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**Broadband Integrated Services Digital Network (B-ISDN);  
Broadband Virtual Path Service (BVPS);  
Part 1: BVPS for Permanent communications (BVPS-P)**

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## Foreword

This European Telecommunication Standard (ETS) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS defines stage one of the Broadband Virtual Path Service (BVPS) for a Broadband Integrated Services Digital Network (B-ISDN), as provided by European public telecommunication operators.

This ETS consists of 2 parts as follows:

**Part 1:** "BVPS for Permanent communications (BVPS-P)".

Part 2: "BVPS for Reserved communications (BVPS-R)".

<b>Transposition dates</b>	
Date of adoption of this ETS:	31 August 1995
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Date of withdrawal of any conflicting National Standard (dow):	31 May 1996

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## 1 Scope

This European Telecommunication Standard (ETS) defines the stage 1 of the Broadband Virtual Path Service for Permanent communications (BVPS-P) for a Broadband Integrated Services Digital Network (B-ISDN), as provided by European public telecommunication operators.

Part 2 of this ETS (ETS 300 455-2 [13]) defines the stage 1 of the Broadband Virtual Path Service for Reserved communications (BVPS-R) for a Broadband Integrated Services Digital Network (B-ISDN), as provided by European public telecommunication operators.

This ETS does not specify the additional requirements where the service is provided to the user via a telecommunication network that is not a B-ISDN, but it does include requirements for interworking of other networks with a B-ISDN.

This ETS is applicable to stage two and stage three standards for the BVPS-P. The terms "stage two" and "stage three" are also defined in CCITT Recommendation I.130 [4]. Where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorisation leaving freedom, or as a capability or possibility), this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this ETS is met by conforming to the stage three standards with the field of application appropriate to the equipment being implemented. Therefore, no method of testing is provided for this ETS.

Charging principles and management operations are outside the scope of this ETS.

The BVPS-P provides the transfer of unrestricted digital information between  $T_B$ - or  $S_B/T_B$  reference points. It does not preclude the applicability of the BVPS-P to  $S_B$ .

The provision of the BVPS-P is based on the use of Asynchronous Transfer Mode (ATM) Virtual Path (VP) connections in a B-ISDN.

## 2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] CCITT Recommendation E.164 (1991): "Numbering plan for the ISDN era".
- [2] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".
- [3] ITU-T Recommendation I.113 (1993): "Vocabulary of terms for broadband aspects of ISDN".
- [4] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [5] ITU-T Recommendation I.140 (1993): "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [6] ITU-T Recommendation I.150 (1993): "B-ISDN asynchronous transfer mode functional characteristics".
- [7] ITU-T Recommendation I.356 (1993): "B-ISDN ATM layer cell transfer performance".

- [8] ITU-T Recommendation I.361 : "B-ISDN ATM layer specification".
- [9] ITU-T Recommendation I.371 (1993): "Traffic control and congestion control in B-ISDN".
- [10] ITU-T Recommendation M.3010 (1992): "Principles for a telecommunications management network".
- [11] ETS 300 299: "Broadband Integrated Services Digital Network (B-ISDN); Cell based user network access; Physical layer interfaces for B-ISDN applications".
- [12] ETS 300 300: "Broadband Integrated Services Digital Network (B-ISDN); Synchronous Digital Hierarchy (SDH) based user network access; Physical layer interfaces for B-ISDN applications".
- [13] ETS 300 455-2: "Broadband Integrated Services Digital network (B-ISDN); Broadband Virtual Path Service (BVPS); Part 2: BVPS for Reserved communications (BVPS-R)".

### 3 Definitions, symbols and abbreviations

#### 3.1 Definitions

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

**Asynchronous Transfer Mode (ATM):** See ITU-T Recommendation I.113 [3], definition 204.

**broadband:** See ITU-T Recommendation I.113 [3], definition 101.

**Cell Delay Variation (CDV) tolerance:** The CDV tolerance  $\tau$  corresponds to the maximum anticipated time variation with respect to the Theoretical Arrival Time, see ITU-T Recommendation I.371 [9], subclause 2.4.1.1.

**Integrated Services Digital Network (ISDN):** See ITU-T Recommendation I.112 [2], subclause 2.3, definition 308.

**ISDN number:** A number conforming to the numbering plane and structure specified in CCITT Recommendation E.164 [1].

**non-periodic VP:** A non-periodic VP is a VP whose values of PBR and Quality of Service (QoS) are constant for the subscription duration.

**Peak Cell Rate (PCR):** See ITU-T Recommendation I.371 [9], subclause 2.4.1.1. The PCR is expressed as an integer number of cells per second.

**Peak Emission Interval (PEI):** See ITU-T Recommendation I.371 [9], subclause 2.4.1.

**periodic VP:** A periodic VP is a VP whose same scheme of the values of PBR and QoS repeats within each period for the subscription duration.

**service, telecommunication service:** See ITU-T Recommendation I.112 [2], definition 201.

**Service Management Entity (SME):** The SME is the functional entity to which manager's VP registration requests, VP modification requests and interrogation requests are addressed (see figure A.1).

**subscriber:** The entity that subscribes to the BVPS-P.

**time slot:** The time interval between the activation and the following deactivation of a VP. The duration of an  $i^{\text{th}}$  time slot  $De_i$  is defined by  $De_i = De_{\min} + M_i \times P$  where  $De_{\min}$  is the minimum duration of the time slot,  $M_i$  is an integer and  $P$  is a fixed duration of time.  $De_{\min}$  and  $P$  are service constants.



**user:** Each of the subscriber's functional entity that sends or receives ATM cells through  $T_B$  or  $S_B/T_B$  reference point.

**Virtual Channel (VC):** See ITU-T Recommendation I.113 [3], definition 401.

**Virtual Channel Identifier (VCI):** A logical number that locally identifies a specific VC at a User-Network Interface (UNI).

**Virtual Path (VP):** From the user's point of view, a virtual end-to-end connection that ensures unidirectional or bi-directional transport of ATM cells belonging to VCs that are associated by a common VPI at each UNI.

**Virtual Path Identifier (VPI):** A logical number that identifies a specific VP at a UNI.

### 3.2 Symbols and abbreviations

For the purposes of this ETS, the following symbols and abbreviations apply:

ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
BVPS-P	Broadband Virtual Path Service for Permanent communications
BVPS-R	Broadband Virtual Path Service for Reserved communications
CBR	Constant Bit Rate
CDV	Cell Delay Variation
(N-)ISDN	(Narrowband) Integrated Services Digital Network
PCR	Peak Cell Rate
PEI	Peak Emission Interval
QoS	Quality of Service
SME	Service Management Entity
SP	Service Provider
UNI	User-Network Interface
VBR	Variable Bit Rate
VC	Virtual Channel
VCI	Virtual Channel Identifier
VP	Virtual Path
VPI	Virtual Path Identifier

## 4 Description

The BVPS-P permits communication in both directions between two users in a point-to-point configuration.

The provision of the BVPS-P is based on VP connections in a B-ISDN.

A communication is established in permanent mode (for non-periodic and periodic use).

In accordance with ITU-T Recommendation I.361 [8], there can be up to and including 256 VPs associated with the subscription to the BVPS-P.

The physical bit rate at the  $T_B$  or  $S_B/T_B$  reference points corresponds to the existing UNIs as defined within ETS 300 299 [11] and ETS 300 300 [12].

The parameter "PCR" is associated with each VP. The network shall allocate the appropriate resources using the PCR value. Statistical multiplexing cannot be used for the BVPS-P.

The subscriber can negotiate with the Service Provider (SP) any value of the PCR that is available at the UNI and agreed by the SP.

The SP shall enforce user cells according to the PCR reference algorithm specified in ITU-T Recommendation I.371 [9]. The cell conformance is defined with reference to the pair  $(T, \tau)$  where  $T$  is the PEI and  $\tau$  is the CDV tolerance. The SP shall provide the user the values of PEI and CDV tolerance that are part of the traffic contract.

User information transfer is unrestricted. It is structured in ATM Cells. The cell format is of the UNI type defined in ITU-T Recommendation I.361 [8], subclause 2.2. The bit rate of the source can be Constant Bit Rate (CBR) or Variable Bit Rate (VBR). The effective availability of the PCR (greater than zero) for a VP corresponds to a time slot. During a time slot as defined within this ETS, the user provides user information in blocks of 48 octets that shall be transparently transferred.

## 5 Procedures

### 5.1 Provision and withdrawal

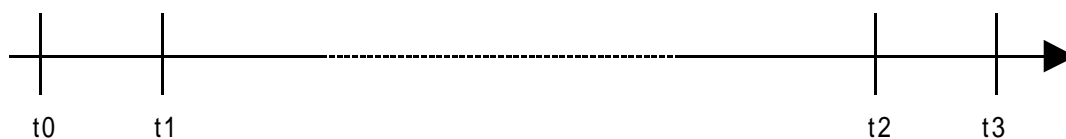
The BVPS-P is provided after prior arrangement with the SP.

The BVPS-P permits the establishment of permanent communication between two UNIs.

It has to be noted that subscriptions of reserved (see ETS 300 455-2 [13]) and permanent establishments of communications can coexist on the same UNI.

The subscription states the maximum number  $Nb_{max}$  of VPs per UNI. According to ITU-T Recommendation I.361 [8], the number of VPs available at the UNI is less than or equal to 256. Hence,  $Nb_{max}$  is evaluated taking these constraints into account.

Provision and withdrawal procedures are based on schedule 1 (see figure 1). Provision of the BVPS-P corresponds to subscription phase and withdrawal of the BVPS-P corresponds to the end of the subscription.



- t0 : time at which the subscription to the BVPS-P is requested.
- t1 : time at which the BVPS-P is available.
- t2 : time at which the subscription to the BVPS-P is requested to be terminated.
- t3 : time at which the subscription to the BVPS-P is effectively terminated.

**Figure 1: Schedule 1**

The notification time  $Ta = t1 - t0$  is necessary greater than or equal to a minimum time  $Ta_{min}$ .

The availability of BVPS-P  $Da = t3 - t1$  corresponds to the subscription duration.  $Da$  varies between the minimum subscription duration  $Da_{min}$  and the maximum subscription duration  $Da_{max}$ . If  $t3$  is not indicated  $Da$  is assumed equal to  $Da_{max}$ .

The values of  $Ta_{min}$ ,  $Da_{min}$  and  $Da_{max}$  are fixed by the SP.

Each VP is available at its subscribed PCR during a period  $Da$ .

Non-periodic or/and periodic VPs can be subscribed.

At the subscription the SP and the subscriber negotiate the values of service parameters for each VP.

For a non-periodic VP subclause 5.1.1 applies.

For a periodic VP subclause 5.1.2 applies.

Following parameters are defined per VP.

### 5.1.1 Non-periodic VP

#### 5.1.1.1 Mandatory subscription parameters

The following subscription parameters shall be agreed by the SP and the subscriber:

- ISDN numbers of the users;
- values of the VPIs;
- subscription beginning time:  $t_1$ ;
- symmetry: unidirectional, bi-directional symmetric or bi-directional asymmetric;
- PCR: in each direction for a bi-directional asymmetric VP.

#### 5.1.1.2 Optional subscription parameters

As a SP option, the following parameters may be agreed by the SP and the subscriber:

- subscription end time:  $t_3$ ;
- value of QoS: in each direction for a bi-directional asymmetric VP.

### 5.1.2 Periodic VP

This subscription allows the specification of a period and of a number  $N$  of time slots within the period (see figure 2). The number  $N$  of time slots shall be within 1 and  $N_{max}$  (fixed by the SP).

For each time slot the values of the PCR and QoS can be specified independently from the values they have in other time slots.

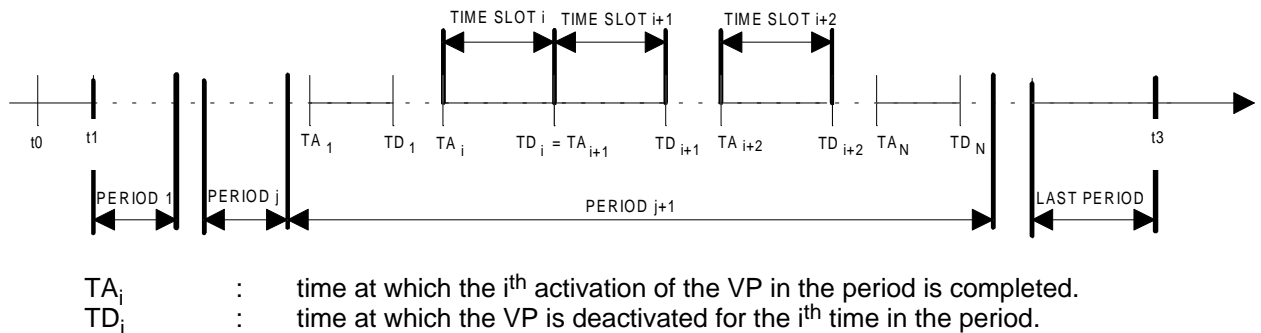


Figure 2: Schedule 2

#### 5.1.2.1 Mandatory subscription parameters

The following subscription parameters shall be agreed by the SP and the subscriber:

- ISDN numbers of the users;
- values of the VPIs;
- subscription beginning time:  $t_1$ ;
- period: day, week or month;
- beginning time of each time slot in the period:  $TA_i$  (with  $1 \leq i \leq N$ );
- end time of each time slot in the period:  $TD_i$  (with  $1 \leq i \leq N$  and  $TA_i < TD_i \leq TA_{i+1}$ );
- symmetry: unidirectional, bi-directional symmetric or bi-directional asymmetric;
- PCR for each time slot: in each direction for a bi-directional asymmetric VP.

#### 5.1.2.2 Optional subscription parameters

As a SP option, the following parameters may be agreed by the SP and the subscriber:

- subscription end time:  $t_3$  that corresponds to the end of the last period;
- value of QoS for each time slot, in each direction for a bi-directional asymmetric VP.

## 5.2 Normal procedures

### 5.2.1 Activation and deactivation

The activation procedure leads to the effective availability of the requested PCR (greater than zero) for the VP.

The deactivation procedure leads to the PCR value equal to zero for the VP.

As a SP option for a periodic VP, a deactivation may be simultaneous with an activation ( $TD_i=TA_{i+1}$ ), this shall correspond to a PCR modification (without a jump to PCR zero) ensuring the continuity of the BVPS-P.

A non-periodic VP is available at the subscribed PCR for all the duration of the subscription. According to figure 1 activation occurs at time  $t_1$  and deactivation at time  $t_3$ . For a non-periodic VP, the VP setup shall be completed at time  $TA$  and the VP release shall be initiated either after or at time  $TD$  or after or at time  $t_2$ .

For a periodic VP, the activation (respectively deactivation) procedure shall be repeated for each time slot at  $TA_i$  (respectively  $TD_i$ ). For a periodic VP, the VP setup shall be completed at time  $TA_1$  of the first period and the VP release shall be initiated either after or at time  $TD_N$  of the last period or at time  $t_2$ .

### 5.2.2 Registration

The registration is done at subscription.

### 5.2.3 Registration modification

A registration modification corresponds to a subscription modification.

### 5.2.4 Erasure

The erasure leads to the deletion of all the data related to the VP in the SME.

The erasure occurs at the same time as the withdrawal.

### 5.2.5 Invocation and operation

The BVPS-P is automatically invoked when the user provides user information in blocks of 48 octets during a time slot.

## 5.3 Exceptional procedures

Not applicable

## 6 Interworking

### 6.1 Interworking with N-ISDNs

Not applicable.

### 6.2 Interworking with private B-ISDNs

The BVPS-P can be provided to private B-ISDN

## 7 Interaction with supplementary services

Each supplementary service description identifies the applicability to the BVPS-P

## **8 Static description of the service using attributes**

The attributes are defined in ITU-T Recommendation I.140 [5].

The values of the attributes are defined in ITU-T Recommendation I.140 [5].

### **8.1 Information transfer mode**

ATM.

#### **8.1.1 Connection mode**

Connection-oriented.

#### **8.1.2 Traffic type of VP**

The traffic of the source can be CBR or VBR. However, the source traffic bit rate shall be less than or equal to the PCR of the VP.

#### **8.1.3 End-to-end timing of VP**

Not required.

#### **8.1.4 VCI transparency**

VCI = 0 to 3 and VCI = 5 to 31 shall not be used by the user. VCI = 4 may be used by the user for end-to-end F4 flow. All other VCIs are transparent.

### **8.2 Information transfer rate**

The rate of a VP is a PCR.

If a user subscribes to several VPs, the PCR of aggregated VPs is defined as the addition of the PCRs of each single VP.

Any PCR value supported by the UNIs to be interconnected is allowed.

### **8.3 Information transfer capability of VP**

Unrestricted digital information.

### **8.4 Structure of VPs**

Cell sequence integrity.

### **8.5 Establishment of communication**

Permanent.

### **8.6 Symmetry of VP**

- a) Unidirectional.
- b) Bi-directional symmetric.
- c) Bi-directional asymmetric.

### **8.7 Communication configuration**

Point-to-point.

## **8.8 Access channels and rates**

Standardized access rates are defined within ETS 300 299 [11] and ETS 300 300 [12].

### **8.8.1 For user information**

#### **8.8.1.1 Number of channels**

Up to and including 256 VPs, but the maximum number available for each user  $Nb_{max}$  is fixed at the subscription.

#### **8.8.1.2 Type of channels**

VP.

### **8.8.2 For signalling**

Not applicable.

## **8.9 Access protocols**

### **8.9.1 Information access protocol physical layer**

Standardized physical layers are defined within ETS 300 299 [11] and ETS 300 300 [12].

### **8.9.2 Information access protocol ATM layer**

See ITU-T Recommendation I.361 [8] and ITU-T Recommendation I.150 [6].

### **8.9.3 Information access protocol ATM adaptation layer**

User defined.

## **8.10 QoS of VPs**

The QoS is based on the performance parameters defined in ITU-T Recommendation I.356 [7].

## History

Document history	
December 1994	Public Enquiry PE 75: 1994-12-05 to 1995-03-31
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