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**Širokopasovno digitalno omrežje z integriranimi storitvami (B-ISDN) -
Komutacijske, centralne in prevezovalne funkcije in zmogljivostne zahteve**

Broadband Integrated Services Digital Network (B-ISDN); Switching, exchange and cross-connect functions and performance requirements

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Integrated Services Digital
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Foreword

This ETSI Technical Report (ETR) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

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1 Scope

This ETSI Technical Report (ETR) describes Broadband Integrated Services Digital Network (B-ISDN) switching, exchange and cross-connect functions and performance requirements and applies to public network nodes of a B-ISDN.

This ETR is not intended to define any systems or equipment in, or connected to, B-ISDN network nodes.

Some text may only apply to a certain type (or types) of B-ISDN network node. Where this occurs, the application is defined in the text. Not all the recommended functions will necessarily be provided in every B-ISDN network node.

2 References

For the purposes of this ETR, the following references apply:

- [1] DE/SPS-03007: "Broadband Integrated Services Digital Network (B-ISDN); Metasignalling protocol".
- [2] DE/SPS-03019: "Broadband Integrated Services Digital Network (B-ISDN); Information models and protocols for the management/control of the ATM switching network element".
- [3] CCITT Recommendation I.113: "Vocabulary of terms for broadband aspects of ISDN".
- [4] ITU-T Recommendation I.211: "General service aspects of B-ISDN".
- [5] ITU-T Recommendation I.311: "B-ISDN general network aspects".
- [6] ITU-T Recommendation I.356: "B-ISDN ATM layer cell transfer performance".
- [7] ITU-T Recommendation I.361: "B-ISDN ATM layer specification".
- [8] ITU-T Recommendation I.371: "Traffic control and congestion control in B-ISDN".
- [9] ITU-T Recommendation I.432: "B-ISDN user-network interface - Physical layer specification".
- [10] ITU-T Recommendation I.580: "General arrangements for interworking between B-ISDN and 64 kbit/s based ISDN".
- [11] ITU-T Recommendation I.610: "Organisation and maintenance principles of the B-ISDN access".
- [12] ITU-T Recommendation M.3010: "Principles for a telecommunications management network".
- [13] CCITT Recommendation Q.9: "Vocabulary of switching and signalling terms".
- [14] CCITT Recommendation Q.511: "Exchange interfaces towards other exchanges".
- [15] CCITT Recommendation Q.512: "Exchange interfaces for subscriber access".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of this ETR, the following definitions apply:

Asynchronous Transfer Mode (ATM)

ATM is used in this ETR as addressing a specific packet oriented transfer mode using Asynchronous Time Division (ATD) multiplexing technique: the multiplexed information flow is organised in fixed size blocks, called cells. A cell consists of an user information field and a header field; the primary role of the header is to identify cells belonging to the same virtual channel on the ATD multiplex. Cells are assigned on demand, depending on the source activity and the resources available. Cell sequence integrity on a virtual channel is guaranteed by the B-ISDN.

ATM is a connection-oriented technique: header values are assigned to each section of a connection at call set-up and released at the end of the call. Signalling and user information are carried on separate virtual channels.

ATM is designed to offer a flexible transfer capability common to all services.

ATM Cross-Connect (AXC)

The ATM cross-connect is directed by management plane functions only. According to the functionalities provided by the user plane ATM cross-connects are classified into:

- ATM Multiplexers (MUX) (bandwidth management, Usage Parameter Control (UPC), header translation functions can be limited);
- ATM cross-connect.

ATM switch

The ATM switch is directed by control plane functions. According to the functionalities provided by the control plane ATM switches are classified into local exchanges, transit exchanges and concentrators.

B-ISDN network node

A B-ISDN network node is a cell handling node of the public ATM-based network including Virtual Path (VP)/Virtual Channel (VC) cross-connect (ATM cross-connect) and VP/VC switches (ATM switch).

3.2 Symbols and abbreviations

For the purposes of this ETR, the following abbreviations apply:

AAL	ATM Adaptation Layer
ATD	Asynchronous Time Division
ATM	Asynchronous Transfer Mode
AXC	ATM Cross-Connect
B-ISDN	Broadband ISDN
CBR	Constant Bit Rate
CON	ATM Concentrator
CPN	Customer Premises Network
ET	Exchange Termination
GMDP	Generalised Markovian Deterministic Process
HEC	Header Error Control
HED	Head-End for Distribution services
ISDN	Integrated Services Digital Network
LEX	Local EXchange
MUX	ATM Multiplexer
NNI	Network Node Interface
NPC	Network Parameter Control

OAM	Operations, Administration and Maintenance
SDH	Synchronous Digital Hierarchy
STM	Synchronous Transfer Mode
TEX	Transit EXchange
TMN	Telecommunications Management Network
UNI	User-Network Interface
UPC	Usage Parameter Control
VBR	Variable Bit Rate
VC	Virtual Channel
VCI	Virtual Channel Identification
VP	Virtual Path
VPI	Virtual Path Identification

4 Overview

4.1 Principles of B-ISDN

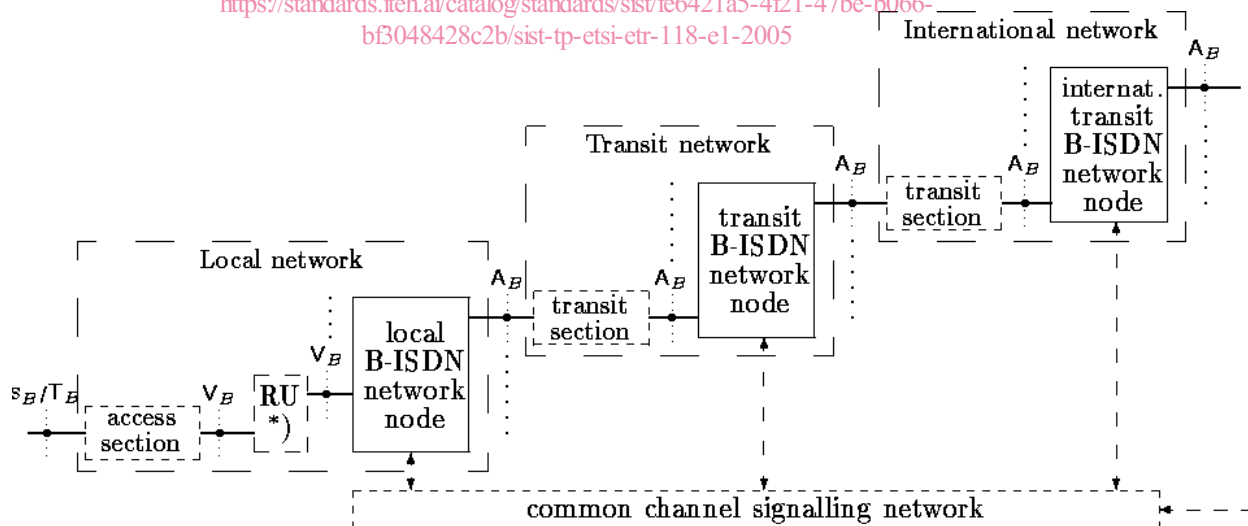
The main feature of the B-ISDN concept is the support of a wide range of audio, video and data applications in the same network. A key element of service integration for B-ISDN is the provision of a range of services using a limited set of connection types and multi-purpose user-network interfaces. B-ISDNs support both switched and non-switched connections.

A B-ISDN will contain intelligence for the purpose of providing service features, maintenance and network management functions. This intelligence may not be sufficient for some new services and may have to be supplemented by either additional intelligence within the network, or possibly compatible intelligence in the user terminals.

A layered structure should be used for the specification of the access protocol to a B-ISDN.

4.2 Field of application (standards.iteh.ai)

This ETR is intended to be applied to public ATM-based network nodes in a B-ISDN. The general reference configuration of the B-ISDN is illustrated in figure 1.



*) May or may not exist.

NOTE: The relationship between B-ISDN and Telecommunications Management Network (TMN) is for further study.

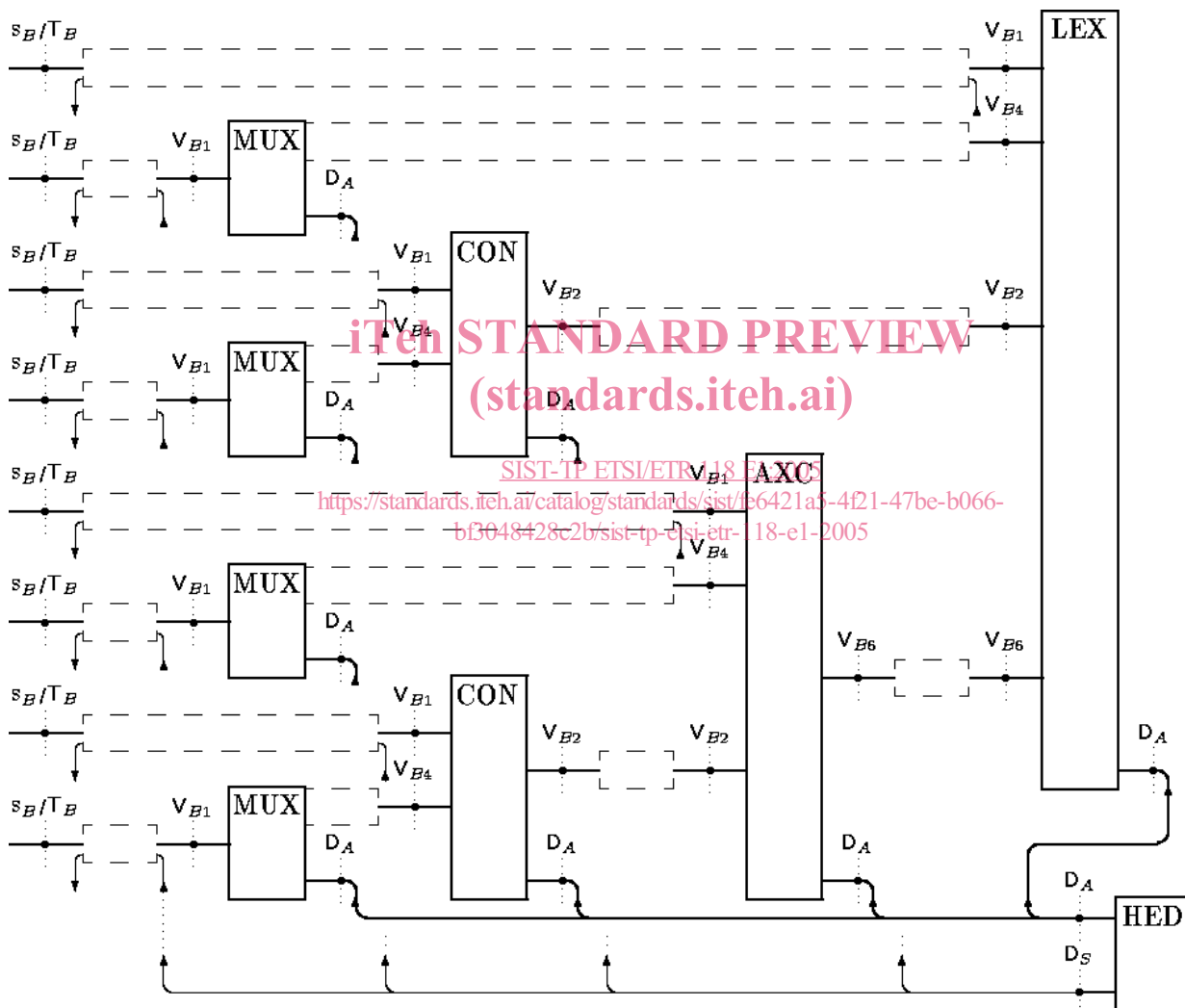
Figure 1: General reference configuration of public B-ISDN

It is recognized that B-ISDN may be implemented in a variety of ways according to specific national situations, e.g. this may be the use of the existing telecommunication infrastructure and technology. For the selection of features, functions and interfaces to be provided in a B-ISDN, the different releases (i.e. release 1, 2 and 3) as defined by ITU-T Study Group 13 (formerly CCITT Study Group XVIII) should be taken into account.

In figure 2, the configuration for B-ISDN customer access is detailed. A number of ATM Concentrators (CONs) and ATM Cross-Connects (AXCs) are shown.

In addition, a so-called "Head-End for Distribution services" (HED) is identified which may provide the distribution channels towards the Customer Premises Network (CPN). The interfaces and possible distribution services are for further study.

Two different solutions for provisioning of such distribution channels towards the customer are illustrated which are either based on ATM techniques (interface at reference point D_A) or other techniques but integrated in the B-ISDN customer access on the transmission level (interface at reference point D_S).



NOTE: The arrows indicate the direction of the distribution channels. Additional backward channels may be required for signalling and Operations, Administration and Maintenance (OAM) flows.

Figure 2: Possible configurations for subscriber access including distribution services

In figure 3, the configuration for B-ISDN interexchange trunks of the public B-ISDN is detailed. Beside direct interconnections of B-ISDN exchanges (either a Local EXchange (LEX) or a Transit EXchange (TEX)), connections via ATM cross-connect equipment are illustrated.

In addition, there are pure VP switching based connections shown which may be used to realize so-called "leased lines" between CPNs.

It should be mentioned that cross-connect equipment based on Synchronous Transfer Mode (STM) or Synchronous Digital Hierarchy (SDH) techniques are considered as part of the transmission systems and not as B-ISDN network nodes.

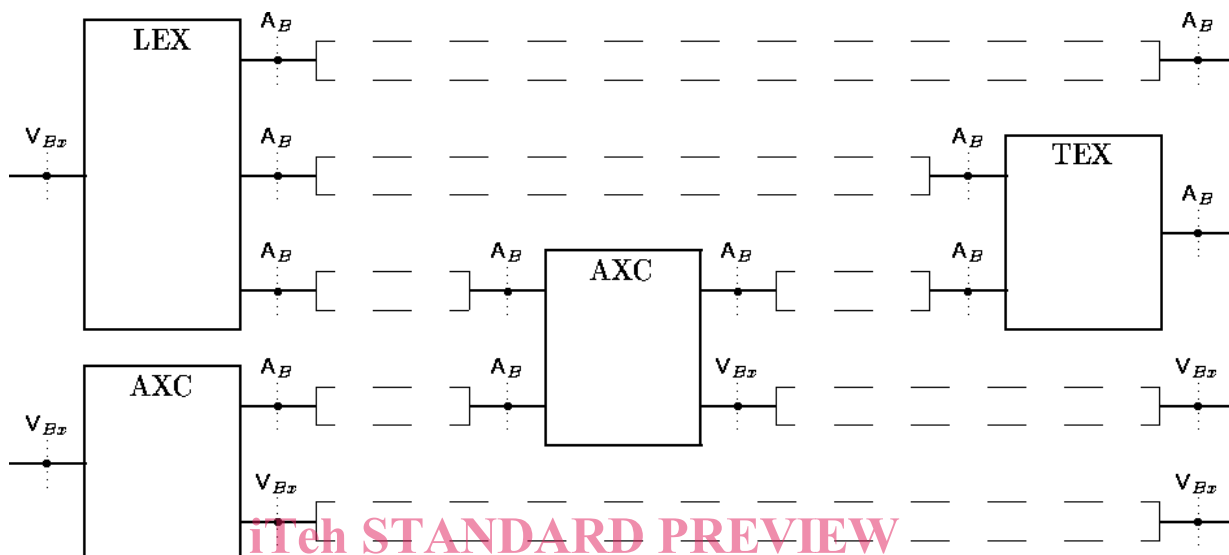


Figure 3: Configurations for interexchange trunks

5 General characteristics of B-ISDN network nodes

5.1 General

5.1.1 Cell structure and encoding of the header elements

The cell structure and encoding of the header elements is specified in ITU-T Recommendation I.361 [7].

The following exceptions are identified for this ETR:

- cell loss priority indication (see ITU-T Recommendation I.371 [8]);
- the usage of the cell loss priority requires further study.

6 Interfaces on B-ISDN network nodes

6.1 General

This Clause is not intended to define any transmission system, network or customer premises equipment in or connected to a CPN or B-ISDN network node via these interfaces. Therefore only the characteristics of the interfaces are described.

Within this ETR, a digital section is defined as the whole of the means of digital transmission between two consecutive reference points.