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Using Service Access Points in CSNA

Document ID: 17537

Introduction

Prerequisites

- Requirements

- Components Used

- Conventions

SAP Specification Capability for Widely-Used Workstations

SAP Values

- IBM Bit Ordering

- Canonical Bit Ordering

- Architected SAP Values

NetPro Discussion Forums – Featured Conversations

Related Information

Introduction

The Channel Interface Processor (CIP) internal adapter can be shared between multiple Virtual Telecommunications Access Method (VTAM) hosts. This is performed by associating a Service Access Point (SAP) with a channel path in the Cisco Systems Network Architecture (CSNA) environment. During adapter open time, CSNA receives an Open_Adapter_Request followed by an Open_SAP_Request from VTAM. This occurs when the External Communication Adapter (XCA) major node is activated. The XCA major node then associates the SAP presented by VTAM with the CIP internal adapter number of the opened adapter and the subchannel address used.

The SAP specification ranges from x'00' – x'FF'. VTAM V3R4, and higher, support a SAP value range of 4 – 252 or x'04' – x'FC', where x'F0' is reserved for NetBIOS. SAPs are in multiples of x'04', beginning with x'04'. The SAP is defined by the SAPADDR parameter in the VBUILD macro of XCA and SWNET major nodes. The SAPADDR values are coded with the decimal equivalents in the VTAM VBUILDS.

Each end station application must be investigated to identify whether the SAP definition is fixed (that is, hard coded), or is a variable that can be specified externally at installation customization time.

Note: To change the product SAP values, the product documentation available with each product must be consulted for the current status on the capability.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

SAP Specification Capability for Widely–Used Workstations

- OS/2 Communications Manager uses a default SAP value of x'04'.
- NS/2 provides for SAP specification in the .NDF file by specifying a destination_addresslength of x'07', and then specifying the desired SAP value at the end of the destination_address. If the destination_address_length is x'06', then the SAP defaults to x'04'.
- The 3174 allows SAP value specification on a logical terminal basis. A 3174 downstream of CSNA must be configured for the multi–host environment (Q101 = M). VTAM requires a physical unit (PU) definition and associated logical unit (LU) definitions for each CSNA–to–3174 connection (Q106–Q107). Each logical terminal (LT) of the 3174 can be associated with an LU address and an upstream host SAP via the LT address and the LT assignment panels. Combinations of these two 3174 panels and the XCA and SWNET major node provide for almost any to any connectivity of 3174 terminals.
- DOS PC 3270 emulation can use any SAP value.
- IBM 3270 workstation program can be setup to use SAP values x'04', x'08' and x'0C'.

SAP Values

The order of bits in a source SAP and destination SAP field byte differs in IBM and non–IBM environment. The standard way of describing the order of bits in a byte is known as canonical bit ordering. IBM usually writes the binary values in reverse order, known as non–canonical bit ordering.

Canonical bit ordering is used on Ethernets, while non–canonical addressing is used on a Token Ring environment. When trying to relate the sets of documentation to each other, confusion can result. Also, when tracing a Token Ring, a field containing a station address field can be present within the data. However, this field can be in canonical bit order. If so, it must be translated to IBM order to be understood.

Example 1: The SAP value of NetBIOS is F0 in hex.

IBM writes this binary value as:

```
1111 0000
```

In canonical form, this same binary value is read right to left as:

```
0000 1111
```

Example 2: Suppose a station has a Mac Address of 100058694A17.

IBM writes this binary value as:

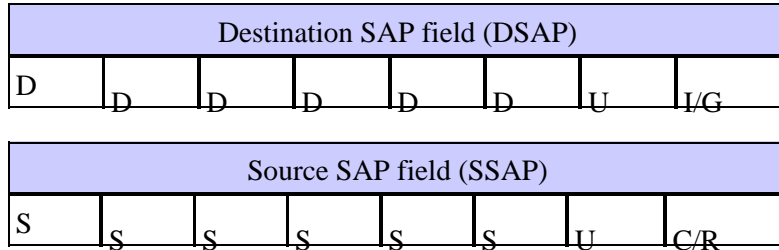
```
1 0 0 0 5 8 6 9 4 A 1 7  
0001 0000 0000 0000 0101 1000 0110 1001 0100 1010 0001 0111
```

In canonical form, this same binary value is read as:

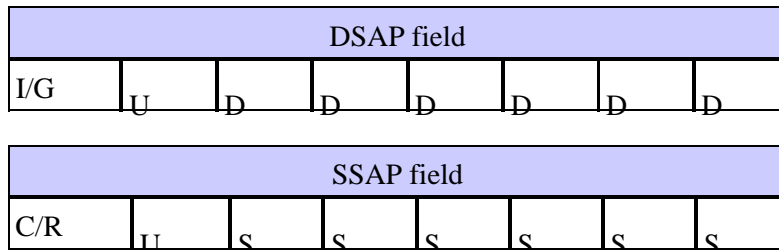
```
0000 1000 0000 0000 0001 1010 1001 0110 0101 0010 1110 1000
```

Note: The order of the bytes remains the same, but each byte has the binary digits read from right to left when converting from the IBM form to the canonical form.

IBM Bit Ordering



Canonical Bit Ordering



C/R Command/Response bit ---> 0=Command 1=Response
 U User defined SAP ---> 0=User 1=Standard
 I/G Individual/Group SAP ---> 0=Individual 1=Group

Architected SAP Values

These two tables display the Architected SAP values in canonical form with their IBM hexadecimal representation.

Table 1: Architected IEEE-Defined Logical Link Control (LLC) SAPs

I/G	U	Other 6 bits	IBM Hex Value	Definition
0	0	00 0000	x'00'	Null SAP
0	1	00 0000	x'02'	LLC Sublayer Management
0	1	00 yyyy	x'x2'	Network Mgt Function
1	1	00 0000	x'03'	Group LLC Sublayer Mgt
0	1	10 0000	x'06'	D.O.D. Internet
0	1	10 yyyy	x'x6'	National Stnds Bodies
0	1	11 0000	x'0E'	Proway Network Mgt
0	1	11 0010	x'4E'	Manufacturing Message Service

0	1	11 1110	x'7E'	ISO 8208 (X.25 PLP)
0	1	11 0001	x'0E'	Proway Act Stn List Maint
0	1	11 1111	x'FE'	OSI Network Layer Protocols
0	1	01 0101	x'AA'	Subnetwork Access Protocol (SNAP)
0	1	00 0010	x'42'	Bridge Spanning Tree Protocol
1	1	11 1111	x'FF'	Global SAP

Note: yyyy can be anything except B'0000'.

Table 2: Architected IBM-Defined LLC SAPs

I/G	U	Other 6 bits	IBM Hex Value	Definition
0	0	10 0000	x'04'	SNA Path Control Individual
1	0	10 0000	x'05'	SNA Path Control Group
0	0	00 1111	x'F0'	NETBIOS
0	0	10 1111	x'F4'	LAN Management Individual
1	0	10 1111	x'F4'	LAN Management Group
0	0	01 1111	x'E8'	IMPL
0	0	11 1111	x'FC'	Discovery
0	0	11 1011	x'DC'	Dynamic Address Resolution
0	0	10 1011	x'D4'	Resource Management

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Networking Professionals Connection is a forum for networking professionals to share questions, suggestions, and information about networking solutions, products, and technologies. The featured links are some of the most recent conversations available in this technology.

NetPro Discussion Forums – Featured Conversations for IBM

Network Infrastructure: Enterprise Data Centers

Related Information

- **IBM Technologies**
 - **Technical Support & Documentation – Cisco Systems**
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