INTERNATIONAL STANDARD

ISO 8878

First edition
1987-09-01

ADDENDUM 2
1990-06-15

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

ADDENDUM 2: Use of an X.25 PVC to provide the OSI CONS

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

ADDITIF 2: Utilisation d'un PVC X.25 pour fournir l'OSI CONS

Reference number
ISO 8878 : 1987/Add.2 : 1990 (E)

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Addendum 2 to ISO 8878:1987 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology.*

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

ADDENDUM 2: Use of an X.25 PVC to provide the OSI CONS

1. Clause 0, Paragraph 1, Line 1: Delete "two".
2. Clause 0, Paragraph 1, Line 2: Insert the words "Virtual Call (VC) and Permanent Virtual Circuit (PVC) services of the" before "X.25 Packet Level Protocol."
3. Clause 0, Paragraph 1, Line 2: Change the first three words to "For VCs, one method, which is presented. . ."
4. Clause 0, Paragraph 1, Line 4: Change "The second method" to "A second method for VCs,"
5. Clause 0: Add the following new paragraph after Paragraph 7:

   Annex F defines the method for providing the OSI CONS in conjunction with the PVC service of X.25. Annex F is a normative part of this International Standard.
6. Clause 1, Paragraph 1, Line 5: Add the following sentence after ". . .(Annex A)."

   These mappings apply to the X.25 VC service.
7. Clause 1: Add the following new paragraph after Paragraph 1:

   For the PVC service for both the X.25/PLP-1984 and the X.25/PLP-1980, a mapping of CONS primitives and parameters to the X.25/PLP is given in Annex F.
8. Clause 4.3: Add the following to the list of abbreviations:

   PVC Permanent Virtual Circuit
9. Clause 5.1: Extend Paragraph 2 by adding the following:

   in Clauses 6 and 7 (the corresponding mapping for PVCs is given in Annex F).
10. Add Annex F as provided on the following pages.

ANNEX F

Subnetwork Convergence Protocol For Use With X.25 Permanent Virtual Circuits

This annex is normative.

F.0 Introduction and scope

This annex defines a set of SNDCP procedures for use with X.25 Permanent Virtual Circuit (PVC) service for X.25-1980 and later versions. These procedures provide:

a) a mechanism for transferring data during the "connection establishment" and "connection release" phases of a Network Connection;

b) a method for transferring NSAP Addresses;

c) association of QOS characteristics with the PVC; and

d) a method for selecting use of the Receipt Confirmation and Expedited Data options.

With the use of the procedures in this annex, a PVC can be used to provide the CONS for different NCs, with the same or different parameter values, at different times.

This annex specifies the procedures for use by an End System: the PVC can connect the End System either to another End System or to an Intermediate System. This annex allows for the possibility of using a PVC in support of other protocols, but not simultaneously with the procedures of this annex (apart from transient collision cases, which do not fail unnecessarily).

F.1 Overview

The procedures defined in this annex provide a mechanism for using X.25 PVC service in support of the OSI CONS. These procedures make up for the lack of dynamic mechanisms visible to the NS user for NC establishment and release. No special procedures are defined here for the data transfer phase.

The procedures in this annex make use of the packets, packet fields, and states associated with the X.25 Virtual Call (VC) service. The "images" of these packets (i.e., "packet images") are encoded within X.25 DATA packets. The states associated with the VC service are considered as substates within state d1.

Two timers and one retransmission counter are specified for the SNDCP procedures: the Connect Response Timer, the Disconnect Response Timer, and the Disconnect Retransmission Counter. The procedures for use, and the default values, of these are the same as those for T21, T23, and R23, respectively, in ISO 8208.

F.2 Abbreviations

The abbreviations given in the main body of this International Standard apply, with the following additions:

Q-bit	Qualifier bit
SNDCP	Subnetwork Dependent Convergence Protocol

F.3 Protocol mechanisms

F.3.1 NC establishment procedure

The mapping of primitives/parameters used during the NC Establishment phase to packet-images/fields is given below.

a) An N-CONNECT request primitive and the associated parameters are mapped to a CALL REQUEST packet-image and the associated fields, as specified in clause 6 of the main body of this International Standard.

NOTE — The NL entity considers the QOS aspects (e.g., throughput) that were associated with the PVC, when it was established, in relation to the QOS parameters of the N-CONNECT request primitive (see 6.2.5). For example, if the Lowest Quality Acceptable Throughput of an N-CONNECT request primitive is greater than the throughput class of a particular PVC, then that PVC shall not be used for the associated NC.

b) This CALL REQUEST packet-image is sent to the remote NL entity in an M-bit Sequence (MBS) of one or more DATA packets. The Q-bit in all DATA packets of the MBS shall be set to 1. The Connect Response Timer shall be started. The timer is normally terminated when the connection establishment is completed. If the timer expires, then the connection shall be disconnected (see F.3.2).

c) An MBS of one or more DATA packets with its(their) Q-bit set to 1 and recognized as an INCOMING CALL packet-image is mapped to an N-CONNECT indication primitive and the associated parameters, as described in clause 6 of the main body of this International Standard.

d) The equivalent procedure is applied to an N-CONNECT response primitive and CALL ACCEPTED packet-image, and to an N-CONNECT confirm primitive and CALL CONNECTED packet-image.

The roles of "DCE" and "DTE" for resolution of call collision procedures shall be established a priori. That is, in the event of a collision between a CALL REQUEST packet-image and an INCOMING CALL packet-image, the procedures of ISO 8208 for resolving call collision shall be followed by applying the roles of "DTE" and "DCE" to the two ends of the PVC.

If the PVC is not in state d1 (flow control ready), the N-CONNECT request primitive shall be answered with an N-DISCONNECT indication primitive, where the Originator-parameter value is "NS Provider," and the Reason-parameter value is "Connection Rejection — Reason Unspecified/Transient Condition."

For X.25-1980, the EDN Facility shall be encoded by the NL entity as "no use of Expedited Data" in the CALL REQUEST packet-image; alternatively, the EDN Facility may be omitted.

F.3.2 NC release procedure

F.3.2.1 Invocation of NC release

An N-DISCONNECT request primitive and associated parameters are mapped to a CLEAR REQUEST packet-image and associated fields, as specified in clause 7 of the main body of this International Standard.

Invocation of NC release by the NL entity, resulting in an N-DISCONNECT indication primitive to the NS user, also results in a CLEAR REQUEST packet-image. The Cause and Diagnostic Code Fields map to the Originator and Reason parameters of the primitive, as specified in 7.2.2 of the main body of this International Standard.

In either case, the CLEAR REQUEST packet image shall be sent in an MBS of one or more DATA packets. The Q-bit set in all DATA packets of the MBS shall be set to 1. The Disconnect Response Timer is started. If the logical channel is in state f2 (DXE receive not ready), the NL entity shall reset the logical channel before transmitting the CLEAR REQUEST packet-image.

On receipt of a CLEAR CONFIRMATION or CLEAR INDICATION packet-image, the NL entity shall stop the Disconnect Response Timer and the NC release is complete.

If the Disconnect Response Timer expires, the CLEAR REQUEST packet-image shall be retransmitted and the Disconnect Response Timer shall be restarted. The maximum number of such retransmissions is determined by the value of the Disconnect Retransmission Counter.

F.3.2.2 Response to NC release

A received CLEAR INDICATION packet-image and associated fields are mapped to an N-DISCONNECT indication primitive and associated parameters, as specified in clause 7 of the main body of this International Standard. On receiving such a packet-image, the NL entity shall send a CLEAR CONFIRMATION packet-image in a DATA packet with the M-bit set to 0 and the

Q-bit set to 1. The NC release is then complete at the NL entity. If the logical channel is in state f2 (DXE receive not ready), the NL entity shall reset the logical channel before transmitting the CLEAR CONFIRMATION packet-image.

F.3.3 Procedures for X.25 reset during NC establishment or release

If, during the NC establishment procedure, the NL entity receives a RESET INDICATION packet, it shall

a) respond to the reset by transmitting a RESET CONFIRMATION packet; and

b) then, invoke the NC release procedure, as specified in F.3.2.1.

If, during the NC release procedure, the NL entity receives a RESET INDICATION packet, then the NL entity shall confirm the RESET INDICATION packet but shall otherwise ignore the packet with respect to the effects on the NC release procedure.

F.3.4 Data transfer phase of the NC

The data transfer phase is carried out as described in clauses 8-11. In particular, the Q-bit of DATA packets used for data transfer is set to 0.

If a RESET REQUEST packet is transmitted but not confirmed after R22 retransmissions, the NL entity shall signal an N-DISCONNECT indication primitive to the NS User. The Originator parameter is "NS Provider" and the Reason parameter is "Disconnection — Transient Condition."

F.3.5 Protocol violations

F.3.5.1 SNDCP violations

If an MBS of one or more DATA packets is received with the Q-bit set to 1 and is not formatted as a valid packet-image for a call setup or call clearing packet appropriate to the state of the NC (if any), then:

a) if there is an NC present (i.e., in the NC establishment phase or the data transfer phase), then the NL entity shall invoke the release of the NC as specified in F.3.2.1;

b) if no NC is present and the Disconnect Response Timer is not running, then the NL entity shall act as specified in F.3.2.1 for invocation of NC release except that no N-DISCONNECT indication primitive is generated;

c) otherwise, if no NC is present and the Disconnect Response Timer is running, the received MBS shall be discarded.

F.3.5.2 Unexpected packets received

When the Disconnect Response Timer is running following rejection of an incoming NC establishment attempt or following release of an established NC, any INTERRUPT packet received and any DATA packet received with the Q-bit set to 1 shall be discarded. At other times when no NC is in the data transfer phase, such packets shall be ignored as being outside the scope of this annex.

NOTE — The procedures specified above permit co-existence of the SNDCP specified in this annex with other protocols, provided that such other protocols do not set the Q-bit to 1 in the first DATA packet of an instance of communication. Such co-existence applies to successive, not simultaneous, use of the protocols.

F.3.5.3 Other protocol violations

Other protocol violations during an NC shall be dealt with as specified in clause 12 of the main body of this International Standard.

F.4 Protocol encoding for NC establishment and release

The encoding of packet-images used during the NC establishment and release phases is exemplified in Figure 7.