted. A single service access point can have many links terminating in it. (3) The gateway address of the controller. A SAP provides a point to link the controller to the host system.

Service Advertising Protocol (SAP). In Internetwork Packet Exchange** (IPX**), a protocol that provides the following:

A mechanism that allows IPX servers on an internet to advertise their services by name and type. Servers using this protocol have their name, service type, and IP address recorded in all file servers running NetWare**.

A mechanism that allows a workstation to broadcast a query to discover the identities of all servers of all types, all servers of a specific type, or the nearest server of a specific type.

A mechanism that allows a workstation to query any file server running NetWare to discover the names and addresses of all servers of a specific type.

service point command facility (SPCF). A program or function that exchanges data and control between the network operator, the link connection component manager (LCCM), and the link connection subsystem manager (LCSM).

service transaction program. Any IBM-supplied transaction program running in a network accessible unit. Contrast with *application transaction program*.

session. (1) In network architecture, for the purpose of data communication between functional units, all the activities which take place during the establishment, maintenance, and release of the connection. (T) (2) A logical connection between two network accessible units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. Each session is uniquely identified in a transmission header (TH) accompanying any transmissions exchanged during the session. (3) A logical connection between a server and a requester that was initiated by a successful request for a shared resource. See also *host session* and *DOS session*.

session activation request. In SNA, a request that activates a session between two network accessible units (NAUs) and specifies session parameters that control various protocols during session activity; for example, BIND and ACTPU. Contrast with *session deactivation request*.

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

One of the components of transmission control. Session control is used to purge data flowing in a session after an unrecoverable error occurs, to resynchronize the data flow after such an error, and to perform cryptographic verification.

A request unit (RU) category used for requests and responses exchanged between the session control components of a session and for session activation and deactivation requests and responses.

session data. Data about a session, collected by the NetView program, that consists of session awareness data, session trace data, and session response time data.

session deactivation request. In SNA, a request that deactivates a session between two network accessible units (NAUs); for example, UNBIND and DACTPU. Synonymous with *generic unbind*. Contrast with *session activation reques t*.

session ID. An alphabetic ID (*a* through *h*) assigned by Personal Communications or Communications Server to each session or screen. This applies to all types of host sessions and is used in file transfers. See also *short name*.

session-level pacing. (1) A flow control technique that permits a receiving half-session or session connector to control the data transfer rate (the rate at which it receives request units) on the normal flow. It is used to prevent overloading a receiver with unprocessed requests when the sender can generate requests faster than the receiver can process them. (2) See also *adaptive session-level pacing*, *fixed session-level pacing*, and *virtual route (VR) pacing*.

session-level security. For logical unit (LU) 6.2, partner LU verification and session cryptography. See *conversation-level security*.

session limit. The maximum number of concurrently active LU-LU sessions that a particular logical unit (LU) can support.

shared. Pertaining to the availability of a resource for more than one use at the same time.

shift-out character (SO). A code extension character that substitutes for the graphic characters of the standard character set an alternative set of graphic characters upon which an agreement has been arrived

at or that has been designated using code extension procedures. (I) (A)

short name. (1) In Personal Communications or Communications Server , a character displayed in column 7 of the operator information area that shows the session ID. See also *session ID* and *operator information area*. (2) In Communications Manager/2, the one-letter name (A through Z) of the presentation space or emulation session. Synonymous with *presentation space ID (PSID)* and *short-session ID*.

short-session ID. In Communications Manager/2, synonym for *short name*.

shutdown. The process of ending operation of a system or a subsystem, following a defined procedure.

single-byte character set (SBCS). A character set in which each character is represented by a one-byte code. Contrast with *double-byte character set (DBCS)*.

SLU. Secondary logical unit.

SNA. Systems Network Architecture.

SNA management services (SNA/MS). The services provided to assist in management of SNA networks.

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

SO. The shift-out character. (I) (A)

socket. An endpoint for communication between processes or application programs.

SPCF. Service point command facility.

specific-mode. In VTAM, the following:

The form of a RECEIVE request that obtains input from one specific session

The form of an ACCEPT request that completes the establishment of a session by accepting a specific queued CINIT request.

Contrast with *any-mode*. See *continue-specific mode*.

sphere of control (SOC). The set of control point domains served by a single management services focal point.

SSCP. System services control point.

SSCP-dependent LU. An LU that requires assistance from a system services control point (SSCP) in order to initiate an LU-LU session. It requires an SSCP-LU session.

SSCP-LU session. In SNA, a session between a system services control point (SSCP) and a logical unit (LU). The session enables the LU to request the SSCP to help initiate LU-LU sessions.

SSCP-PU session. In SNA, a session between a system services control point (SSCP) and a physical unit (PU); SSCP-PU sessions allow SSCPs to send requests to and receive status information from individual nodes in order to control the network configuration.

stack. Synonym for *pushdown list*.

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

station. An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line.

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

storage. (1) A functional unit into which data can be placed, in which they can be retained and from which they can be retrieved. (T) (2) The action of placing data into a storage device. (I) (A) (3) A storage device. (A)

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

subarea node (SN). A node that uses network addresses for routing and maintains routing tables that reflect the configuration of the network. Subarea nodes can provide gateway function to connect multiple subarea networks, intermediate routing function, and boundary function support for peripheral nodes. Type 4 and type 5 nodes can be subarea nodes.

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

subdirectory. A directory contained within another directory in a file system hierarchy.

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

subvector. A subcomponent of the network management vector transport (NMVT) major vector.

switched network. Any network in which connections are established by closing switches, for example, by dialing.

synchronization point. Synonym for *sync point*.

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

Synchronous Data Link Control (SDLC). A discipline conforming to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. (I)

synchronous operation. In VTAM, a communication, or other operation in which VTAM, after receiving the request for the operation, does not return control to the program until the operation is completed. Contrast with *asynchronous operation*.

synchronous request. In VTAM, a request for a synchronous operation. Contrast with *asynchronous request*.

sync point. An intermediate or end point during processing of a transaction at which an update or modification to one or more of the transaction's protected resources is logically complete and error free. Synonymous with *synchronization point*.

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

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

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

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

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

T

table. A repository for data that NetDA/2 uses to design a network. Each table contains information related to the network.

task. In a multiprogramming or multiprocessing environment, one or more sequences of instructions treated by a control program as an element of work to be accomplished by a computer. (I) (A)

TCP. Transmission Control Protocol.

TCP/IP. Transmission Control Protocol/Internet Protocol.

TERMINATE. In SNA, a request unit that is sent by a logical unit (LU) to its system services control point (SSCP) to cause the SSCP to start a procedure to end one or more designated LU-LU sessions.

TG. Transmission group.

TH. Transmission header.

thread. In the OS/2 operating system, the smallest unit of operation to be performed within a process.

threshold. (1) In the NetView program, a percentage value, set for a resource and compared to a calculated error-to-traffic ratio. (2) In NetView for AIX, a setting that specifies the maximum value a statistic can reach before notification that the limit was exceeded. For example, when a monitored MIB value has exceeded the threshold, the data collector generates a threshold event. (3) In NPM, high or low values supplied by the user to monitor data and statistics being collected.

(4) In IBM bridge programs, a value set for the maximum number of frames that are not forwarded across a bridge due to errors, before a "threshold exceeded" occurrence is counted and indicated to network management programs. (5) An initial value from which a counter is decremented to 0, or a value to which a counter is incremented or decremented from an initial value.

timeout. (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (I) (2) A time interval allotted for certain operations to occur; for example, response to polling or addressing before system operation is interrupted and must be restarted.

time stamp. (1) To apply the current system time. (2) The value on an object that is an indication of the system time at some critical point in the history of the object. (3) In query, the identification of the day and time when a query report was created that query automatically provides on each report.

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

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

topology. In communications, the physical or logical arrangement of nodes in a network, especially the relationships among nodes and the links between them.

topology database. See *local topology database* and *network topology database*.

TP. Transaction program.

transaction program (TP). A program that processes transactions in an SNA network. There are two kinds of transaction programs: application transaction programs and service transaction programs. See also *conversation*.

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

Transmission Control Protocol/Internet Protocol (TCP/IP). A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

transmission group (TG). (1) A connection between adjacent nodes that is identified by a transmission group number. (2) In a subarea network, a single link or a group of links between adjacent nodes. When a transmission group consists of a group of links, the links are viewed as a single logical link, and the transmission group is called a *multilink transmission group (MLTG)*. A *mixed-media multilink transmission group (MMMLTG)* is one that contains links of different medium types (for example, token-ring, switched SDLC, nonswitched SDLC, and frame-relay links). (3) In an APPN network, a single link between adjacent nodes. (4) See also *parallel transmission groups*.

transmission group (TG) profile. In VTAM, a named set of characteristics (such as cost per byte, cost per unit of time, and capacity) that is used for APPN links.

transmission group (TG) vector. A representation of an endpoint TG in a T2.1 network, consisting of two control vectors: the TG Descriptor (X'46') control vector and the TG Characteristics (X'47') control vector.

transmission header (TH). Control information, optionally followed by a basic information unit (BIU) or a BIU segment, that is created and used by path control to route message units and to control their flow within the network. See also *path information unit*.

transmission priority. A rank assigned to a message unit that determines its precedence for being selected by the path control component in each node along a route for forwarding to the next node in the route.

transport protocol. A specification of the rules governing the exchange of information between components of a transport network.

trap. In the Simple Network Management Protocol (SNMP), a message sent by a managed node (agent function) to a management station to report an exception condition.

tutorial. Information presented in a teaching format.

T1. In the United States, a 1.544-Mbps public access line. It is available in twenty-four 64-Kbps channels. The European version (E1) transmits 2.048 Mbps. The Japanese version (J1) transmits 1.544 Mbps.

U

UNBIND. In SNA, a request to deactivate a session between two logical units (LUs). See also *session deactivation request*. Contrast with *BIND*.

uninterpreted name. In SNA, a character string that a system services control point (SSCP) can convert into the network name of a logical unit (LU). Typically, an uninterpreted name is used in a logon or Initiate request from a secondary logical unit (SLU) to identify the primary logical unit (PLU) with which the session is requested.

upstream. In the direction of data flow from the user to the host. Contrast with *downstream*.

uptime. (1) Synonym for *operable time*. (T) (2) Deprecated term for *available time*. (3) Synonym for *operating time*.

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

user identifier (UID). A name that uniquely identifies a user on a network or system.

UTC. Coordinated universal time.

V

value. (1) A specific occurrence of an attribute; for example, “blue” for the attribute “color.” (T) (2) A quantity assigned to a constant, a variable, a parameter, or a symbol.

variable. (1) In programming languages, a language object that may take different values, one at a time. The values of a variable are usually restricted to a certain data type. (I) (2) A quantity that can assume any of a given set of values. (A) (3) A name used to represent a data item whose value can be changed while the program is running.

vector. The MAC frame information field.

verb. See *LU 6.2 verb*.

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

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

virtual machine (VM). (1) A virtual data processing system that appears to be at the exclusive disposal of a particular user, but whose functions are accomplished by sharing the resources of a real data processing system. (T) (2) In VM/ESA, the virtual processors, virtual storage, virtual devices, and virtual channel subsystem allocated to a single user. A virtual machine also includes any expanded storage dedicated to it.

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

virtual node. Synonym for *virtual routing node*.

virtual route (VR). (1) In SNA, either (a) a logical connection between two subarea nodes that is physically realized as a particular explicit route or (b) a logical connection that is contained wholly within a subarea node for intranode sessions. A virtual route between distinct subarea nodes imposes a transmission priority on the underlying explicit route, provides flow control through virtual route pacing, and provides data integrity through sequence numbering of path information xnits (PIUs). (2) Contrast with *explicit route (ER)*. See also *path* and *route extension (REX)*.

virtual route (VR) pacing. In SNA, a flow control technique used by the virtual route control component of path control at each end of a virtual route to control the rate at which path information units (PIUs) flow over the virtual route. VR pacing can be adjusted according to traffic congestion in any of the nodes along the route. See also *session-level pacing*.

virtual routing node. A representation of a node's connectivity to a connection network defined on a shared-access transport facility, such as a token ring. Synonymous with *virtual node*.

Virtual Telecommunications Access Method (VTAM). An IBM licensed program that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability.

VM. Virtual machine.

VM/ESA. Virtual Machine/Enterprise Systems Architecture.

VR. Virtual route.

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

W

WAN. Wide area network.

weight. For route selection purposes, the degree to which resources (such as nodes and transmission groups) meet the criteria specified by a particular class of service. In APPN route selection, routes of minimum weight are chosen.

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

window. (1) A portion of a display surface in which display images pertaining to a particular application can be presented. Different applications can be displayed simultaneously in different windows. (A) (2) An area with visible boundaries that presents a view of an object or with which a user conducts a dialog with a computer system. (3) In data communication, the number of data packets a data terminal equipment (DTE) or data circuit-terminating equipment (DCE) can send across a logical channel before waiting for authorization to send another data packet. The window is the main mechanism of pacing, or flow control, of packets. (4) See *pacing window*.

window size. The specified number of frames of information that can be sent before receiving an acknowledgment response.

WinSock application programming interface (API). A socket-style transport interface developed for the Windows family of operating systems.

workstation. (1) A functional unit at which a user works. A workstation often has some processing capability. (T) (2) One or more programmable or nonprogrammable devices that allow a user to do work. (3) A terminal or microcomputer, usually one that is connected to a mainframe or to a network, at which a user can perform applications.

X

XID. Exchange identification.

XMIT. Transmit.

Z

Z time. Abbreviation for *Zulu time*. Synonym for *coordinated universal time (UTC)*.

Zulu time (Z). Synonym for *coordinated universal time (UTC)*.

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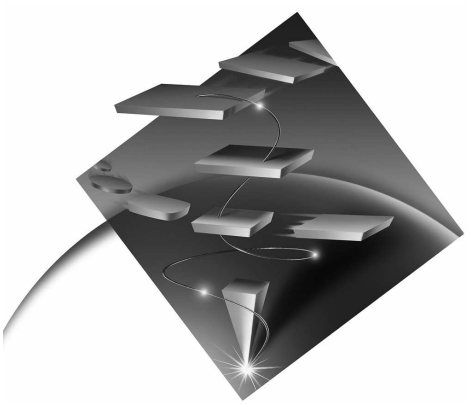

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