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Širokopasovno digitalno omrežje z integriranimi storitvami (B-ISDN) - Signalizacijske zahteve za video na zahtevo (VOD) in več predstavnostne interaktivne storitve

Broadband Integrated Services Digital Network (B-ISDN); Signalling requirements for Video On Demand (VOD) and multimedia interactive services

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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) defines the signalling requirements for provisioning of Video On Demand (VOD) over an ATM switched network taking into account a potential need for further Multi-Media Interactive (MMI) services. Signalling scenarios are developed showing the applicability of signalling capabilities from ITU-T and ETSI CS2 step 1 and, as appropriate, from other groups (e.g. ATM Forum).

This ETR is mainly based on network reference configuration as identified by ETSI STC NA5; inputs from other bodies are also taken into consideration. The use of signalling functionality which are under specification is also considered, as well as the definition of additional signalling capabilities if required.

2 References

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

[1] ETR 262 (1996): "Video on Demand (VOD) network aspects".

[2] Draft The ATM Forum (1996): "ATM UNI 4.0 Specification".

3 Abbreviations

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

AAL	ATM Adaptation Layer
ATC	ATM Transfer Capabilities
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband ISDN
BHLI	Broadband Higher Layer Information
CBR	Constant Bit Rate
COBI	Connection Oriented Bearer Independent
CPE	Customer Premises Equipment
CS1	Capability Set 1
CS2 step 1	Capability Set 2 step 1
DAVIC	Digital Audio Video Council
DSM-CC	Digital Media Storage Command & Control
EII	European Information Infrastructure
ETSI	European Telecommunications Standards Institute
GW1	GateWay level 1
GW2	GateWay level 2
IN	Intelligent Network
IP	Intelligent Peripherals
LAN	Local Area Network
LEX	Local Exchange
MBS	Maximum Burst Size
MMI	Multi-Media Interactive
NNI	Network Node Interface
ONP	Open Network Provision
PCR	Peak Cell Rate
PSA	Proxy Server Agent
QoS	Quality of Service
S-AAL	Signalling ATM Adaptation Layer
SAP	Service Access Point
SCF	Service Control Function
SCP	Service Control Point
SCR	Sustainable Cell Rate
SDF	Service Data Function
SRF	Specialized Resources Function
TCAP	Transaction Capabilities
TEX	Transit Exchange
UNI	User Network Interface

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VBR	Variable Bit Rate
VC	Virtual Connection
VOD	Video On Demand
VP	Virtual Path

4 VOD and interactive service assumptions

The following discussion is based on the VOD service, but the roles described, especially for the Broker and the Service Provider are common to all the interactive services. Referring to the VOD attention is drawn to the interactive versions of this service, usually named interactive VOD and Quasi Interactive VOD. This discussion is not fully pertinent to the Near VOD, which is closer to a distributive service.

4.1 Functional roles and network entities

Considering a general functional model for the provision of the VOD (and more generally of the MMI services) there are four general functional roles which are relevant for the description of the use of the signalling functionality in the provision of these services:

User: It is the user of the services, potentially every subscriber of the network.

Broker: It is the broker of the service; it re-sells the service giving to the User some added values, such as a better selection of the Service Provider or of the film. The presence in the network of few (one?) brokers is foreseen.

Service Provider: It is the entity that supports the real provision of the service. More than one Service Provider is foreseen in the network.

Content Provider: It is the provider of the video images, it could be a big film house or distributor. More than one Content Provider is foreseen in the network.

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On the basis of the reference architecture for the provision of VOD on ATM switched network a one-to-one mapping between the first three functional roles previously identified and the network entities in this network reference architecture can be done:

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CPE: It is the equipment located at the User premises and allows the User to access to the service. It can also allow the share of the local loop, for example between the video transmission and the normal telephone line.

service gateway: It is the entity which supports the brokering functions; it allows the User to make the related selection by using mechanisms of navigation between menus, previews, hypertexts, etc.

program server: It supports the selection of the film by using mechanisms of navigation between menus, previews, hypertexts, etc.; it contains a Video Server that supports the interactive control of the video data flow, (forward, rewind, pause, still advance, etc.). In order to simplify the description of the use of the different signalling capabilities, the functions of the Program server and of the Service Operation are both allocated to this entity. Obviously these functions could be allocated to different physical entities.

The fourth functional role is not explicitly identified by the VOD architecture, because it is not strictly related with the VOD service provision. In fact the updating of the contents of the Program Server is not part of the VOD service, but it is considered as a sort a different service related to the provision of the VOD one.

This role is considered in the rest of this ETR due to its impact in terms of signalling requirements and for this reason another network entity is considered:

Content Server: It is the entity which supports the functions performed by the Content Provider, for example to update the content of the Video Servers.

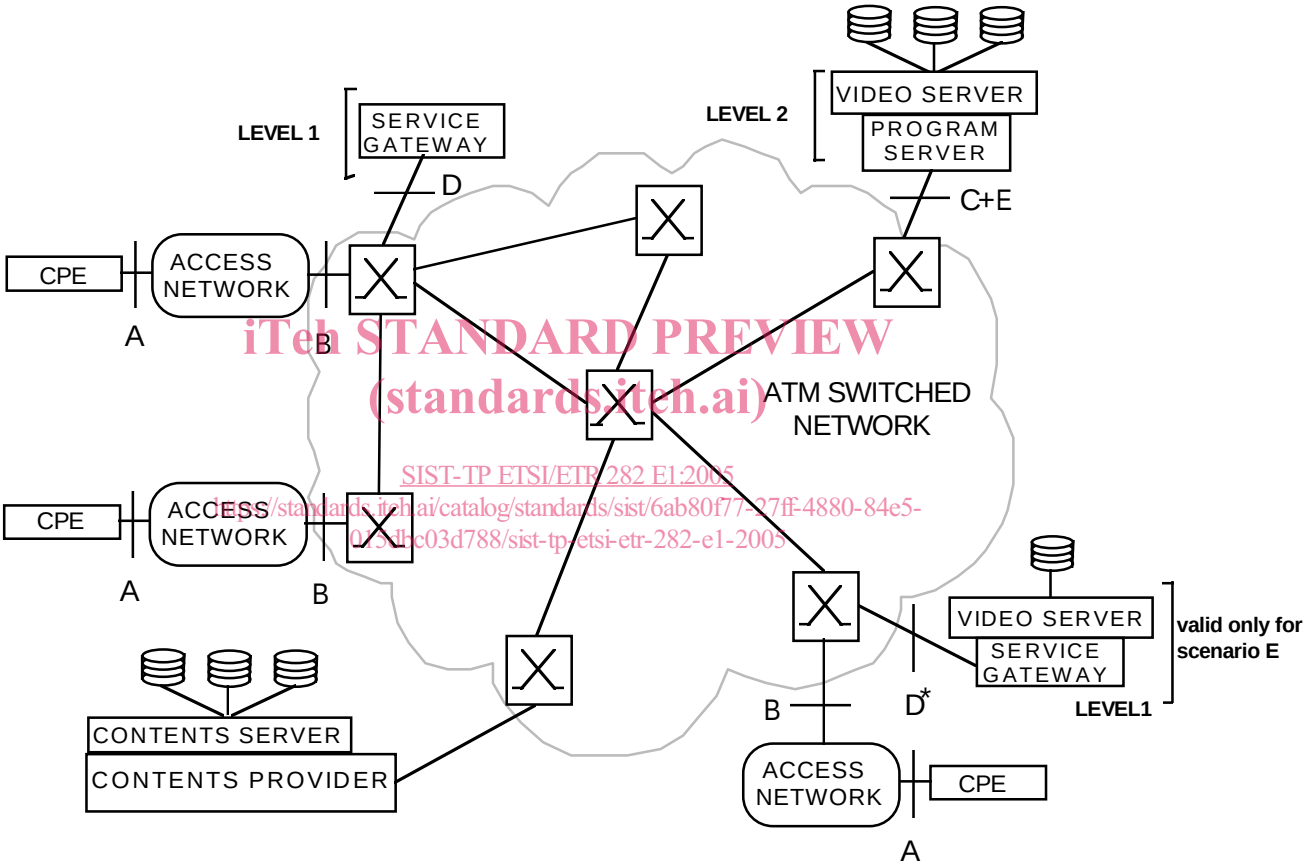
4.2 Mapping to entities as defined by other bodies

In order to give the opportunity of a better understanding of the content of this ETR a simple mapping among the entities described in the previous subclause and the elements present in different network reference architecture for the VOD provisioning is given in this subclause. In particular inputs from DAVIC and ATM Forum are considered:

- The **Customer Premises Equipment** comprises the **Set Top Unit** and it is the **Client** in the service provisioning.

- The **Service Gateway** is similar to the **Gateway level 1**; it is the sum of the **Service Related Control** and the **Network Related Connection Control.** It may include the function of the so called **"Access Network Controller".**

- The **Program Server** is similar to the combination of the **Video Server** and the **Gateway Level 2**. It is the **Server** in the service provisioning.



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NOTE: A, B, C, D, E are reference point as described in ETR 262 [1].
D* indicates that some functions performed at the reference point E may also be required.

Figure 1: Network elements in a scenario for VOD provision

5 Signalling capabilities

5.1 Signalling capabilities identification and relation with the standards

The most important support that the B-ISDN network can give to the interactive services is the control of switched ATM connection. Furthermore, the availability of other signalling capabilities allows more flexibility and efficiency in the realization of the services. In the following tables the signalling functionality which should be useful for this purpose are listed. A short description of each capability follows.

This first table refers to the ITU-T CS2 step 1. Most of these functions are also present in the specifications of ATM Forum Phase 2.

Table 1

SIGNALLING FUNCTIONALITY RELEVANT TO THE VOD SERVICE (CS2 step 1)	
B-ISDN COMMUNICATION CONFIGURATIONS	CONTROL OF SWITCHED ATM CONNECTIONS
	POINT-TO-POINT uni and bi-directional
	POINT-TO-MULTIPOINT unidirectional
ATM TRANSFER CLASSES	DETERMINISTIC BIT RATE
	STATISTICAL BIT RATE
	ATM BLOCK TRANSFER
	AVAILABLE BIT RATE
SIGNALLING CAPABILITIES	SYMMETRIC AND ASYMMETRIC BANDWIDTH
	MODIFICATION OF THE CONNECTION CHARACTERISTICS DURING THE ACTIVE PHASE OF THE CALL Point-to-point only
	NEGOTIATION OF THE CONNECTION CHARACTERISTICS DURING THE CALL ESTABLISHMENT Point-to-point only
	USER-TO-USER SIGNALLING

Other signalling functionality which are not included in ITU-T CS2 step 1 are potentially relevant for VOD. Some of them will be included in the ATM Forum UNI 4.0 [2].

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Table 2

OTHER SIGNALLING FUNCTIONALITY RELEVANT TO THE VOD SERVICE	
INTEGRATION	INTEGRATION WITH IN
SIGNALLING CAPABILITIES	MULTICONNECTION Point-to-point only
	THIRD PARTY CALL CONTROL
	PROXY SIGNALLING
	TRANSPORT OF NEW IDENTIFIERS
	EXPLICIT BEARER TRANSFER
	EXPLICIT CALL TRANSFER
	SUPPORT CONNECTION ORIENTED BEARER INDEPENDENT SIGNALLING COMMUNICATION Non-local information exchange

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5.2 Signalling functionality description

This subclause contains a short description of signalling functionality mentioned above. For more details see the correspondent reference in clause 2.

5.2.1 Control of switched ATM connections

The control of switched ATM connection is performed by B-ISDN Signalling protocols on UNI and NNI interfaces.

5.2.2 Point-to-point communication configuration

A point-to-point communication configuration (unidirectional or bi-directional) uses a point-to-point ATM Virtual Channel (VC) or Virtual Path (VP) connection between two Users.