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SERIES X: DATA NETWORKS AND OPEN SYSTEM
COMMUNICATION

Public data networks – Transmission, signalling and
switching

Interworking between PSPDNs via B-ISDN

ITU-T Recommendation X.77

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION X.77**INTERWORKING BETWEEN PSPDNs VIA B-ISDN****Summary**

This Recommendation defines the procedures for interworking case of concatenation of PSDTSs via B-ISDN. It includes reference configurations, protocol stacks and detailed signalling procedures. The Recommendation may be used in the case where packet-switched links between networks providing PSDTS services are transferred over B-ISDN networks as backbone networks.

Source

ITU-T Recommendation X.77 was prepared by ITU-T Study Group 7 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 9th of August 1997.

FOREWORD

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The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Recommendation X.77

INTERWORKING BETWEEN PSPDNs VIA B-ISDN

(Geneva, 1997)

1 Scope of the Recommendation

This Recommendation defines the procedures for interworking case of concatenation of PSDTs via B-ISDN. It includes reference configurations, protocol stacks and detailed signalling procedures.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- ITU-T Recommendation E.164 (1997), *The international public telecommunication numbering plan*.
- ITU-T Recommendation E.166 (1996), *Numbering plan interworking for the E.164 and X.121 numbering plans*.
- ITU-T Recommendation I.150 (1995), *B-ISDN asynchronous transfer mode functional characteristics*.
- ITU-T Recommendation I.211 (1993), *B-ISDN service aspects*.
- ITU-T Recommendation I.361 (1995), *B-ISDN ATM layer specification*.
- ITU-T Recommendation I.363 (1993), *B-ISDN ATM Adaptation Layer (AAL) specification*.
- ITU-T Recommendation I.365.1 (1993), *B-ISDN ATM adaptation layer sublayers: Frame relaying service specific convergence sublayer (FR-SSCS)*.
- ITU-T Recommendation I.371 (1996), *Traffic control and congestion control in B-ISDN*.
- ITU-T Recommendation I.413 (1993), *B-ISDN user-network interface*.
- ITU-T Recommendation I.430 (1995), *Basic user-network interface – Layer 1 specification*.
- ITU-T Recommendation I.431 (1993), *Primary rate user-network interface – Layer 1 specification*.
- ITU-T Recommendation I.432 (1993), *B-ISDN user-network interface – Physical layer specification*.
- ITU-T draft Recommendation I.505, *Identification and selection of interworking function*.
- ITU-T Recommendation I.580 (1995), *General arrangements for interworking between B-ISDN and 64 kbit/s based ISDN*.
- ITU-T Recommendation Q.2110 (1994), *B-ISDN ATM adaptation layer – Service Specific Connection Oriented Protocol (SSCOP)*.
- ITU-T Recommendation Q.2130 (1994), *B-ISDN signalling ATM adaptation layer – Service Specific Coordination Function for support of signalling at the User-Network Interface (SSCF at UNI)*.
- ITU-T Recommendation Q.2931 (1995), *Digital Subscriber Signalling System No. 2 (DSS 2) – User-Network Interface (UNI) layer 3 specification for basic call/connection control*.
- ITU-T Recommendation X.1 (1996), *International user classes of service in, and categories of access to, public data networks and Integrated Services Digital Networks (ISDNs)*.



Documents

Document Sharing Hub

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- ITU-T Recommendation X.25 (1996), *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.*
- ITU-T Recommendation X.31 (1995), *Support of packet mode terminal equipment by an ISDN.*
- ITU-T Recommendation X.32 (1996), *Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and accessing a packet-switched public data network through a public switched telephone network or an integrated services digital network or a circuit-switched public data network.*
- ITU-T Recommendation X.75 (1996), *Packet-switched signalling system between public networks providing data transmission services.*
- ITU-T Recommendation X.121 (1996), *International numbering plan for public data networks.*
- ITU-T Recommendation X.122 (1996), *Numbering plan interworking for E.164 and X.121 numbering plans.*
- ITU-T Recommendation X.213 (1995) | ISO/IEC 8348:1996, *Information technology – Open Systems Interconnection – Network service definition.*
- ITU-T Recommendation I.365.4 (1996), *B-ISDN ATM adaptation layer sublayers: Service specific convergence sublayer for HDLC applications.*

3 Terms and definitions

This Recommendation defines the following terms.

3.1 DL-FRAME SSCF: The Service Specific Convergence Function for HDLC Applications. Detailed description for DL-FRAME SSCF is shown in Recommendation I.365.4.

4 Abbreviations

This Recommendation uses the following abbreviations:

AAL	ATM Adaptation Layer
ATM	Asynchronous Transfer Mode
AU	Access Unit
B-ET	Exchange Terminal for Broadband ISDN
B-ISDN	Broadband ISDN
B-NT	Network Termination for Broadband ISDN
B-TA	Terminal Adaptor for Broadband ISDN
BCOB	Broadband Connection Oriented Bearer class
CH	Cell Handler
CPCS	Common Part Convergence Sublayer
CPCS-CI	CPCS-Congestion Indication
CPCS-LP	CPCS-Loss Priority
CPCS-UU	CPCS-User-to-User indication
DNIC	Data Network Identification Code
DTE	Data Terminal Equipment
ISDN	Integrated Services Digital Network
IWF	InterWorking Function
NT	Network Termination

PH	Packet Handler
PMBS	Packet Mode Bearer Service
PSDTS	Packet-Switched Data Transmission Services
PSPDN	Packet-Switched Public Data Network
PVC	Permanent Virtual Circuit
QOS	Quality of Service
SSCF	Service Specific Convergence Function
STE	Signalling Terminal
SVC	Switched Virtual Call
TA	Terminal Adaptor
TE	Terminal Equipment
VCI	Virtual Channel Identifier
VPCI	Virtual Path Connection Identifier

5 Conventions

No particular conventions are included.

6 Reference configurations

There are two cases in terms of the connection establishment method through the B-ISDN network (see Figure 6.1):

- the case where B-ISDN connections are Permanent virtual channel (PVC);
- the case where B-ISDN connections are Switched virtual channel (SVC).

In this configuration, an X.77 signalling terminal (X.77-STE) with X.75 and ATM capabilities is equivalent to a combination consisting of an X.75 Signalling Terminal (STE) and an ATM-Adaptor with ATM capabilities (for ATM capabilities; see clause 14).

Interfaces between X.77-STE/ATM-Adaptor and the B-ISDN are UNI of the B-ISDN. An X.75 datalink connection shall be associated with one ATM virtual channel.

6.1 Case where B-ISDN provides PVC

In the case where ATM connection is PVC, the protocol stack is shown in Figure 6-2.

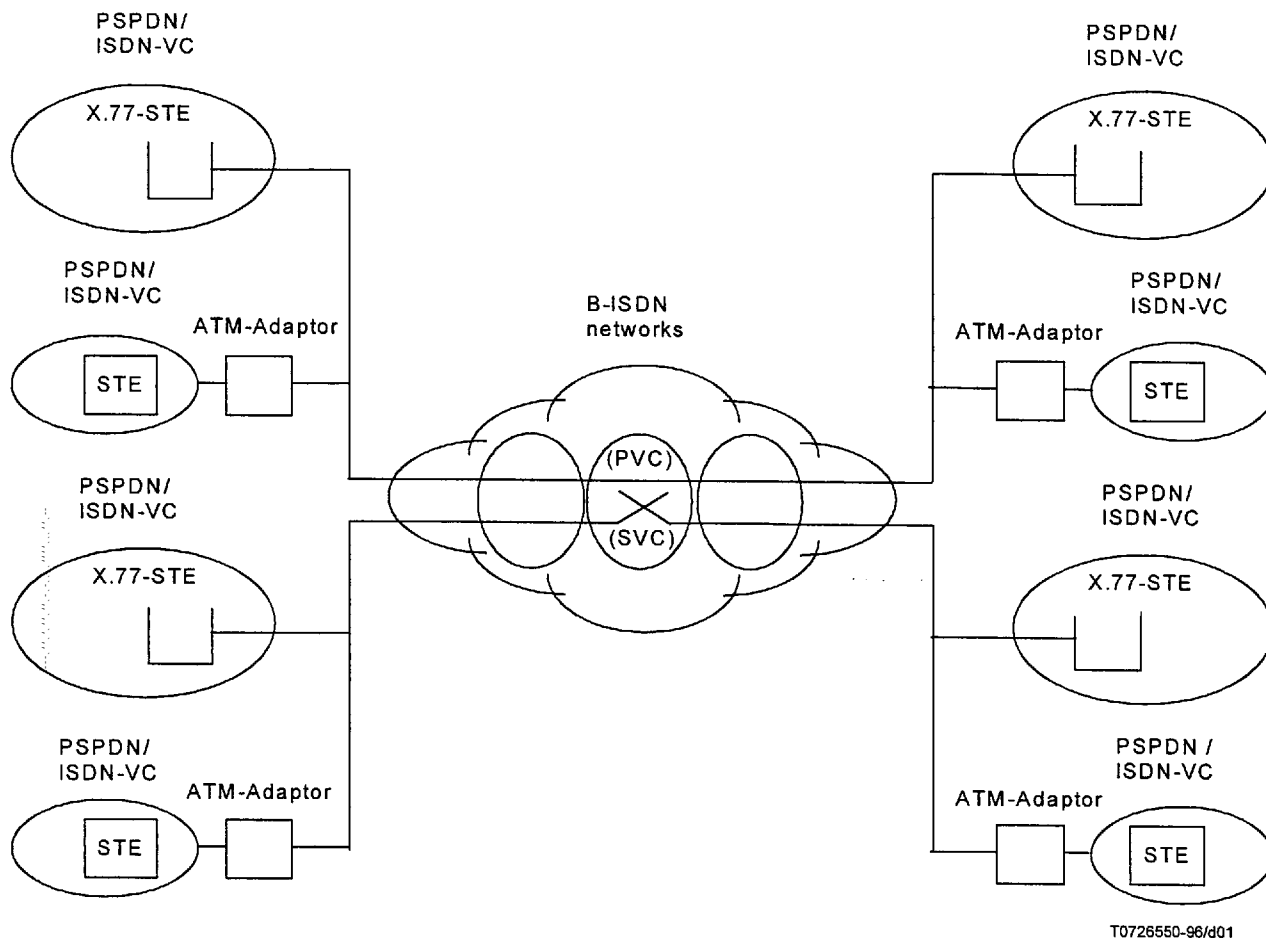
Either ATM-Adaptor or X.77-STE should support AAL type 5 Common part function and DL-FRAME SSCF (see 11.1.1) to convey X.75 frames.

NOTE – Use of AAL type 1 instead of AAL type 5 should not be precluded.

In the case where AAL type 5 is used, AAL type 5 message mode service will be available. The functionality of the DL-FRAME SSCF only provides for the mapping of the equivalent primitives of AAL to CPCS and vice versa.

In this case, the ATM connection shall be established by procedures beyond the scope of this Recommendation.





NOTE – SVC case of using ATM-Adaptor is for further study

Figure 6-1/X.77 – Reference configuration of interworking between networks providing PSDTs via B-ISDNs

6.2 Case where B-ISDN provides SVC

6.2.1 U-plane

See 6.1.

6.2.2 C-plane

C-plane protocol stack is shown in Figure 6-3.

ATM connection shall be established by the procedures specified in clause 13.

7 Service parameters and service quality

7.1 Peak cell rate

The Peak Cell Rate in the Source Traffic Descriptor specifies an upper bound on the traffic that can be applied on an ATM connection. Enforcement of this bound by the UPC/NPC allows the network operator to allocate sufficient resources to ensure that the performance objectives (e.g. for Cell Loss Ratio) can be achieved (see 2.4.1/1.371).

7.2 Service quality

The QOS level for Peak Cell Rate may be delivered within a certain probability.

NOTE – Other parameters are for further study.