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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Information processing systems — Data communications — Use of X.25 to provide the OSI connection-mode network service

Systèmes de traitement de l'information — Communication de données — Utilisation du protocole X.25 pour fournir le service de réseau OSI en mode connexion

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8878 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Information processing systems — Data communications — Use of X.25 to provide the OSI connection-mode network service

0 Introduction

This International Standard defines two methods for providing the OSI Connection-Mode Network Service (CONS) through the use of the X.25 Packet Level Protocol (X.25/PLP). The first method, which is presented in the main body of this International Standard, specifies a mapping between elements of the 1984 version of the X.25/PLP (X.25/PLP-1984) and elements of the OSI CONS. The second method, which is presented in Annex A of this International Standard, defines a Subnetwork Dependent Convergence Protocol (SNDCP) that shall be used to provide the OSI CONS over subnetworks or with equipment using the 1980 version of the X.25/PLP. This SNDCP should only be used if the elements of the X.25/PLP-1984, as defined in 5.1 of this International Standard, are not available to support the OSI CONS.

Annex B gives the conformance requirements for equipment providing the OSI CONS by one or more of the methods in this International Standard and defines the possibilities and rules for interworking between such equipment.

Annexes A and B are integral parts of this International Standard. They are intended to provide a migration strategy towards the use of the 1984 version of X.25 in both subnetworks and DTEs. Their status will be reviewed periodically.

Annex C provides additional considerations on the relationship between the X.25 protocol procedures and the CONS primitives.

Annex D illustrates the use of X.25 Network Protocol Address Information (NPAI), i.e., the Address Field and the Address Extension Facilities.

Annex E illustrates the use of X.25 transit delay facilities.

The above three annexes are not integral parts of this International Standard.

The relationship between the X.25/PLP-1984 and the OSI CONS is shown in Figure 1. This relationship is described only in terms of the Network Layer entities that provide the CONS. No discussion is given here to describe the actions of a Network Layer entity that only provides a relay function for a given network connection.

The OSI Network Service is defined in terms of:

a. the primitive actions and events of the Service;

b. the parameters associated with each primitive action and event, and the form which they take; and

c. the interrelationship between, and the valid sequences of, these actions and events.

The OSI Network Service does not specify individual implementations or products nor does it constrain the implementation of entities and interfaces within a computer system.

The X.25/PLP-1984 is defined in terms of:

a. procedures for Virtual Calls and Permanent Virtual Circuits;

b. formats of packets associated with these procedures; and

c. procedures and formats for optional user facilities and CCITT-Specified DTE facilities.

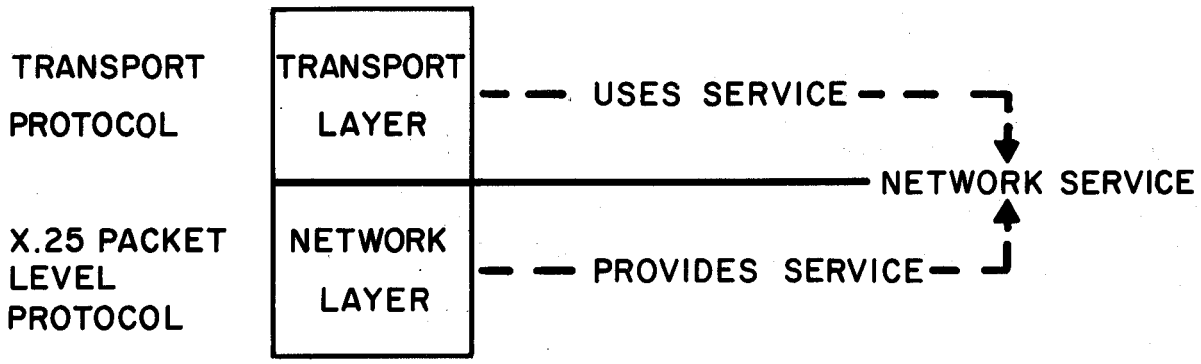


FIGURE 1

Relationship of the X.25 Packet Level Protocol to the OSI Connection-Mode Network Service

The use of the word "Network" to name the "Network" Layer of the OSI Reference Model should be distinguished from the use of the word "network" to denote a communications network as conventionally understood. To facilitate this distinction, the term "subnetwork" is used for a collection of physical equipment, commonly called a "network" (reference ISO 7498). Subnetworks may be either public or private networks. In the case of public networks, their properties may be determined by separate CCITT Recommendations such as X.21 for a circuit-switched network or X.25 for a packet-switched network.

Throughout the set of OSI Standards, the term "Service" refers to the abstract capability provided by one layer of the OSI Reference Model to the layer above it. Thus, the Network Service is a conceptual architectural Service, independent of administrative divisions.

NOTE — It is important to distinguish the specialized use of the term "Service" within the set of OSI standards from its use elsewhere to describe the provision of a service by an organization (such as the provision of a service, as defined in CCITT Recommendations, by an Administration).

1 Scope and field of application

The OSI CONS, as stated above, is defined in terms of a set of primitive actions and events and associated parameters. For a protocol to support this service, there must be a mapping between the abstract primitives and parameters of the CONS and the real elements of the protocol. This International Standard provides such a mapping for the X.25/PLP-1984. It also provides a mapping of the CONS primitives and parameters to the X.25/PLP-1980 plus an SNDCP (Annex A). In addition, the method of selecting the appropriate mapping, if any, for different combinations of end systems and Network Layer relay systems implementing one or more of the mappings is defined (Annex B).

This International Standard specifies the conformance requirements for three classes of implementation. These requirements are applicable both to end system operation and to half the operation of a Network Layer relay. Where relay operation is concerned, the two halves of the relay may be the same or different classes of implementation.

This International Standard specifies the requirements to be met by a *Conforming-1984* implementation. Implementations in this class are designed to operate directly and efficiently with other Conforming-1984 implementations, including cases of operation across an X.25(1984) subnetwork.

This International Standard also specifies the requirements to be met by a *Conforming-1980* implementation. Implementations in this class are designed to operate directly with other Conforming-1980 implementations, including cases of operation across any form of X.25 subnetwork, but will operate less efficiently than Conforming-1984 implementations.

This International Standard also specifies the requirements to be met by a *Compatible* implementation. Implementations in this class are designed to operate directly with all other implementation classes, including cases of operation across any type of X.25 subnetwork. They make efficient use of X.25(1984) when placed in this environment.

The X.25/PLP-1984 or X.25/PLP-1980 with the SNDCP is usually regarded as operating between an end system (i.e., a "Data Terminal Equipment" in X.25 terminology) and a packet-switched public data subnetwork. However, the X.25/PLP-1984 or X.25/PLP-1980 with the SNDCP can also be used in other environments to provide the OSI CONS. Examples of such other uses include:

a. an end system connected to an X.25 packet-switched private data subnetwork;

b. an end system connected to a local area network;

c. direct connection or circuit-switched connection (including connection across a circuit-switched data subnetwork) of two end systems without an intervening packet-switched public data subnetwork; and

d. an end system connected to an Integrated Services Digital Network.

2 References

ISO 7498, *Information processing systems — Open Systems Interconnection — Basic Reference Model.*

ISO 8208, *Information processing systems — Data communications — X.25 Packet Level Protocol for Data Terminal Equipment.*

ISO 8348, *Information processing systems — Data communications — Network service definition.*

ISO 8348/Add. 2, *Information processing systems — Data communications — Network service definition — Addendum 2: Network layer addressing.*

ISO/TR 8509, *Information processing systems — Open Systems Interconnection — Service conventions.*

CCITT Recommendation X.25, *Interface Between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit*, 1984 (Red Book).

CCITT Recommendation X.96, *Call Progress Signals in Public Data Networks*, 1984 (Red Book).

SECTION ONE: GENERAL

3 Definitions

3.1 Reference Model definitions

The following concepts, developed and defined in the OSI Reference Model (ISO 7498), are used:

a. Network connection
b. Network Layer
c. Network Service
d. Network Service Access Point
e. Network Service Access Point address
f. Subnetwork

3.2 Service Conventions definitions

The following terms, as they apply to the Network Layer and as defined in the Service Conventions Standard (ISO/TR 8509), are used:

a. Network Service user
b. Network Service provider
c. primitive
d. request
e. indication
f. response
g. confirm

3.3 Network Service definitions

The following terms, as defined in the Network Service (ISO 8348), are used:

a. Calling Network Service user

b. Called Network Service user

3.4 Addressing definitions

The following concepts, as defined in ISO 8348/Add. 2, are used:

a. Subnetwork Point of Attachment address
b. Network Protocol Address Information
c. Initial Domain Part
d. Authority and Format Identifier
e. Initial Domain Identifier
f. Domain Specific Part

3.5 X.25 definitions

The following concepts, as developed in the X.25 Packet Level Protocol for DTEs (ISO 8208) and in CCITT Recommendation X.25, are used:

a. virtual circuit
b. Virtual Call
c. logical channel
d. Packet Level
e. Data Terminal Equipment
f. Data Circuit-terminating Equipment
g. DXE (either a DTE or a DCE)

3.6 X.96 definitions

The following terms, as defined in CCITT Recommendation X.96, are used:

a. Category C call progress signal
b. Category D call progress signal

4 Abbreviations

4.1 Network Service abbreviations

CONS	Connection-Mode Network Service
N	Network
NC	Network-connection
NL	Network Layer
NS	Network Service
NSAP	Network Service Access Point
OSI	Open Systems Interconnection
QOS	Quality of Service

4.2 Addressing abbreviations

AFI	Authority and Format Identifier
DSP	Domain Specific Part
IDI	Initial Domain Identifier
IDP	Initial Domain Part
NPAI	Network Protocol Address Information
SNPA	Subnetwork Point of Attachment

4.3 X.25 abbreviations

AEF	Address Extension Facility
AF	Address Field
D-bit	Delivery Confirmation bit

DCE	Data Circuit-terminating Equipment
DTE	Data Terminal Equipment
EDN	Expedited Data Negotiation (Facility)
EETDN	End-to-End Transit Delay Negotiation (Facility)
FPF	Facility Parameter Field
GFI	General Format Identifier
LC	Logical channel
M-bit	More Data bit
MBS	M-bit Sequence
MTCN	Minimum Throughput Class Negotiation (Facility)
PLP	Packet level protocol
P(R)	Packet receive sequence number
P(S)	Packet send sequence number
TCN	Throughput Class Negotiation (Facility)
TDSAI	Transit Delay Selection And Indication (Facility)
VC	Virtual Call

4.4 Abbreviations applying to Annex A

AE	Address Extension (parameter)
ID	Identifier
LI	Length Indicator
MTC	Minimum Throughput Class (parameter)
N-CC	Network Connection confirm
N-CR	Network Connection request
N-DR	Network Disconnect request
NPDU	Network Protocol Data Unit
NSDU	Network Service Data Unit
PT	Parameter Type
PV	Parameter Value
Q-bit	Qualifier Bit
SNDCP	Subnetwork Dependent Convergence Protocol

5 Overview

The Network Service provides for the transparent transfer of data between NS users. It makes invisible to these NS users the way in which supporting communications resources are utilized to achieve this transfer.

5.1 Elements of the X.25/PLP-1984 used to support the OSI CONS

The X.25/PLP-1984, as defined by ISO 8208, provides a specific realization for the transparent transfer of data between NS users of the CONS. The elements of this protocol to be considered are:

a. the virtual-circuit types;

b. the packet types and fields to be mapped to the primitives and parameters of the OSI CONS; and

c. the optional user facilities and CCITT-Specified DTE facilities.

Of the two types of virtual circuits defined in ISO 8208, the use of Virtual Calls (VCs) is mapped to the NC Establishment and Release Phases of the OSI CONS.

Table 1 below lists the X.25/PLP-1984 packets and associated fields that shall be used when supporting the OSI CONS.

TABLE 1

PACKETS AND FIELDS OF THE X.25/PLP-1984 USED TO SUPPORT THE OSI CONS

Packet Types[1]	Fields[2]
CALL REQUEST INCOMING CALL CALL ACCEPTED CALL CONNECTED	General Format Identifier[3], Address Field, Facility Field, Call and Called User Data Field[4]
CLEAR REQUEST CLEAR INDICATION	Clearing Cause Field, Diagnostic Code Field, Address Field, Facility Field, Clear User Data Field[4]
DATA	D-bit, M-bit, P(S)[5], P(R)[5], User Data Field[4]
INTERRUPT	Interrupt User Data Field[4]
RECEIVE READY[6] RECEIVE NOT READY[6] REJECT[6] (if agreed to)	P(R)[5]
RESET REQUEST RESET INDICATION	Resetting Cause Field, Diagnostic Code Field
RESTART INDICATION	Restarting Cause Field, Diagnostic Code Field

NOTES

1. The packets shown in the table are used in support of the primitives of the OSI CONS. Other packets not shown in the table (i.e., CLEAR CONFIRMATION, INTERRUPT CONFIRMATION, RESET CONFIRMATION, and RESTART CONFIRMATION packets) are essential to the use of the packets shown. Yet other packets (i.e., RESTART REQUEST, DIAGNOSTIC, REGISTRATION REQUEST, and REGISTRATION CONFIRMATION packets) have no relationship to the provision of the OSI CONS.
2. The information in the fields shown in the table have a direct relationship to the parameters associated with the primitives of the OSI CONS. Other fields not shown in the table (e.g., the Logical Channel Identifier, the Packet Type Identifier, the Address Length Fields, and the Facility Length Field) are essential to the use of the appropriate packets.
3. Bit 7 of octet 1 of the GFI in these packets is used to negotiate the overall availability of the D-bit in support of the Receipt Confirmation Service. As such, this bit has no specific field-name as defined in the X.25/PLP-1984.
4. All user data fields are octet aligned.
5. The P(S) and P(R) fields are essential to the operation of the X.25/PLP-1984 in providing the Receipt Confirmation Service.
6. The action implied by these packets has no relationship to the primitives of the OSI CONS. However, the P(R) field is essential to the operation of the X.25/PLP-1984 in providing the Receipt Confirmation Service.

In addition, the following optional user facilities and CCITT-Specified DTE facilities shall be used and/or agreed to:

a. optional user facilities —

- Fast Select (facility used; when operating in a DTE-to-DTE environment without an intervening packet-switched network, the use of the Fast Select Facility shall also be agreed to by the two DTEs),
- Fast Select Acceptance (facility agreed to if operating in a packet-switched network environment),
- Throughput Class Negotiation (facility agreed to and used), and

- Transit Delay Selection And Indication (facility used);

b. CCITT-Specified DTE facilities —

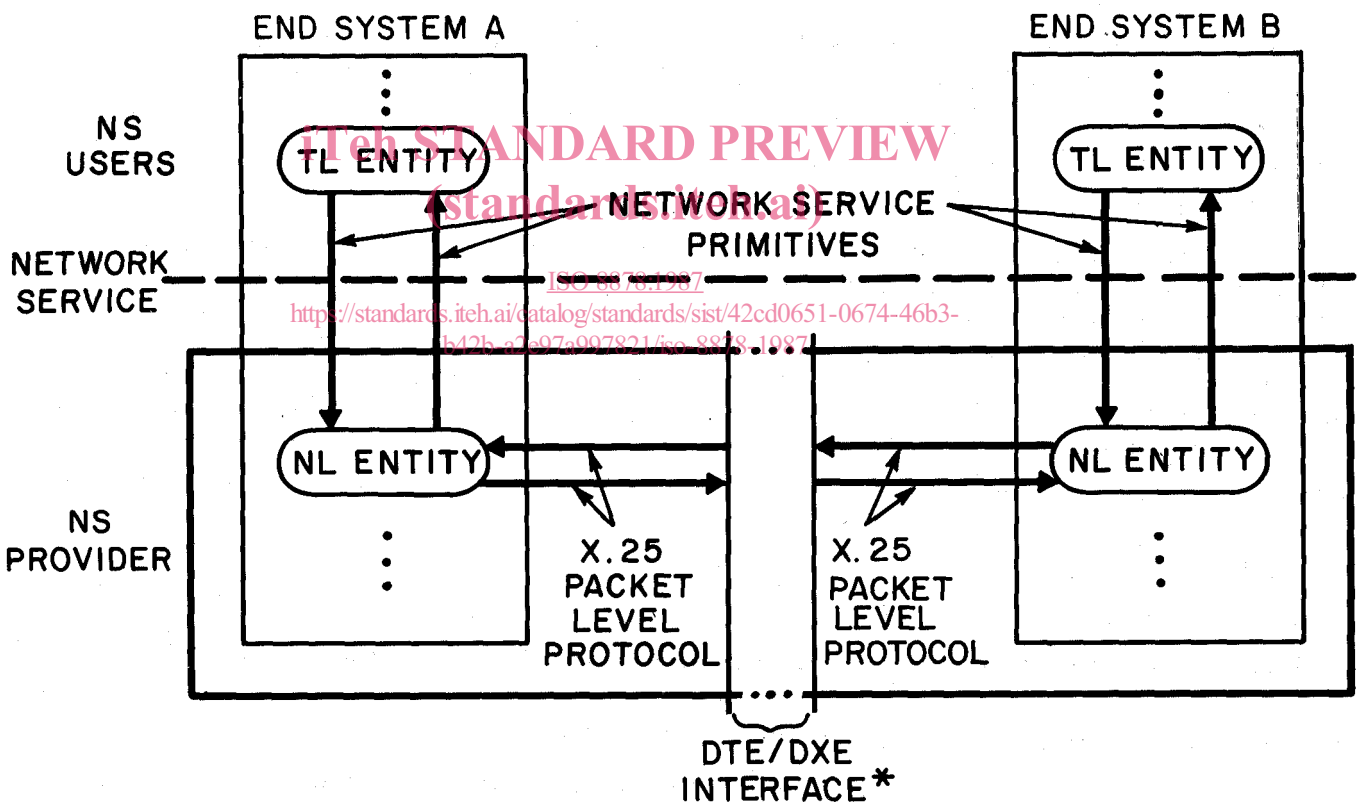
- Called Address Extension (facility used),
- Calling Address Extension (facility used),
- End-to-End Transit Delay Negotiation (facility used),
- Expedited Data Negotiation (facility used), and
- Minimum Throughput Class Negotiation (facility used).

5.2 General operation of the X.25/PLP-1984 for supporting the OSI CONS

The X.25/PLP-1984 can be used to provide the OSI CONS in an end system connected to a public or private X.25 packet-switched subnetwork. It can also be used in environments where the end system is connected to a Local Area Network or where end systems are connected by a dedicated path or by a circuit-switched connection.

As shown in Figure 2, the NS provider (more particularly, the NL entity in an end system) must provide a translation between

a. the primitives and parameters of the OSI CONS; and
b. the packets and associated fields of the X.25/PLP-1984.



* This interface consists of zero or more Network Layer entities providing a Network Layer relay function.

FIGURE 2

Operation of OSI Connection-Mode Network Service and X.25 Packet Level Protocol (1984)

Request and response primitives are translated into packets to be transmitted across the DTE/DXE interface by the NL entity. Received packets, where appropriate, are translated by the NL entity into indication and confirm primitives.

Annex C provides additional considerations on the relationship between the X.25 protocol procedures and the CONS primitives.

NOTE — The Network Service Definition specifies valid sequences of primitives at an NC endpoint and valid parameter responses at the called NC endpoint to Receipt Confirmation negotiation, Expedited Data negotiation, and QOS parameter negotiation. The necessity for the NL entity to monitor compliance and the actions to be taken on non-compliance are a local matter, and not subject to standardization.

There is also a relationship between some local mechanism used to identify a particular NC and a LC number used to identify a particular virtual circuit. This relationship is a local matter and is not discussed here.

SECTION TWO: MAPPING THE OSI CONS TO/FROM THE X.25/PLP-1984

6 Network connection establishment phase

6.1 Primitive/Parameter and Packet/Field relationships

Table 2 shows the relationships between the primitives/parameters used during the Network Connection Establishment Phase and the packets/fields associated with the Call Setup Procedures.

6.2 Procedures

6.2.1 Primitive/Packet mapping

When an NL entity receives an N-CONNECT request or an N-CONNECT response primitive from an NS user, it transmits a CALL REQUEST or a CALL ACCEPTED packet, respectively, across the DTE/DXE interface.

When an NL entity receives an INCOMING CALL or a CALL CONNECTED packet, it signals an N-CONNECT indication or an N-CONNECT confirm primitive, respectively, to the NS user.

6.2.2 NSAP addresses

Local operation determines the contents of the NPAI and whether NSAP Addresses, where explicitly supplied, are mapped to and from the Address Field (AF) or the Address Extension Facilities (AEF) of X.25/PLP-1984 call setup packets. Annex D describes guidelines for the methods by which the required AF contents may be derived from the NSAP Address. The permitted techniques for the placement of NSAP Addresses in either the AF or AEF are given in this clause. The encoding techniques to be employed are those specified in ISO 8208 for the AF and AEF. The content of these fields shall be in the preferred binary encoding defined in ISO 8348/Add. 2. Examples of encoding NSAP Addresses in the NPAI of the X.25/PLP-1984 are also given in Annex D.

NOTE — The use of the preferred binary encoding results in binary-coded decimal digits in the AF, as required by ISO 8208.

6.2.2.1 Encoding of NSAP addresses

6.2.2.1.1 Use of the AF

Under certain conditions, the NSAP Address, as defined in ISO 8348/Add. 2, 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 of 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 6.2.2.1.2).

6.2.2.1.2 Use of the AEF

When the conditions in 6.2.2.1.1 are not satisfied, the AEF shall be used. The NSAP Address, complete with AFI, is placed in the AEF (bits 8 and 7 of the first octet of the FPF of the AEF are both set to zero). In this case,

TABLE 2

CONS:X.25/PLP-1984 MAPPING FOR THE NETWORK CONNECTION ESTABLISHMENT PHASE

CONS	X.25/PLP-1984
PRIMITIVES:	**PACKETS:**
N-CONNECT request	CALL REQUEST
N-CONNECT indication	INCOMING CALL
N-CONNECT response	CALL ACCEPTED
N-CONNECT confirm	CALL CONNECTED
PARAMETERS:	**FIELDS (INCLUDING FACILITIES):**
Called Address	Called DTE Address Field Called Address Extension Facility
Calling Address	Calling DTE Address Field Calling Address Extension Facility
Responding Address	Called DTE Address Field Called Address Extension Facility
Receipt Confirmation Selection	General Format Identifier[1]
Expedited Data Selection	Expedited Data Negotiation Facility
QOS-Parameter Set	Throughput Class Negotiation Facility[2] Minimum Throughput Class Negotiation Facility Transit Delay Selection And Indication Facility End-to-End Transit Delay Negotiation Facility
NS-User-Data	Call and Called User Data Field Fast Select Facility[3]

NOTES

1. Bit 7 of octet 1 of the GFI in call setup packets is used to negotiate the overall availability of the D-bit in support of the Receipt Confirmation Service. As such, this bit has no specific field-name as defined in the X.25/PLP-1984.
2. For proper operation, this optional user facility shall also be agreed to for use on the interface.
3. For proper operation, the Fast Select Acceptance Facility shall also be agreed to on the interface when accessing a packet-switched network.

the contents of the AF are not defined by this International Standard. Guidelines for their derivation are given in Annex D.

6.2.2.2 Decoding of NSAP addresses

6.2.2.2.1 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.

6.2.2.2.2 AEF case

If the AEF is present and bits 8 and 7 of the leading octet of the FPF are both set to zero, 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.

6.2.3 Receipt Confirmation selection

Bit 7 of octet 1 in the GFI of X.25/PLP-1984 call setup packets is mapped to/from the Receipt Confirmation Selection parameter of N-CONNECT primitives.

If the Receipt Confirmation Selection parameter of the N-CONNECT request primitive indicates "use of Receipt Confirmation," then the NL entity, if it can support the D-bit Procedure as defined in 8.2.3 and 9.2.1, sets bit 7 of the GFI to 1 to indicate use of receipt confirmation during the Data Transfer Phase. If "no use of Receipt Confirmation" is indicated or the NL entity cannot support the D-bit Procedure, then bit 7 is set to 0.

When an NL entity receives an INCOMING CALL packet with bit 7 of the GFI set to 1 but it cannot support the D-bit Procedure, it indicates "no use of Receipt Confirmation" in the Receipt Confirmation Selection parameter of the N-CONNECT indication primitive signaled to the Called NS user. Otherwise, if bit 7 of the GFI is set to 1 (respectively, 0), then the NL entity indicates "use (respectively, no use) of Receipt Confirmation" in the Receipt Confirmation Selection parameter of the N-CONNECT indication primitive signaled to the Called NS user.

When an NL entity receives an N-CONNECT response primitive with the Receipt Confirmation Selection parameter indicating "use (respectively, no use) of Receipt Confirmation," it sets bit 7 of the GFI in the CALL ACCEPTED packet to 1 (respectively, 0).

When an NL entity receives a CALL CONNECTED packet with bit 7 of the GFI set to 1 (respectively, 0), it indicates "use (respectively, no use) of Receipt Confirmation" in the Receipt Confirmation Selection parameter of the N-CONNECT confirm primitive signaled to the Calling NS user.

6.2.4 Expedited Data selection

The Expedited Data Negotiation (EDN) Facility of the X.25/PLP-1984 is mapped to/from the Expedited Data Selection parameter of N-CONNECT primitives.

If the Expedited Data Selection parameter of the N-CONNECT request primitive indicates "use of Expedited Data," then the NL entity, if it can support the Interrupt Procedure using 32-octet INTERRUPT packets, encodes the EDN Facility to indicate use of expedited data during the Data Transfer Phase. If "no use of Expedited Data" is indicated or the NL entity cannot support 32-octet INTERRUPT packets, then the EDN Facility is encoded to indicate no use of expedited data; alternatively, the EDN Facility may be omitted.

When an NL entity receives an INCOMING CALL packet with no EDN Facility or with the EDN Facility indicating use of expedited data but it cannot support 32-octet INTERRUPT packets, it indicates "no use of Expedited Data" in the Expedited Data Selection parameter of the N-CONNECT indication primitive signaled to the Called NS user. Otherwise, if the EDN Facility indicates use (respectively, no use) of expedited data, then the NL entity indicates "use (respectively, no use) of Expedited Data" in the Expedited Data Selection parameter of the N-CONNECT indication primitive signaled to the Called NS user.

When an NL entity receives an N-CONNECT response primitive with the Expedited Data Selection parameter indicating "use (respectively, no use) of Expedited Data," it encodes the EDN Facility in the CALL ACCEPTED packet to indicate use (respectively, no use) of expedited data. If the Expedited Data Selection parameter indicates "no use of Expedited Data," the NL entity may omit the EDN Facility from the CALL ACCEPTED packet.

When an NL entity receives a CALL CONNECTED packet with the EDN Facility indicating use (respectively, no use) of expedited data, it indicates "use (respectively, no use) of Expedited Data" in the Expedited Data Selection parameter of the N-CONNECT confirm primitive signaled to the Calling NS user. If the CALL

CONNECTED packet has no EDN Facility, then the NL entity indicates "no use of Expedited Data" to the Calling NS user.

6.2.5 QOS parameter set

The set of QOS parameters that are conveyed during the NC Establishment Phase consists of three parameters:

a. the throughput for the direction of data transfer from the Calling NS user to the Called NS user;

b. the throughput for the direction of data transfer from the Called NS user to the Calling NS user; and

c. the transit delay that applies to both directions of data transfer.

For each of these three parameters, a set of "subparameters" is defined as follows:

a. a "Target" value, which is the QOS value desired by the Calling NS user;

b. a "Lowest Quality Acceptable" value, which is the lowest QOS value agreeable to the Calling NS user;

c. an "Available" value, which is the QOS value the NS provider is willing to provide; and

d. a "Selected" value, which is the QOS value to which the Called NS user agrees.

The set of values that can be specified for each subparameter is defined in every Network Service. This set includes the value "unspecified." It may also include a value defined to be a "default value" that is mutually understood by the NS provider and an NS user as applying in the absence of particular values.

6.2.5.1 Throughout QOS parameters

The Throughout Class Negotiation (TCN) Facility and the Minimum Throughput Class Negotiation (MTCN) Facility of the X.25/PLP-1984 are mapped to/from both Throughput QOS parameters of N-CONNECT primitives. The specific mapping of these X.25/PLP-1984 facilities to/from both sets of Throughput subparameters is given in Table 3.

TABLE 3

MAPPING OF THROUGHPUT QOS SUBPARAMETERS TO X.25/PLP-1984 FACILITIES

CONS		X.25/PLP-1984	
Subparameter	Primitive	Facility	Packet
Target	N-CONNECT request	TCN	CALL REQUEST
Lowest Quality Acceptable	N-CONNECT request	MTCN	CALL REQUEST
Available	N-CONNECT indication	TCN	INCOMING CALL
Lowest Quality Acceptable	N-CONNECT indication	MTCN	INCOMING CALL
Selected	N-CONNECT response	TCN	CALL ACCEPTED
Selected	N-CONNECT confirm	TCN	CALL CONNECTED

The set of values that can be specified for each Throughput subparameter ranges from 75 bits per second through 48000 bits per second, inclusive. This set consists of the following discrete values: 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, and 48000 bits per second. An NL entity supports either all of these values or a contiguous subset of them. The value "unspecified" is also allowed.

6.2.5.1.1 Processing an N-CONNECT Request primitive

If an NL entity, when receiving an N-CONNECT request primitive, cannot support the Lowest Quality Acceptable throughput (i.e., the minimum throughput) when specified for either direction of data transfer, then it rejects the request. In this case, the NL entity does not transmit any X.25/PLP-1984 packet but it does signal an N-DISCONNECT indication primitive to the Calling NS user. The Originator parameter is "NS Provider." The Reason parameter is "Connection Rejection — QOS Not Available/Transient Condition," or "Connection Rejection — QOS Not Available/Permanent Condition" if the NL entity could never support the Lowest Quality Acceptable for either direction of data transfer.