3.5 Recommendation I.334

PRINCIPLES RELATING ISDN NUMBERS/SUBADDRESSES TO THE OSI REFERENCE MODEL NETWORK LAYER ADDRESSES

1. Introduction

Recommendation X.200, covering the open systems reference model, applies the term "address" to identify service access points at each layer. With respect to the network layer, a service access point may be identified by an ISDN number/subaddress. This Recommendation is provided to clarify the concepts and terminology which relate ISDN numbers and subaddresses to one another and to OSI reference model network layer addresses.

1.1 Basic relationships

The essential purpose of the network layer is to achieve routing of information within the open systems interconnection (OSI) environment. To that purpose it may be useful to establish a correspondence between an ISDN address (ISDN number, possibly with subaddress) and an X.200 network layer service access point. However, an ISDN address may in some instances identify an end-system not conforming to the OSI model. In such cases the format and syntax of the subaddress are available for user-specific purposes. Section 2 summarizes the coding agreements which allow this flexibility. (The publication of the summary in this Recommendation is for information only and does not indicate administrative responsibility for contents nor assure current status of the material presented.)

1.2 NSAPs and ISDN addresses

The ISDN address (ISDN number, possibly with subaddress) may include the OSI network layer address and thereby offer means to identify NSAPs.
Figure 1 shows the three cases, a), b) and c) below, relating an ISDN address to a particular OSI NSAP address.

For completeness, references to protocol elements are included in the three cases which follow. For circuit mode access, the calling/called subaddress information elements associated with the Q.931 SETUP message are used to transmit subaddress information, while the X.25 address extension field serves this purpose for packet mode access. For interoffice circuit mode calls, the Q.931 subaddress information, elements may be transmitted within the access transport parameter of the SS7 initial address message. On packet mode internetwork calls, the X.75 address extension field is available to carry subaddress information.

The components of the OSI NSAP address are the AFI (Authority and Format Identifier), the IDI (Initial Domain Identifier) and possibly the DSP (Domain Specific Part).

a) The OSI NSAP address is comprised only of an AFI and IDI, in which the IDI is semantically identical to the ISDN number. There is no DSP. A terminal can do one of the following:

Case a1) The entire NSAP is carried in the subaddress field; or

Case a2) If the conditions in section 1.3.1 are satisfied the NSAP address can be inferred from the E.164 number.

Note - For circuit mode calls, the semantic content of the AFI may be contained in the numbering and addressing plan identification in the Q.931 or SS7 calling/called address protocol elements. For packet mode calls, similar information

may be found in the X.25/X.75 protocol. Until such time as a protocol mechanism for identifying numbering plan and type of number, analogous to that which exists in Q.931/SS7, is implemented in X.25/X.75, such information may be derivable from the X.25/X.75 address fields which may include a numbering plan escape code. It may also be possible for the semantic content of the AFI to be implied by network arrangements.

b) The OSI NSAP address is comprised of an AFI+IDI+DSP, in which the IDI is semantically identical to the ISDN number. In this case, the entire NSAP address is carried in the subaddress/address extension field.

c) The OSI NSAP address is comprised of an AFI+IDI+DSP, in which the IDI is not related to the ISDN number. The entire NSAP address is conveyed in the subaddress/address extension field.

FIGURE 1/I.334

Relationship of NSAP address to ISDN number

Note 1 - The semantic content of AFI is contained in the numbering/task mark addressing plan identification (NAPI) in the Q.931/X.25 address information element or implied by network arrangement.

Note 2 - The IDI of the OSI NSAP address is semantically identical to the ISDN number.

Note 3 - The ISDN number is not related to the NSAP address.

1.3 Encoding of NSAP Addresses

1.3.1 Use of the AF

Under certain conditions, the NSAP Address, as defined in ISO 8348/AD2, may be conveyed entirely in the AF. These conditions are:

a) the NSAP Address consists solely of the IDP (i.e., the DSP is null);

b) the AFI can be deduced from the contents of the AF (e.g., with knowledge of the subnetwork to which the DTE is attached); and

c) the IDI is the same as the SNPA Address.

When all the above conditions are satisfied, the AF may be used to convey the semantics of the entire NSAP Address (the AFI is implied and the contents of the AF are equivalent to the IDI). In these cases, the AEF may also be used (see Clause 1.3.2).

1.3.2 Use of the AEF

When the conditions in Clause 1.3.1 are not satisfied, the AEF shall be used. The NSAP Address, complete with AFI, is placed in the AEF (type of subaddress is X.213/ISO 8348/AD2). In this case, the contents of the AF are not defined by this International Standard.

1.4 Decoding of NSAP Addresses

1.4.1 Absent AEF Case

If the AEF is not present, then local knowledge is required by the receiving NL entity to determine whether an OSI NSAP Address is to be deduced from the content of the AF. If this local knowledge indicates that an NSAP Address is present, its abstract syntax is as follows:

a) the AFI is deduced from knowledge of the subnetwork from which the packet was received;

b) the IDI is the same as the contents of the AF; and

c) the DSP is absent.

1.4.2 AEF Case

If the AEF is present and the type of subaddress is X.213/IS0 8348/AD2, then the NSAP Address is contained entirely within the AEF. The abstract syntax is as follows:

a) the AFI is contained within the first two digits of the AEF;

b) the IDI is the remainder of the IDP after any leading and trailing padding digits are discarded; and

c) the DSP, if present, constitutes the remainder of the AEF content after any trailing padding digits are discarded.

2. Means to specify the type of subaddress

Considering the three cases in which the NSAP address may be related to the ISDN address/subaddress, a mechanism which permits determination of the type of subaddress present may be useful in making distinctions. The method of distinction is dependent upon the protocol being used.

In the case of Q.931/I.451, 3 bits within octet 3 of each subaddress information element (i.e., calling and called party subaddress) 1 establish the "type of subaddress". Two existing assignments, subject to change by responsible authorities are "user-specified" and "X.213/ISO 8348/AD2". All other values are reserved.

The actual subaddress information is coded beginning in octet 4 with the possibility of continuing up to octet 23, i.e., the subaddress information element has the capacity to carry a maximum of 20 octets of subaddress information.

- Under the X.213/ISO 8348/AD2 encoding of type of subaddress, the initial two digits of the subaddress represent the AFI which permits further distinction in subaddress encoding schemes as specified in Figure 2.

- Under the user-specified encoding of type of subaddress, the subaddress field is encoded according to user specifications subject to a maximum length of 20 octets.

In the case of packet mode calls using X.25/ISO 8208, bits within the first octet of the calling/called address extension facility parameter field indicate the "type of address extension" in a similar manner.

Octets 1 and 2 of the subaddress information elements serve as information element and length identifiers, respectively.