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Foreword

This Technical Committee Reference Technical Report (TCR-TR) has been produced by the Description of Architecture and Services Harmonization Task Group (TG/DASH) of the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This TCR-TR has been endorsed by the 21st TC Chairmens' Co-ordination (TCC 21) meeting, and approved by the 23rd Technical Assembly (TA 23).

A TCR-TR is a deliverable for use inside ETSI which records output results of ETSI Technical Committee (TC) or Sub-Technical Committee (STC) studies which are not appropriate for European Telecommunication Standard (ETS), Interim European Telecommunication Standard (I-ETS) or ETSI Technical Report (ETR) status. They can be used for guidelines, status reports, co-ordination documents, etc. They are to be used to manage studies inside ETSI and shall be mandatorially applied amongst the concerned TCs. They shall also be utilized by the TC with overall responsibility for a study area for co-ordination documents (e.g. models, reference diagrams, principles, structures of standards, framework and guideline documents) which constitute the agreed basis for several, if not all, TCs and STCs to pursue detailed standards.

This is a short report on recommendations towards the harmonization of architecture and service descriptions was prepared for the May 1994 meeting of TC-NA to give a clear understanding of the first results of DASH, of the DASH work in progress, and of the follow-up work recommended by DASH. DASH proposes that a subsequent meeting of TC-NA considers a more complete version which will include rationales and cross references. The progress of this more complete version is promising, but time is required to assess it and to discuss it with involved STCs.

Introduction

Faced with a series of different existing service description methodologies and different existing conceptual models on which to base specific network architectures (in short, of different existing architecture and service description methodologies), the ETSI Strategic Review Committee on Public Networks [1] expressed a concern that these differences could endanger Global Service Provisioning across Multiple Service Provisioning Domains, based upon different Service Provisioning Platforms. This concern led to SRC4 Recommendations 5 and 6. NA TG/DASH was subsequently set up under TC-NA to address the concern, to analyse its relevance to ETSI and, if highly relevant, to recommend ways of solving it (see Report of NA Workshop on SRC4 Recommendations 5 and 6 [3]). The terms of reference of TG/DASH are given in annex A.

The intended users of this TCR-TR include all the ETSI STCs involved in the specification of telecommunication services or network architectures. In particular, the following users are addressed:

User	TCR-TR used	Potential Benefits
ETSI NA	To help identify work items that address areas of major common concern.	Harmonized service and network architecture descriptions.
ETSI NA1	To plan joint activities to ensure that service descriptions are harmonized.	Harmonized service descriptions.
ETSI NA4	To ensure that architecture description methods are applicable to all networks.	Harmonized descriptions of network architecture and contribution to consistent definitions of relationships between TMN and other aspects (e.g. transport architectures, IN).
ETSI NA5	To plan joint activities to ensure compatible network architecture descriptions.	Broadband network architecture harmonized with other architectures.
ETSI NA6	Requirements for enhancement of INCM for global service provisioning.	Enhanced INCM covering mobile, multimedia, broadband, etc.
ETSI BTC	To help identify work items that address areas of major common concern (as for NA).	Harmonized service and network architecture descriptions.
ETSI MTS	Requirements for specification methods and techniques.	Needed technical methods and tools are defined and provided.
ETSI RES	To help identify work items that address areas of major common concern.	Harmonized service and network architecture descriptions.
ETSI SMG	To help identify work items that address areas of major common concern.	Harmonized service and network architecture descriptions.
ETSI SMG3, SMG5	To plan joint activities to ensure that network architecture descriptions are harmonized.	UMTS network architecture should evolve from other architectures.
ETSI SPS	To assist the identification of signalling requirements based on all services.	Compatible signalling specifications to enable global service provisioning.
ETSI TE	To help identify work items that address areas of major common concern.	Terminal specifications harmonized with service descriptions and network architecture descriptions.
ETSI TE10	Input to the Multimedia Reference Model.	A multimedia reference model fitting within an enhanced INCM (also covering multimedia aspects).
ETSI TM	To help identify work items that address areas of major common concern.	Harmonized network architecture descriptions.
ETSI TM3	To plan joint activities to ensure that network architecture descriptions are harmonized.	Harmonized network architecture descriptions.
ECMA TC32	To help identify work items that address areas of major common concern.	Harmonized service and network architecture descriptions.
ECMA TC32 TG13	To plan joint activities to ensure that service descriptions are harmonized.	Harmonized service descriptions.

Other STCs (such as NA2) are also important but have not been considered in detail by TG/DASH.

1 Scope

This Technical Committee Reference Technical Report (TCR-TR) examines the problems currently existing in ETSI for which the harmonization of architecture and service descriptions can contribute to the solution. The range of architecture and service description methodologies in ETSI, and the trend of single STCs developing new methodologies to meet specific technical requirements, is examined together with the consequences of letting this situation continue. 8 areas of major common concern are addressed, and recommendations made on the requirements for network architecture and service descriptions and on joint activities required to contribute to a solution of these concerns.

2 References

For the purposes of this TCR-TR, the following references apply:

[1] ETSI Strategic Review Committee on Public Networks: Report to the Technical Assembly, March 1992.

[2] ETSI Strategic Review Committee on Corporate Telecommunications Networks: Report to the Technical Assembly, August 1993.

[3] Report of NA Workshop on SRC4 Recommendations 5 and 6, Sophia Antipolis, 28-29 September 1992.

[4] ETS 300 345: “Integrated Services Digital Network (ISDN); Interworking between public ISDNs and private ISDNs for the provision of telecommunication services; General aspects”.

[5] ETR 010: “ISDN Standards Management (ISM); The ETSI Basic Guide on the European Integrated Services Digital Network (ISDN)”.

[6] ETR 062: “Network Aspects (NA); Baseline document on the integration of Intelligent Network (IN) and Telecommunication Management Network (TMN)”.

[7] ETR 084: “Terminal Equipment (TE); Multimedia & Hypermedia Information Retrieval Services (M&HIRS); Investigation of candidate architectures for M&HIRS”.

[8] ETR 085: “Transmission and Multiplexing (TM); Generic functional architecture of transport network”.

[9] TCRTR 014: “Transmission and Multiplexing (TM); Harmonisation of transport network architecture and protocol reference model for the transport of Asynchronous Transfer Mode (ATM) cells”.

[10] MTS (94) 010 Revision 2 "Methods for Testing and Specification (MTS); Methodologies for Standards Engineering - Specification of Protocols and Services", 21-Jul-94 (draft for work item DE/MTS 00013).

[11] ETR 172: “Business TeleCommunications (BTC); Virtual Private Networking; Services and networking aspects; Standardization requirements and work items.

[12] ETR 160: “Human Factors (HF); Human Factors aspects of multimedia telecommunications”.

[13] ETR 197: “Network Aspects (NA); Baseline document on multimedia services”.

[14] DTR/NA-060107: “Intelligent Network (IN); Report on IN Long Term Evolution (LTE)”.

[15] TCR-TR 045: “Intelligent Network (IN); Service life cycle reference model for services supported by an IN”.

[16] ETR 137: “Intelligent Network (IN); Service and service feature interaction service creation, service management service execution aspects”.

[17] ETSI PD - NA6/SMG5 (93-001): “IN/UMTS Framework Document”.

[18] ETSI/TCC19(95)106: Report of 19th TCC meeting, 14-16 February 1995.

[19] ETSI/NA1(92)02: “Guide-line to NA1 new services description”, Version 4 rev. 1, 2 February 1994.

[20] ETSI/NA1(93)03: “Optional features applicable to NA1 new services”, Version 2 rev. 1, 2 February 1994.

[21] Report of the joint NA4/NA6 workshop on TMN/IN Integration, Paris, 28-30 September 1993.

[22] CCITT Recommendation I.113: “Vocabulary of terms for broadband aspects of ISDN”.

[23] CCITT Recommendation I.130: “Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN”.

[24] CCITT Recommendation I.140: “Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN”.

[25] CCITT Recommendation I.210: “Principles of telecommunication services supported by an ISDN and the means to describe them”.

[26] CCITT Recommendation I.211: “B-ISDN service aspects”.

[27] CCITT Recommendation Q.1201/I.312: “Principles of intelligent network architecture”.

[28] CCITT Recommendation Q.1202/I.328: “Intelligent Network - Service plane architecture”.

[29] CCITT Recommendation Q.1203/I.329: “Intelligent network - Global functional plane architecture”.

[30] CCITT Recommendation Q.1204: “Intelligent network distributed functional plane architecture”.

[31] CCITT Recommendation Q.1290: “Glossary of Terms used in the definition of Intelligent Networks”.

[32] ITU-T Recommendation I.374: “Framework Recommendation on "network capabilities to support multimedia services”.

[33] Oshisanwo, A and Boyd, T: “Telecommunications Information Networking Architecture”, Proceedings of the 4th IEE Conference on Telecommunications, Manchester, UK, 18-21 April 1993.

[34] RACE Project R2083: “Final report of the SMP Task Group”, Brussels, 19 May 1994.

[35] ETS 300 387: “Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services”.

[36] ECMA-217: “Services for Computer Supported Telecommunications Applications (CSTA) Phase II”.

[37] ECMA-218: “Protocol for Computer Supported Telecommunications Applications (CSTA) Phase II”.

[38] ECMA TR/68: “Scenarios for Computer Supported Telecommunications Applications (CSTA) Phase II”.

[39] ETS 300 415: “Private Telecommunication Network (PTN); Terms and definitions”.

[40] ETSI/TA21(95)73: "Revised ETSI-ECMA Agreement".

[41] ITU-T Recommendation Q.1300: “Telecommunication Applications for Switches and Computers (TASC), General overview”.

[42] ETR 076: “Integrated Services Digital Network (ISDN); Standards guide”.

3 Definitions, symbols and abbreviations

3.1 Definitions

The concept of global service provisioning used in this TCR-TR is that provided by the TG/DASH terms of reference (see annex A).

Other definitions are as given in CCITT Recommendation Q.1290 [31].

3.2 Abbreviations

ASN.1	Abstract Syntax Notation 1
AVT	Audio-Visual Terminal
BCSM	Basic Call State Model
B-ISDN	Broadband Integrated Services Digital Network
BSP	Basic services Service provisioning Platform
CCAF	Call Control Agent Functional entity
CCF	Call Control Functional entity
CS2	Capability Set 2
CS3	Capability Set 3
CSTA	Computer Supported Telecommunications Applications
CTN	Corporate Telecommunications Network
DASH	Description of Architecture and Services Harmonization
DFP	Distributed Functional Plane
GFP	Global Functional Plane
GSL	Global Service Logic
IBC	Integrated Broadband Communications
IMCC	ISDN Management and Co-ordination Committee
IN	Intelligent Network
INAP	IN Application Part
INCM	IN Conceptual Model
ISDN	Integrated Services Digital Network
LTA	Long Term IN Architecture
MSC	Management Service Component
MTS	ETSI Technical Committee - Methods for Testing and Specification
OSF	Operations System Function
PSCS	Personal Services Communication Space
PTN	Private Telecommunications Network
PTO	Public Telecommunications Operator
RACE	Research and development into Advanced Communication technologies for Europe
SCE	Service Creation Environment
SCEF	Service Creation Environment Functions
SCF	Service Control Function
SDF	Service Data Function
SDL	Service Description Language

SF	Service Feature
SIB	Service Independent Building block
SP	Service Plane
SRF	Specialized Resource Function
TA	ETSI Technical Assembly
TASC	Telecommunication Applications for Switches and Computers
TINA-C	Telecommunications Information Networking Architecture Consortium
TMN	Telecommunications Management Network
UMTS	Universal Mobile Telecommunications System
UNI	User-Network Interface
VPN	Virtual Private Network
WSF	Work Station Function

4 DASH methods

4.1 Methods of working

The DASH method of working, shown in figure 1, was agreed at the first meeting on 24-25 May 1993. A long term vision of what is required for service and architecture description methodology was generated. This was then described in a series of liaison statements to the relevant ETSI STCs. The responses received were analysed at subsequent meetings of DASH and consolidated into a series of recommendations.

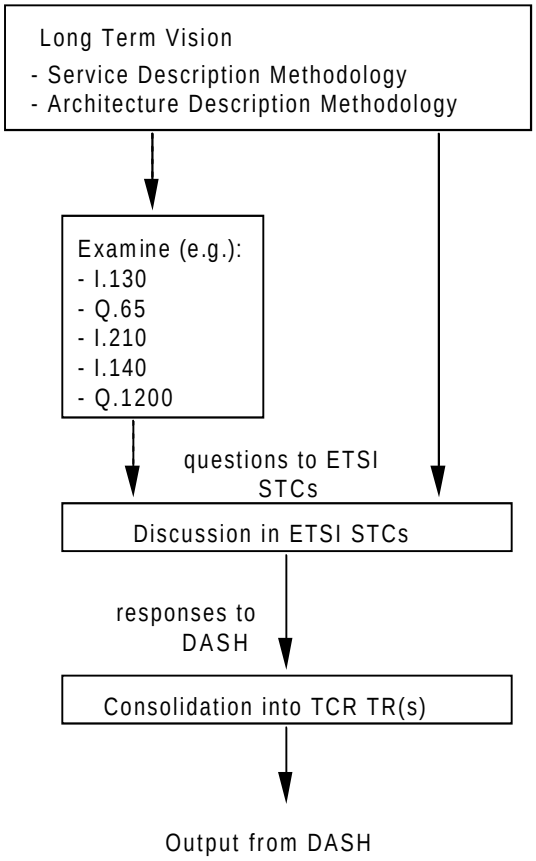

Figure 1: Agreed DASH method of working

The terms of reference of TG/DASH are given in annex A.

4.2 Guiding principles

The following principles were considered by the first meeting of NA TG/DASH as necessary to achieve the long term vision required to provide the consistent service groupings necessary to derive the service and architecture description methodology:

In a global service provisioning context:

1) it should be possible to describe telecommunication services (including management services) by applying a common description methodology;

2) it should be possible to describe telecommunication services in a network-independent manner (at stage 1);

3) the service description methodology should ensure that the service interactions and service aspects of interworking are fully considered;

4) telecommunication service descriptions should allow the identification of the required network capabilities (in a network-independent manner);

5) an intermediate description language for service <-> network capabilities mappings is required;

6) it should be possible to describe network capabilities in a service-independent manner. A common description methodology for network architectures should be developed aligned with the concept of the long term IN architecture[1)];

7) it should be possible to describe services in the context of multiple environments (e.g. business/residential, GSM, IN, B-ISDN, satellite) and multiple network operator and service provider domains. The architecture should define reference points and interfaces supporting interactions between the various players;

8) it should be possible to construct telecommunication services using service-independent tools;

9) any architecture adopted should not exclude the use of specific network technologies (e.g. satellites).

4.3 Selection of areas of major common concern

Examination of the impact of these recommendations on work currently being carried out in the ETSI STCs led to the identification of the following areas of major common concern.

In view of the requirement for global service provisioning:

1) the relationship between public and private networks and services;

2) the relationship between TMN and IN;

3) the relationship between fixed and mobile networks and services;

4) the production of a range of signalling specifications for different networks and services;

5) the application of the 3-stage methodology for service and network capability characterization to advanced services;

6) the inconsistent use of the Basic Call State Model by different ETSI STCs;

7) the requirement for greater co-ordination of multimedia issues in ETSI;

8) the requirements for the enhancement of the INCM.

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1) The reference to the Long Term IN Architecture (LNA) is intended to mean the current IN architecture (as defined in the Q.1200 series of CCITT Recommendations [27], [28], [29], [30] and [31]) extended to support, for example, multimedia and multipoint control capabilities and satellite systems, or a new architecture developed to also encompass these extensions.

Not all candidate areas of major common concern could be considered within the terms of reference of DASH. For example, the area of security was considered as important to the uptake of services in a global service provisioning environment, but security did not fall within the terms of reference of DASH.

These areas of major common concern are examined in clause 5.

4.4 Coherent and complete coverage of transport architectures

In addition to the 8 major common concerns listed above, DASH considers that problems exist in the area of transport architecture up to layer 4. These are mostly in relation to user plane aspects, and may be only a problem of terminology.

The following issues should be addressed:

1) the need for a harmonized terminology to be used in ETSI deliverables related to transmission, flexibility and switching aspects of both the access and the core segments. The use of different terminology for the access and core segments may not be a problem provided some alignment exists, but the use of different terminology within the same segment could be a problem, particularly where the same carrier (e.g. fibre) is considered;

2) this is particularly important for the access segment. A harmonized terminology to cover both wired and wireless access, and both fixed and mobile terminals may be needed;

3) the approach to transport architecture within the TMN should be clarified, and the need for a harmonized terminology addressed.

To address the concern, it is recommended that ETR 085 [8] should to converted into a TCR-TR and extended if necessary in co-operation with NA4, NA5, RES, SMG, BTC and ECMA TC32.

Due to lack of time and appropriate expertise, DASH has not been able to address this issue in more detail through the mechanism of liaison statements appropriate STCs.

4.5 Relationship with TINA-C

The task group was aware of and acknowledged the TINA-C initiative (see article from Proceedings of the 4th IEE Conference on Telecommunications [33]). It is considered that TINA-C could contribute to longer term visions on global service provisioning. It is recommended that ETSI continue to pay close attention to TINA-C/ODP studies and to use these concepts when appropriate.

4.6 Relationship with technical methods, languages and tools

TC MTS is responsible for formal specification methods and techniques within ETSI. These methods and techniques are then used within methodologies such as the 3-stage method for service and network capability characterization (see CCITT Recommendation I.130 [23]). With reference to DE/MTS-00013 [10], DASH recommends that service and network architecture description methodologies should take account of activities and deliverables from MTS, and consider where and when to incorporate results. ASN.1, SDL and TTCN are examples of methods that have already been recommended by TA, and continuation of this is recommended to check the consistency of network related standards such as INAP at a deeper level of detail than the standards themselves, and to check the consistency of service related standards such as building blocks for IN at a level useful for some analysis of service interaction.

5 Areas of major common concern

The areas of major common concern are expanded in this clause under a series of common headings.

5.1 Area 1: The relationship between public and private networks and services

Although a number of co-ordination arrangements have been established between public and private network and services standards, these have not always led to compatible service and network specifications. Public and private network and service standards are covered by different ETSI STCs. The main reasons why this situation has been maintained are:

1) the business and residential communities have different timescales for the implementation and use of telecommunication services in the widest sense. In general, the business community will require certain types of services more quickly than the residential community and, for voice services, these short timescales have traditionally been met by PBXs, Key systems and Private Networks using leased lines;

2) the business community does not necessarily require total harmonization of services and service provision. Many companies are prepared to provide new internal and external services based on proprietary standards, on the basis that they can generate a competitive edge that will compensate for the lack of globally available equipment. The public networks need to serve a much wider community and so have a greater need for harmonization between equipment and service providers;

3) the telecommunications models of public and private networks are different. The public network model is intended to supply common services to a large number of users simultaneously, whereas the private network model is intended to provide more specific services to a smaller number of people. This has led to the use of different development techniques, for example, IN in the public network and CSTA in the private network. CSTA is intended to provide the private network with a platform to provide large numbers of services from a range of different suppliers, whereas IN has been focused on providing a range of services from a single service provider. Attention should also be paid to the work of ITU-T Recommendation Q.1300 [41] on this subject.

The use of SNMP in private networks also has an impact on Area 2.

5.1.1 Why the area is important to ETSI

The telecommunication regulatory environment will undergo major changes in the 1990s as a result of the recent European Council measures to liberalize the provision of telecommunications services. A consequence of such a measure will be the gradual opening up of the voice telephony market to other organizations who wish to offer services to the public at large. This means other competing operators will be able to offer what are currently regarded as services reserved for the PTO. The second step currently being considered by the European Commission is the liberalization of the infrastructure market and if implemented could lead eventually to other competing organizations building their own networks and offering voice services to the public at large across Europe.

These regulatory developments are likely to lead to the breaking down of the traditional barriers between public and private domains. This means standards for describing network architectures and telecommunication services across public and private environments should not be diverging but should be developed within a common standards framework.

Opening up the service market across Europe will have implications for the development of global service provisioning across multiple networks traversing both public and private domains. Corporate networking is likely to play a significant market role towards the end of the decade. There will be opportunities for users to exercise greater choice in the availability of corporate networking services. It is therefore important to ensure that standardization development in this area takes full account of the needs of service providers and other players entering the corporate service provision market.

Some services, e.g. Virtual Private Network (VPN), depend on the interworking capabilities between private and public domains and their success is therefore determined by the resolution of the existing incompatibilities. Such services require signalling protocols, user-network interfaces, and service features to be adapted to a “harmonized” context.

Many elements have to be considered which affect different network aspects. Services such as CENTREX will determine the new requirements for the network nodes whereas the enhancements/changes of the access protocol and of the common channel signalling will depend on the specific VPN information to be transported.

VPN management will need to take account of service features such as customer control. In addition, VPN is required to support in the future new features related, for example, to mobility and broadband data transmission. This will determine an even more widespread impact of the service on the network.

5.1.2 How the area is currently covered in ETSI

Public and private aspects have been dealt with by separate ETSI STCs, with co-ordination between them:

- public aspects are dealt with by NA and SPS;

- private aspects are dealt with by BTC and ECMA TC32 (according to the agreement described in ETSI/TA21(95)73 [40]);

- VPN aspects have been reviewed by the Joint VPN Task Group. ETR 172 [11] covers both service and networking aspects of VPNs. A second edition of the ETR is being prepared to cover IN aspects. It is also intended to produce a TCR-TR covering this area.

IMCC has investigated the harmonization of private and public ISDN supplementary services, as defined in the relevant standards. TCC19 took the decision not to publish the draft report as an ETR (see ETSI/TCC19(95)106 [18]). Principles on public and private service harmonization can be found in ETR 010 [5] and ETR 076 [42].

NA1 is investigating service aspects of interworking and have produced ETS 300 345 [4] on interworking between public and private ISDNs.

ECMA standards on PTN services and signalling pass the ETSI public enquiry and voting procedure and are published as ETSs. In parallel, these standards are submitted to ISO/IEC JTC1 using a fast-track procedure so that they can be published as International Standards (IS). PTN services are specified by a combined stage 1/stage 2 standard and a stage 3 standard in line with the methodology adopted by JTC1.

5.1.3 Consequences of no action

Lack of action by ETSI in this area could:

- delay the market aim foreseen by the EU liberalization plans;

- fragment the market for corporate networking across Europe;

- create higher costs for users due to the multiplicity of systems;

- limit user choice in the provision of corporate network services;

- create difficulties for service providers and other new players because of a failure to create the right environment.

5.1.4 Identification of work needed

It is important to ensure that the different TCs and STCs covering the various technical areas of VPN, such as those involving networks, services and management, should aim to work towards harmonized description methodologies. However, it is important that any change to existing methodologies is agreed with ISO/IEC JTC1 for the reasons given in subclause 5.1.2.

A framework should be agreed in ETSI, incorporating both public and private domains, covering:

- architectures;
- network aspects;
- service aspects;
- multi-service provisioning aspects;
- broadband and mobility aspects.

The ETSI technical committees concerned with VPNs should reach a common understanding on the following concepts:

- VPNs;
- CENTREX;
- corporate networking;
- private networking;
- public networking;
- service provision in a mixed network environment.

The allocation of work to technical committees should be agreed.

5.2 Area 2: The relationship between TMN and IN

5.2.1 Why the area is important to ETSI

It is important that, among the services created and executed within IN-based service platforms, those reaching an appropriate level of utilization can be managed effectively by a TMN. This requires specific interactions to be defined and standardized between an IN and a TMN. It is recognised that IN techniques are also planned to be used to provide GSM services, and the following should also be taken to apply to GSM networks.

There are presently different views in ETSI on the following issues:

- where and how they should/can simply interwork;
- the benefits and drawbacks of integration;
- the benefits and drawbacks of interworking.

In annex B, the above concerns are examined in more detail. This captures discussions within DASH.

5.2.2 How the area is currently covered in ETSI

NA4 covers TMN and NA6 covers IN. A joint working group between NA4 and NA6 on TMN/IN integration has been operating effectively since 1992. ETR 062 [6], a baseline document on the integration of TMN and IN has been produced.

5.2.3 Consequences of no action

Lack of action by ETSI in this area will mean that it will not be possible to manage IN services effectively. Lack of clarification of these issues would endanger the production of standards offering a step-wise introduction of new capabilities that can interwork with existing capabilities, and convenient migration strategies. Economies of scale could also be endangered.

In principle, the following two extreme options could result:

1) the maintenance of the separation between standards related to signalling and control, from those related to management and session-handling. This may be a short to medium term solution;

2) the integration of the control and management aspects based on extended use of new signalling and control capabilities.

Emphasis on option 2 is required to understand the concerns identified in this subclause. However, DASH recommends that standards for the short term should be produced following option 1, while keeping open the route towards option 2.

5.2.4 Identification of work needed

DASH recommends that:

- management of IN should be by a TMN. Management of GSM networks employing IN techniques should also be by a TMN;

- a functionally integrated model for the relationship between TMN and IN is required. This does not necessarily imply implementation on a single platform;

- TMN may have to be enhanced functionally to cover specific IN requirements (e.g. for downloading of service logic);

- it is useful to model the IN, TMN and basic services provisioning platform as 3 entities with defined relationships between them. An example of this model is given in annex B. An additional model, emphasizing the relationships between the service creation environment, the management entity and the execution platform, is given in the report from the RACE Project R2083 [34]. Joint work between NA4 and NA6 should:

  a) agree reference models to better understand:

     - classification of services;
     - definition of actors;
     - definition of service provisioning domains;
     - service life cycle model;
     - architecture-oriented conceptual models of the service provisioning environment;
     - models with the same objectives as figures B.1 to B.4;

  b) agree reference models to look at:

     - enhancement of INCM (see subclause 5.8);
     - enhancement of TMN functional architecture and information models.

These models should be able to accommodate both options identified in subclause 5.2.3.

The work of TINA-C is also potentially important for this area of major common concern (see the article from the Proceedings of the 4th IEE Conference on Telecommunications [33]). TINA-C is currently specifying a common software architecture to support both TMN and IN. STCs should ensure that TINA-C activities are fully taken into account when drafting ETSI deliverables in this area.

5.3 Area 3: The relationship between fixed and mobile networks and services

Different architectures are currently being established for fixed and mobile areas. This could lead to interworking problems resulting in limitations to the services that can be provided. Extra costs could result from diverging architectures and techniques leading to higher prices to users.

NOTE: This Area does not explicitly cover personal mobility as addressed by UPT.

5.3.1 Why the area is important to ETSI

This area is important to ETSI because:

- there is a strong trend towards global mobility in the marketplace;
- a consistent approach is needed to achieve service harmonization across different environments;
- a move to a global mobile environment could provide opportunities for new players to enter the market.

5.3.2 How the area is currently covered in ETSI

A joint NA6/SMG5 working group has been set up to establish a common framework for UMTS and have produced a report (see ETSI PD - NA6/SMG5 (93-001) [17]). The work on network specification for UMTS will soon move to SMG3.

NA1 and SMG1 should jointly are proposing to cover service aspects of interworking between fixed and mobile networks as part of their service description guidelines (see ETSI/NA1(92)02 [19]).

A project has been established by NA to deal with Cordless Terminal Mobility (CTM) aspects.

5.3.3 Consequences of no action

Lack of action by ETSI in this area will lead to:

- the emergence of similar but different architectures for fixed and mobile networks, leading to higher costs and the market not reaching its full potential;
- the creation of barriers to global service provisioning;
- a difficulty in establishing inter-operator or service provider relationships, leading to higher costs.

5.3.4 Identification of work needed

DASH recommends that a joint NA6/SMG3 working group continues to progress the harmonization work on UMTS.

SMG5 and SES should agree a common approach to the use of satellites in UMTS.

DASH suggests that the other aspects of harmonization between fixed and mobile terminals areas are covered by co-operation between ongoing work in NA, SMG and RES.

5.4 Area 4: The production of a range of signalling specifications for different networks and services

Many different signalling specifications are emerging for different networks and services. Problems in the support of global services by multiple networks may arise.

5.4.1 Why the area is important to ETSI

There will be an increase in the number of domains over which (similar) services must be provided. For these:

- signalling specifications should not have to start from scratch for each new network concept;
- interworking between different networks (e.g. mobile-fixed, public-private) will be more complicated;
- it will be more difficult to offer similar services in different domains and between different domains (e.g. services such as CLI may not be available as both PBX and network services).

5.4.2 How the area is currently covered in ETSI

The following TCs/STCs are involved in signalling specification:

SPS for SS7, DSS1, etc.;

ECMA TC32 TG14 for the private domain;

NA5 for B-ISDN;

NA6 for IN;

NA7 for UPT;

SMG for mobile.

A list of signalling specification activities is given in annex C.

5.4.3 Consequences of no action

Lack of action by ETSI in this area will lead to:

- the continuing production of differing signalling standards;
- an increase in interworking problems as the number of different domains increases;
- a lower uptake of services in the marketplace.

5.4.4 Identification of work needed

DASH recommends that a specification methodology is defined to cover the following:

- a “general signalling system”, as a desirable aim for global service provisioning across multiple service and network provider domains. This “general signalling system” should also clearly separate service, transport, mobility and security communication;
- consistent signalling requirements;
- consistent signalling protocols;
- a reference architecture for signalling.

It is recommended that a single STC should take the leading role to:

- co-ordinate joint activities to establish the above specification methodology;
- check the consistency of signalling requirements from different areas.

This will lead to the following way of working:

1) each client STC (e.g. NA5) will produce signalling requirements complying with the specification methodology;

2) STCs from SPS will check the consistency of these requirements and will help SPS as a whole to establish coherent standards.

5.5 Area 5: The application of the 3-stage methodology for service and network capability characterization to advanced services

It is now possible to provide the capabilities to support services in a variety of ways. Functions can be provided in terminals, in traditional network switching nodes, or by an IN platform. In some cases it is possible to provide the same service, from the users point of view, using any of these techniques.

The current 3-stage methodology, described in CCITT Recommendations I.130 [23], I.140 [24] and I.210 [25], was established in pre-IN times for the implementation of services within traditional switch nodes, particularly for ISDN. Application of the methodology results in the design and standardization of service specific signalling protocols. Any change to the services or additional services will usually require changes to the signalling protocols.

The development of IN capabilities means that it is no longer necessary to maintain such a close association between services and the inter-nodal signalling protocols. Much of the service functionality can be implemented using service creation facilities without a need to make changes to the signalling protocols. Customization of a service is an enhancement of a service created in a basic form (e.g. a Freephone service) to suit a special customers need. This should be possible without impacting on the network capabilities, Customization of such a service could result in a single network having several hundred variants of that service. The 3-stage methodology is not well suited for the description of these variants as belonging to the same basic service (e.g. Freephone).

A major idea behind the IN concept is that the introduction of a new service should affect the network platform as little as possible. Accordingly, in future, most new services will not require changes in the network, and no new network capabilities need to be described at stage 3.

Other aspects not specifically covered in the 3-stage method are multimedia services and services based on broadband and cellular capabilities.

5.5.1 Why the area is important to ETSI

IN based services will exist together with node-based and terminal-based services in the same network. This could lead to service incompatibilities and problems with terminal operation and network interconnection.

Customization of services, not covered by the 3-stage methodology, will be widespread in the future.

5.5.2 How the area is currently covered in ETSI

Today, the 3-stage methodology is owned by NA4. IN is covered by NA6, mobile services are covered by SMG1, UPT by NA7 and frame relay services by NA2. Although NA4 is currently responsible for the maintenance and enhancement of the service description methodology, it does not currently have sufficient expertise in this area.

The 3-stage methodology is currently only partially applied to advanced services in ETSI, although NA1 is adopting the stage 1 format for the description of advanced services.

5.5.3 Consequences of no action

Lack of action by ETSI in this area will lead to:

- the over-specification of services in an IN environment, negating the benefits of rapid and more flexible service creation facilities;

- the emergence of incompatible services for IN and non-IN environments.

5.5.4 Identification of work needed

The correct application of each method should be properly understood throughout ETSI so that the various subsystems developed by ETSI will work together when implemented as a network system. All environments should be considered including PSTN, ISDN, mobile, IN, etc.

Clear guidance should be given on where the 3-stage methodology should continue to be applied. The implementation of switched node based ISDN implementations is well underway throughout Europe based on protocols and services established using the 3-stage methodology. These implementations carry enormous implications for terminals and interconnection between networks based on service specific access and inter-nodal signalling. It would appear that the 3-stage methodology should be retained at least for the completion and maintenance of this programme. The terminal interconnection issues mean that network operators cannot ignore the 3-stage approach.

For the development of services in an IN environment we should determine the level of service specification required. We should certainly avoid using the 3-stage methodology which results in unnecessarily detailed service specifications. So far it has been possible to specify the network capabilities with only a general understanding of the service requirements expressed in a few lines of text. The adequacy of this approach should be considered and endorsed or otherwise.

Ideally a methodology should be established capable of covering both the 3-stage method for ISDN services and the reduced level of specification required for services in an IN environment. The intention of NA1 to pursue such a harmonized methodology, including the necessary options, is welcomed.

The use of formal languages, such as those investigated by MTS, can be useful to avoid some service interaction problems. However, it is recognized that some service interaction problems are implementation-dependent and cannot be solved by standards.

If service descriptions are required for the purposes of achieving service harmonization, rather than supporting network studies, then neither the 3-stage or IN methodologies may be appropriate. Service harmonization is a politically imposed requirement and the level of harmonization should be determined by the regulators.

Where required for the specification of network capabilities, network aspects of services should be co-ordinated by a single ETSI STC, taking all public and private market requirements into account. It should be the responsibility of this STC to ensure that an agreed common methodology is followed, and that any similar services resulting from the application of this methodology are interoperable.

5.5.5 DASH recommendations on service description standards

DASH considers that the standardization of service descriptions should not be continued for advanced services. Most of the current 3-stage service description is unnecessary and reduces the flexibility required for these services. In particular DASH considers that:

1) stage 1 and stage 2 service descriptions are a means of deriving the stage 3 protocols (e.g. INAP for IN). Stage 1 complements stage 3 to enable user requirements to be verified;

2) stage 2 descriptions do not need to be standardized;

3) in the case of stage 1, provision of a standard depends on the type of service, the nature of the service, and the impact on the user-network interface (e.g. as for ISDN);

4) however, users of a service creation environment may benefit from standardized facilities (e.g. service features or SIBs) which will assist interaction in a controlled manner;

5) the **methodology** used to describe stage 1 and stage 2 should be specified;

6) the methodology used to describe SIBs is not an issue (it has already been defined by NA6). SIBs do not need to be standardized.

Further work should be carried out to show that interworking between services is still possible following the adoption of these principles.

5.6 Area 6: The inconsistent use of the Basic Call State Model (BCSM) by different STCs

DASH is aware that BCSM-related issues are a part of INCM issues. However, this topic is addressed separately here to capture its specific impact on signalling.

A BCSM is defined as a high-level finite state model of call processing for basic call control (i.e. a two party non-IN call) (see CCITT Recommendation Q.1290 [31]). A set of coherent BCSMs should be a part of the signalling specification methodology suggested in Area 4.

5.6.1 Why the area is important to ETSI

- To allow SPS and NA6 to capture the different requirements related to different capabilities from different STCs.

- To improve the flexibility of the existing BCSM.

5.6.2 How the area is currently covered in ETSI

Most ETSI STCs do not provide, either to SPS or to NA6, specific basic call state models.

NA6 and SPS3 have developed the BCSM of ISDN to support IN related standards. Joint activity between NA6 and SMG5 is currently in progress to cover basic call and connection processing models.

5.6.3 Consequences of no action

Lack of action by ETSI in this area will lead to:

- different, non-interoperable, BCSMs may be produced which will complicate the interworking between domains such as private and public, fixed and mobile;

- the signalling requirements from other STCs to SPS could generate signalling standards that require large interworking overheads;

- the capabilities offered by different STCs (as a basis to NA6 for defining enhanced services) could be captured in a fragmented way by NA6. This will worsen the previously highlighted drawbacks as NA6 will usually produce requirements to SPS3.

5.6.4 Identification of work needed

The following process is recommended:

- SPS3, SPS5, NA6 and SMG3 should co-ordinate activities aimed at providing a framework for the definition of basic call and connection processing models, in the form of generic models;

- STCs such as NA5, SMG3 and ECMA TC32 TG13 should provide their requirements to SPS3 and SPS5, and provide descriptions of the offered capabilities to NA6, through specific instances of the generic models.

5.7 Area 7: The requirement for greater co-ordination of multimedia issues in ETSI

5.7.1 Why the area is important to ETSI

Multimedia is a key potential growth area for future telecommunication services. If multimedia services cannot be accessed easily by different customers with different terminal equipment and cannot interwork successfully then the market revenue will be reduced.

5.7.2 How the area is currently covered in ETSI

There are many ETSI STCs dealing with aspects of multimedia. Some of these are shown in figure 2. The new STC TE10 **"Multimedia Planning and Co-ordination"** has been set up to co-ordinate multimedia issues across ETSI. A project manager has been appointed to co-ordinate multimedia issues.

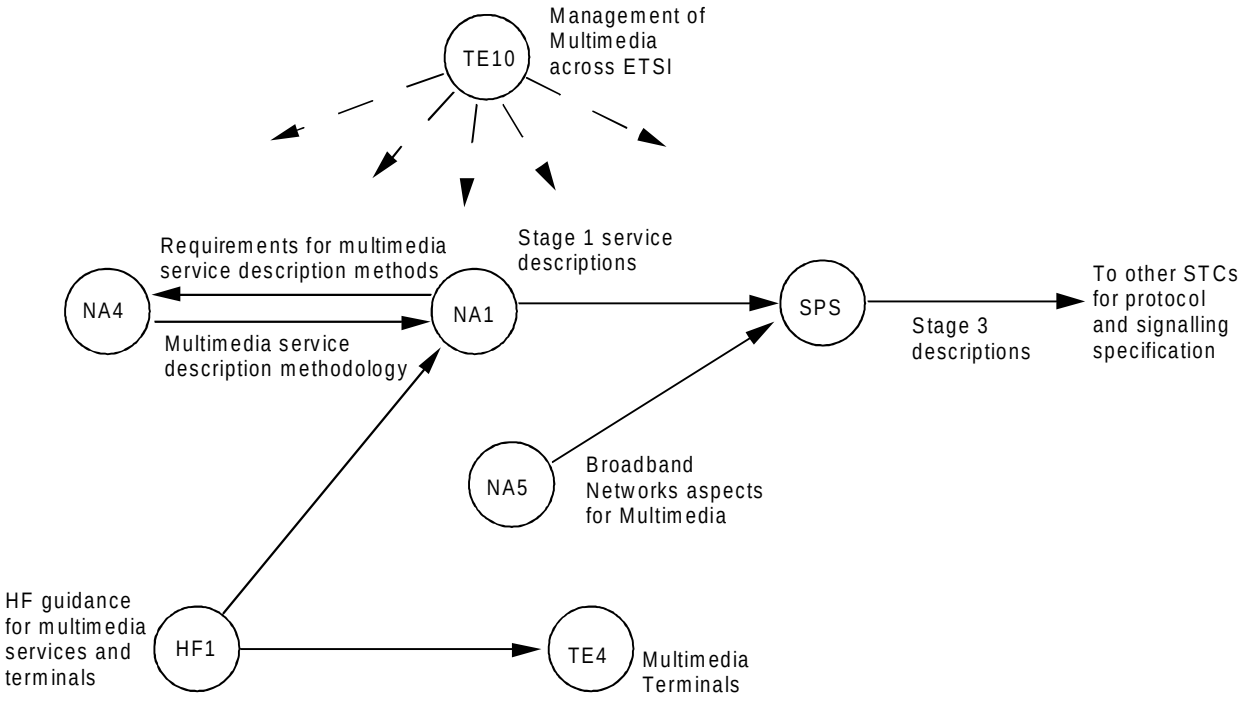


Figure 2: STCs involved in multimedia service description

Key multimedia documents that have been produced or are in production include ETR 084 [7], ETR 160 [12] and ETR 197 [13]. Other documents related to the multiplexing and coding levels and to the transmission of individual media are also available.

5.7.3 Consequences of no action

There are many competitors emerging for the provision of multimedia services. If no action is taken this will lead to many de-facto standards for multimedia provision. These may be incompatible and lead to multimedia services which do not interwork acceptably. This will reduce market uptake and hence the overall revenue from multimedia services and equipment.

NOTE: A similar situation can be identified in the provision of videophones for the PSTN. Market uptake will be reduced if different videophones can not interwork successfully.

Domination by U.S. based fora e.g. the Multimedia Communications Forum, is also possible. A lack of or delay to ETSI standards on multimedia may reduce European initiatives in multimedia leading to lower sales of European equipment.

5.7.4 Identification of work needed

DASH welcomes the setting up of STC TE10 "Multimedia Planning and Co-ordination" group. This should examine:

- how commercial multimedia formats can be supported by ETSI and ITU-T existing and proposed communications standards;

- the network capabilities required to support the requirements of multimedia applications services and terminals.

5.7.5 DASH recommendations on multimedia

In order to maintain maximum flexibility in the provision of multimedia services across different network technologies and network operator domains:

- the support of different media, in terms of media types and quality levels of connections, calls and services, should be achieved with a minimum of additional capabilities in the different planes (user, control and management;

- enhanced services should be supported by IN-based architectures. They should be orthogonal to transport. Most enhanced services that currently apply to telephony (both supplementary and IN-based services) should apply to all media in a multimedia call. Application to services which can affect the information content of a call (e.g. 3-party services and conference calls) should be carefully considered.

A reference model for multimedia services applicable to B-ISDN is shown in annex D (see ITU-T Recommendation I.374 [32]). This should be enhanced to cover aspects other than B-ISDN.

5.8 Area 8: The requirements for the enhancement of the INCM

The concept of the LTA has been identified by DASH as the basis of network architecture descriptions across ETSI. Here the IN Long Term Architecture is intended to mean the current IN architecture (as defined in the Q.1200 series of CCITT Recommendations [27], [28], [29], [30] and [31]) extended to support, for example, multimedia and multipoint control capabilities and satellite systems, or a new architecture developed to also encompass these extensions. It is recognized that the INCM must be enhanced to take account of the network capabilities required to support, for example, multimedia, broadband, mobile and VPN services.

5.8.1 Why the area is important to ETSI

A single conceptual model is required (although it is not sufficient) to ensure that all services can be provided over a range of service provision platforms. The INCM is currently insufficient to describe non-voice services. Much development of IN services in the future will involve multimedia, mobile and broadband technologies for which the INCM is currently inadequate. The number of interworking and interaction issues between these services will also greatly increase. If a common architecture and service description methodology based on the LTA is to be used across ETSI then the INCM must be enhanced to cater for these services.

In particular, the weaknesses of the current INCM are encountered when considering:

- the inclusion of service management aspects;

- the inclusion of terminal and personal mobility;

- support for multimedia and multiparty services, and services with multiple points of control;

- support for global service provisioning.

Considering the timescales for CS2 and CS3, a harmonized approach to enhance the INCM is critical.

5.8.2 How the area is currently covered in ETSI

The service plane is covered by NA1. The global functional plane, distributed functional plane and physical plane are covered by NA6 and NA4.

5.8.3 Consequences of no action

If no action is taken then services will continue to be linked to specific network platforms and will not be able to be offered easily over a range of service provision platforms. The implementations may also not be interoperable and be costly to maintain.

5.8.4 Identification of work needed

Enhancements of the INCM are required at different levels, planes and domains to support the solution of a number of the areas of major common concern (e.g. public/private, fixed/mobile, TMN/IN). Traditionally the INCM is dedicated to the control plane on top of layer 7 related to basic bearer services and basic teleservices. The INCM requires enhancement related to the basic call processing SIB involving layers 4, 5, 6 and 7.

The INCM should be widened in scope to:

- consider user and management planes;

- connection handling issues and issues related to handling of common resources at various layers to support global provisioning of personal mobility services for generic terminals across public and private domains.

Joint activities between STCs are recommended for each of the significant issues arising from the above:

- user plane, reference configurations and network architecture, and connection handing: BTC, SMG, RES, NA4, NA5, TM, TE10. Activities should be co-ordinated by a single STC;

- control plane, reference configurations and network architecture, and call handling: BTC, SMG, RES, NA4, NA5, NA6, TE10, SPS. Activities should be co-ordinated by a single STC.;

- control plane and distributed functional plane: BTC, SMG, RES, NA4, NA6, TE10, SPS. Activities should be co-ordinated by NA6/SPS.

6 Recommendations

The following is a summary of recommendations to ETSI based on the information in this report.

6.1 Technical recommendations

1) a framework incorporating both public and private domains should be agreed in ETSI which covers architectures, network aspects, service aspects, multi-service provisioning aspects, and broadband and mobility aspects. This framework should include a common understanding of the following concepts: VPNs, CENTREX, corporate networking, private networking, public networking and service provision in a mixed network environment. Existing co-ordination mechanisms can be used to agree these concepts;

2) models should be developed and agreed across ETSI to cover the relationship between TMN and IN (including its application to mobile networks). These models should be able to incorporate scenarios based on both the maintenance of the separation of signalling and control from management and session-handling, and on the integration of the control and management capabilities;

3) a joint NA6/SMG3 working group is effective and should continue to progress the harmonization work on UMTS. SMG5 and SES should agree a common approach to the use of satellites in UMTS. Other aspects of harmonization between fixed and mobile terminals areas are covered by co-operation between ongoing work in NA, SMG and RES;

4) a specification methodology should be defined to cover a “general signalling system” (as a desirable aim for global service provisioning across multiple service and network provider domains), a consistent set of signalling requirements, a consistent set of signalling protocols and a reference architecture for signalling. This “general signalling system” should also clearly separate service, transport, mobility and security communication. A single STC should take the leading role to co-ordinate joint activities to establish this methodology and to check the consistency of signalling requirements from different areas;

5) STC NA1 should establish a methodology for use of stage 1 taking into account standardization requirements and thus allowing for reduction of the level of specification. The methodology can be used in several environments (i.e. not only PSTN but also ISDN, IN, etc.);

6) SPS3, SPS5 and NA6 should co-ordinate activities aimed at providing a framework for the definition of basic call and connection processing models (including generic models). STCs such as NA5, SMG5 and ECMA TC32 TG13 should provide their requirements to SPS3 and SPS5, and provide descriptions of the offered capabilities to NA6 through specific instances of the generic models;

7) the TE10 "Multimedia Planning and Co-ordination" group should look at how commercial multimedia formats can be supported by existing and proposed ETSI and ITU-T recommendations, and the network capabilities required to support the requirements of multimedia applications services and terminals;

8) joint activities between STCs should be initiated to examine significant issues arising from the enhancement of the INCM;

9) ETR 085 [8] should be converted into a TCR-TR and extended in co-operation with NA4, NA5, RES, SMG, BTC and ECMA TC32;

10) TC MTS should be involved in supporting ETSI STCs in the establishment of the methodologies and models referred to in Recommendations 4, 5 and 6 and in using formal methods, for example to check the consistency of network related standards such as INAP at a deeper level of detail than the standards themselves, and to check the consistency of service related standards such as building blocks for IN at a level useful for some analysis of service interaction;

11) ETSI should continue to pay close attention to TINA-C/ODP studies and to use these concepts when appropriate.

6.2 Organizational recommendations

1) It is important that the work of harmonization of architecture and service descriptions continues in some form after the termination of the DASH Task Group. A group that can take a global view of services and architectures across the whole of ETSI (not just in NA) is valuable and should be continued. Otherwise there is the danger that the DASH recommendations will not be implemented, or that service and architecture descriptions will diverge again at a subsequent date.

2) The method of sending liaison statements to STCs in order to obtain feedback on the recommendations for harmonization and on the methods of working in the STCs is only partially effective. The liaison statements should be supported by presentations to STCs by nominated representatives of the new group to help explain the concepts. The work should also be augmented by inviting presentations to the new group by nominated representatives of the STCs.

3) Where required for the specification of network capabilities, network aspects of services should be co-ordinated by a single ETSI STC, taking all public and private market requirements into account. It should be the responsibility of this STC to ensure that an agreed common methodology is followed, and that any similar services resulting from the application of this methodology are interoperable.

Annex A: Terms of reference of DASH

Source: NA drafting group

Motivation

Motivations contained in SRC4 Recommendations 5 and 6 are adopted.

As a result of discussions with NA and during a workshop specially set up by NA (Sophia Antipolis, September 28/29 - 1992), these motivations were understood as the need of checking if the present network architecture concepts (e.g. B-ISDN, TMN, INCM, etc.) - considered as adequate to support standardization related to provisioning of specific capability sets (e.g. capability set to support CBDS, IN CS1 to support the first set of IN basic benchmark services) - would be also adequate to support standardization related to provisioning of consistent groupings of services/service features across multiple environments and multiple network operators and service providers domains in an ONP context (global service provisioning).

Increasingly, in the future, services and service definitions will not be “monolithic”. Each service, especially with the advent of sophisticated control architectures, will be composed of smaller “building blocks”. It is expected that only the “building blocks” will be defined in a standardized way and that their contribution to form a service offering will vary freely with individual operator’s choices and individual implementations.

The above requirements should be met by a unified service description methodology.

Objectives and scope

- identify the areas on which common work by experts of different TCs/STCs is needed to facilitate the standardization process required to support global service provisioning. (This activity requires identification and definition of consistent groupings of services adopting the phased standardization approach).

- investigate and describe the consequences of no harmonization of architectures and service description methodologies is performed;

- allocate the common work to well-defined time-frames taking into account the priorities of the related consistent service groupings;

- identify the consistent groupings of capabilities needed to support the consistent groupings of services;

- produce common architectural concepts on which to base the specification of these consistent capability groupings;

- identify common reference points and interfaces which may should be specified in a multi-service, multi-provider context;

- provide guidelines on and, if possible, specify a unified service description methodology supporting global service provisioning;

- take into account studies elsewhere (e.g.; CCITT) as appropriate.

A full spectrum harmonization of network architectures and service description methodologies could slow down the standardization work related to provisioning of specific capabilities sets. Harmonization efforts should therefore be confined/focused on what is strictly needed to respond to SRC4 Recommendations 5 and 6 (confined to areas of major concern requesting experts from different TCs/STCs, if any).

Deliverables

A convenient set of draft TCR-TRs should be produced by TG/DASH by the end of July 1993.

Development of the drafts should also include soliciting responses from individual STCs.

These TCR-TRs should respond to the previously mentioned objectives and scopes in order to support standardization activities starting from 1994.

Once approved with TC-NA, these TCR-TRs should be considered and reviewed by the other involved TCs (e.g. BT, SMG, TM, SPS) in order to consolidate them as a common reference within ETSI.

Annex B: DASH activities on TMN-IN integration

The relationship between an IN, a TMN and a basic services provisioning platform can be described as shown in figure B.1.

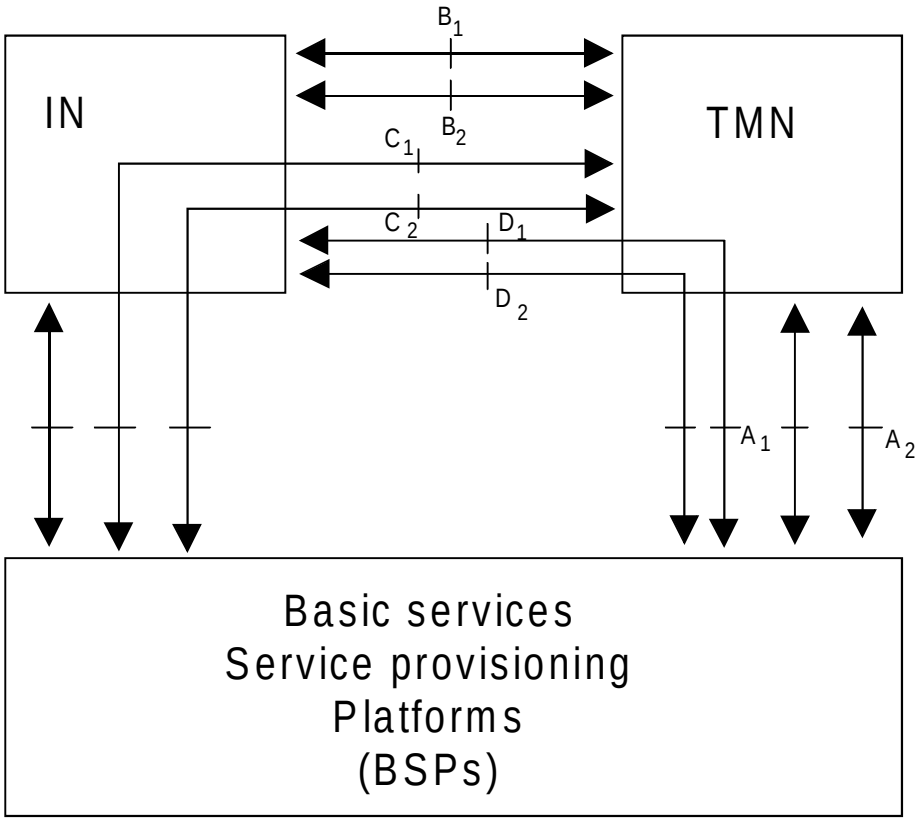


Figure B.1: Interworking between IN, TMN and service platform

The basic services provisioning platform (BSP) represents the set of capabilities provided by network operators and providers of basic services. This offers to providers of enhanced services the possibility of creating and deploying enhanced services.

In principle, the TMN should be considered as a part of those platforms as it provides the management capabilities necessary for those platforms. However, in figure B.1, it is useful to consider the TMN as a separate entity to analyse the information flows required.

The IN represents the set of capabilities created and deployed by providers of IN-based enhanced services.

There are two types of relationship between the 3 entities:

1) modelling of an area within another area (e.g. a map of a BSP within an IN, a map of a BSP within TMN, or a map of an IN within a TMN);

2) support of one area by another area (e.g. support of an IN by a BSP).

Figure B.1 shows all possible relationships of these types:

1) direct relationships between the three entities. Only interfaces between the BSP and TMN (A_1 and A_2), IN and TMN (B_1 and B_2) are discussed;

2) relationships allowing views of one entity though another entity. The first allows views of the BSP from the IN (B_1) and the BSP to support the IN through the TMN (B_2). The second allows views of the BSP from the TMN (C_1) and the BSP to support the TMN through the IN (C_2).

The following interfaces have been identified:

A_1: interfaces required for a TMN to manage a Basic Services provisioning Platform (BSP).

A_2: interfaces required for basic capabilities of a BSP to support transport of TMN messages.

B_1: interfaces required for a TMN to manage an IN Enhanced Services provisioning Platform (ESP).

B_2: interfaces required for IN capabilities to support TMN capabilities.

C_1: interfaces required for a TMN to manage a BSP through an IN.

C_2: interfaces required for basic capabilities of a BSP to support transport of TMN messages through an IN.

D_1,D_2: interfaces required for an IN to be supported by a BSP through a TMN.

Interfaces belonging to classes A_1, B_1, C_1 and D_1 require that adequate BSPs and IN entities are mapped to objects within the TMN.

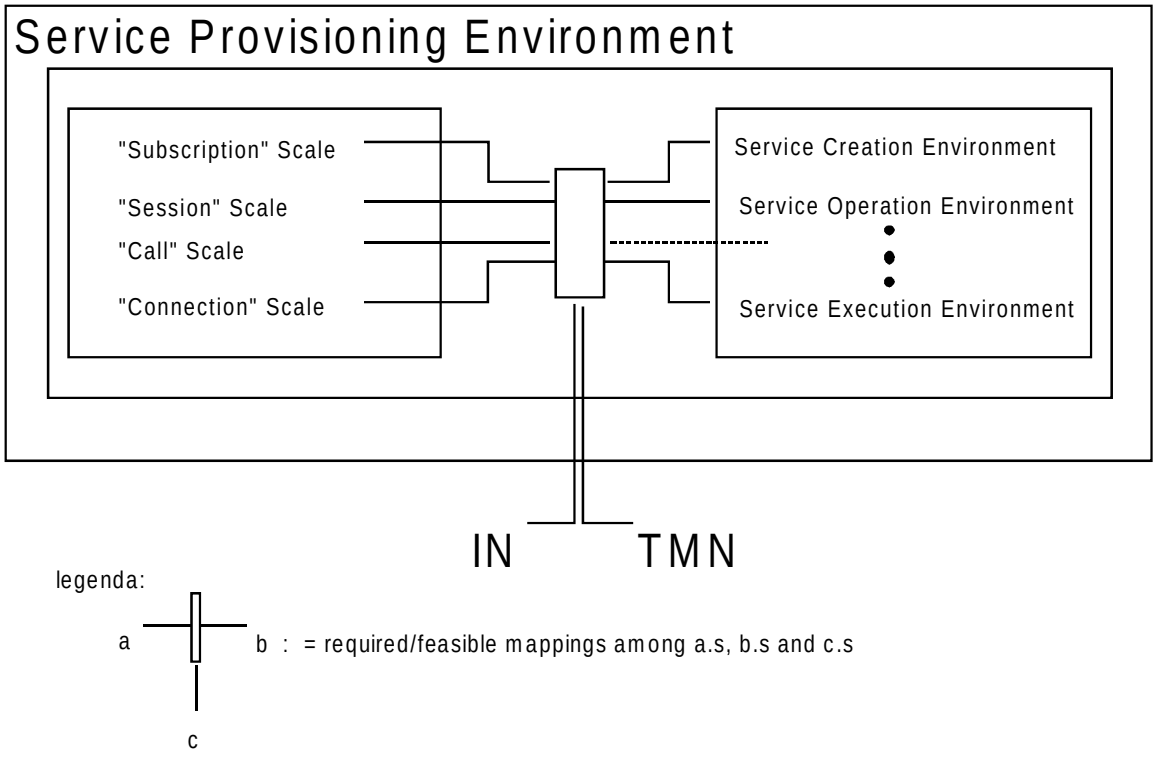


Figure B.2

Figure B.2 shows the required/feasible mappings between events (e.g. calls and connections) and environments of these events (e.g. handling of a call or connection instance, creation of a new call or connection template). Figure B.2 also shows that every significant mapping between a class of events (e.g. all the events related to subscription) and an environment (e.g. service exploitation environment) can be covered by the IN alone, by the TMN alone, or by the IN and TMN in co-operation assuming adequate IN-TMN relationships. Management of environments is considered to be internal to a TMN.

The following issues should be clarified:

a) should the present distinction be maintained between management capabilities requiring session handling (Q and X interfaces) and management capabilities requiring signalling?

NOTE: Economies of scale are based upon these kinds of distinctions.

b) should the A_1 and A_2 interfaces operate at the "session" scale only (no signalling) as happens today? (This means that basic call processing does not contain invocations to the TMN);

c) should the B_1 and B_2 interfaces operate at the "session" scale only (no signalling)? (This means that call related management aspects should be included in SIBs without using in-call invocation of the TMN, but only information provided at the "session" scale);

d) should the C_1, C_2, D_1, D_2 interfaces be avoided or promoted?

e) at which "scale" should the paths towards the specification of standards related to IN and to TMN split? One path will result in the specification of standards for signalling (at all layers) and of signalling/control interfaces. The other path will result in specifications for session handling (e.g. Q, X interfaces);

f) which relationships between actors (network operators, basic service providers, providers of enhanced service corporate telecommunication managers, subscribers, end users, etc. (see figure B.3), telecommunication services and management services) should be considered and how?

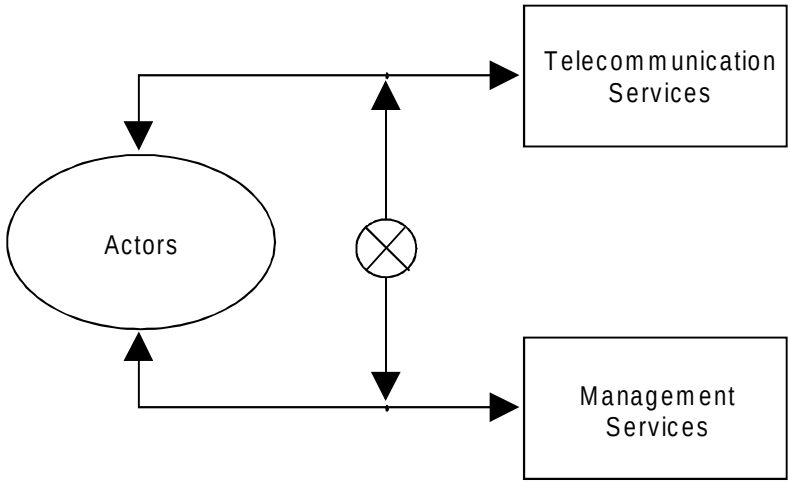


Figure B.3: Relationships between actors

- which kind of commonalties are possible/desirable?
- which relationships should be based on signalling?
- should the requirements for signalling be kept at the minimum possible to assure economy of scope?

The following issues need consideration of their impact on IN, TMN and IN-TMN relationships:

- service classification;
- definition of service provisioning domains;
- service life cycle models;
- architecture oriented conceptual models of service provisioning environments;

g) the relationship between service creation environment, service management environment and service execution environment, and TMN support for IN service creation. In particular, where should standards for the service creation environment be considered? In principle, the DFP of INCM can be subdivided in 2 parts: one including CCAF, CCF, SCF, SRF and SDF; the other including OSF, WSF and SCEF (see figure B.4).

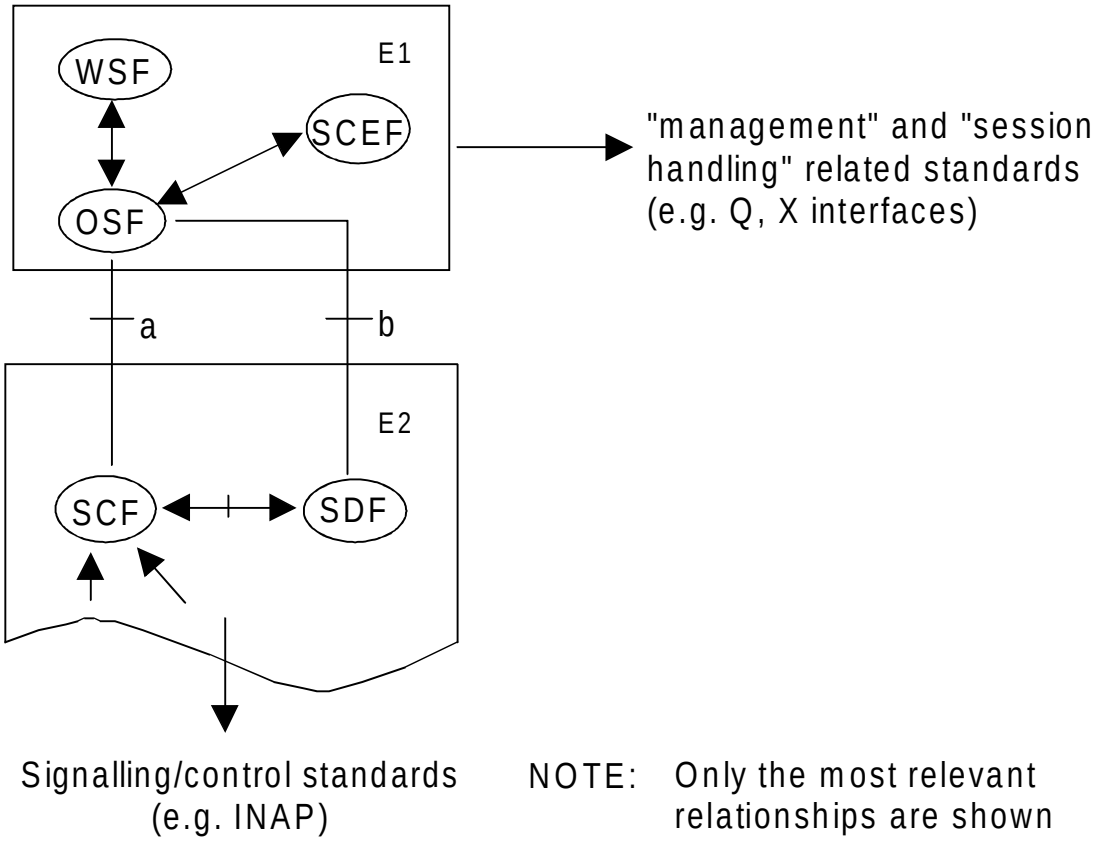


Figure B.4

The first part can be seen from the second only through the SCF and SDF. The first part, resulting in signalling/control standards, should offer to the second part, resulting in management and session handling standards, through Interfaces {a} and {b} a set of capabilities allowing OSF, WSF and SCEF to do their “work” without knowing that way of working of SCF, SDF etc. This has an immediate consequences the data function entities needed to support OSF, WSF and SCEF should be separated from SDF.

Service creation environments should offer to actors, actor-specific views of components for creating new services (SIBs, Q.12X8 operations, rules for composing SIBs, rules for composing Q.12X8 operations). (This means that for some actors the SCF, SDF could be fully visible).

On the basis of service scripts, using visible components, service creation environments should produce specific service logic and other information (subscriber profiles, user profiles, etc.) to be downloaded to SCPs, SDPs etc. by OSF;

h) commonalities between the environment for the creation of enhanced services, an the environment for the creation of management services;

i) the impact of decisions about provisioning of control and management capabilities to customers on IN/TMN relationships;

j) the issue of IN managed objects has already been clarified through joint activities between DASH and the NA4/NA6 joint working group.

Annex C: Signalling specification activities

C.1 SPS1 activities

SPS1 covers:

- B-ISUP release 1;
- ISDN supplementary services for UPT: functional capabilities and information flow control function for providing inter-PTNX connections;
- No. 7 interface for connecting GSM Networks to fixed networks;
- test specifications for the interface between mobile and fixed networks;
- ISUP version 2: basic services;
- ISUP version 2: supplementary services;
- test specification for ISUP version 1 and 2;
- signalling interworking;
- INAP;
- ISDN supplementary services: functional capabilities and information flow;
- basic call control: functional capabilities and information flow.

SPS1 has produced the following standards:

specification of signalling system No. 7: ISDN user part;
application of the ISUP for international ISDN interconnection (ISUP v.1): ETS 300 121-1;
specification of signalling system No. 7: ISDN supplementary services.

Supplementary services:
TP, CW, SUB, DD1, CLIP, CLIR, COLP, MCID, CUG; CH, HMC, AOC, CONF, 3PTY, CFB, CFU, CFNR, CD, EPH;

ETS 300 051, ETS 300 054, ETS 300 057, ETS 300 060, ETS 300 063, ETS 300 091, ETS 300 096, ETS 300 129, ETS 300 137, ETS 300 140, ETS 300 165, ETS 300 181, ETS 300 184, ETS 300 187, ETS 300 203, ETS 300 204, ETS 300 205, ETS 300 206, ETS 300 209

C.2 SPS2 activities

SPS2 covers:

ETSI object identifier tree common domain;
UPT: application protocol;
MTP;
SCCP;
TCAP;
OMAP;
test specification for: MTP, SCCP, TCAP and MAP version 2;
MTP tester;
S-AAL - NNI interface;
mobile services domain.

SPS2 has produced the following standards:

specification of signalling system No. 7:

CCITT MTP to support international interconnection	ETS 300 008-1
CCITT SSCP to support international interconnection	ETS 300 009-1

C.3 SPS3 activities

SPS3 covers:

intelligent network, and its support in an ISDN environment;
intelligent network: PIXIT and TTCN test suite;
Q.3 interface specification;
Q.3 interface to local exchange (LE) and access network (AN): Managed Objects Conformance Statement (MOCS);
Q.3 interface to local exchange (LE) and access network (AN): Abstract test suite (ATS);
meta-signalling protocol: PICS, PIXIT and TTCN abstract test suite;
ISDN: basic call - functional capabilities and information flow;
B-ISDN;
S-AAL requirements.

C.4 SPS5 activities

SPS5 covers:

conformance test specification for the network side of the DSS1 protocol;
conformance test specification for ISDN supplementary services - DSS1;
conformance test specification for 7 kHz and videotelephony ISDN teleservices;
conformance test specification for X.25 terminal equipment;
conformance test specification for generic keypad protocol;
ISDN - user network interface specification for basic call;
ISDN - data link layer specification - DDSS1 protocol;
ISDN - frame relay bearer service protocol;
ISDN - telephony 7 kHz and videotelephony teleservices;
Protocol Implementation eXtra Information for Testing (PIXIT) for basic rate and primary rate ISDN access network;
Protocol Implementation Conformance Statement (PICS) for basic rate and primary rate ISDN access network;
Protocol Implementation Conformance Statement (PICS) for ISDN supplementary services - DSS1 protocol;
Protocol Implementation Conformance Statement (PICS) for ISDN - DSS1 protocol - telephony 7 kHz and videotelephony;
Protocol Implementation Conformance Statement (PICS) for ISDN - generic;
keypad protocol, generic functional protocol, keypad stimulus protocol;
ISDN user network interface specification;
Abstract Test Suite (ATS) for DSS1;
Abstract Test Suite (ATS) for frame relay bearer service protocol;
B-ISDN:S-AAL specification for call control;
B-ISDN:UNI layer 3 specification;
B-ISDN:UNI layer 3 - abstract test suite specification;
control function to provide inter-PTNX connections.

SPS5 has produced the following standards:

Specification of Digital Subscriber System No. 1:

data link layer (ETS 300 l25);
network layer (ETS 300 125, ETS 300 129, ETS 300 196);
keypad protocol (ETS 3001 22);
support of packet mode terminal equipment (ETS 300 007);
support of CCITT X.21, X.21bis and X.20bis based DTE by an ISDN;
synchronous and asynchronous terminal adapter (ETS 300 103);
attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access layer 3 aspects (ETS 300 104).

Specification of digital subscriber system No. 1: ISDN supplementary services:

Supplementary services:

TP, CW, SUB, DDI, CLIP, CLIR, COLP, COLR, MCID, CUG, CH, AOC, CONF, 3PTY, CFB, CFU, CFNR, CD, FPH;

ETS 300 052, ETS 300 055, ETS 300 058, ETS 300 061, ETS 300 064, ETS 300 092, ETS 300 093, ETS 300 097, ETS 300 098, ETS 300 130, ETS 300 138, ETS 300 141, ETS 300 182, ETS 300 185, ETS 300 188, ETS 300 207, ETS 300 210.

C.5 ECMA TC32-TG14 activities

TC32-TG14 covers:

signalling at the S-reference point;
PTN Inter-exchange signalling protocol (QSIG);
protocol implementation conformance statement for PTN services;
conformance test specifications for QSIG;
abstract test suite for QSIG.

TC32-TG14 has produced the following standards:

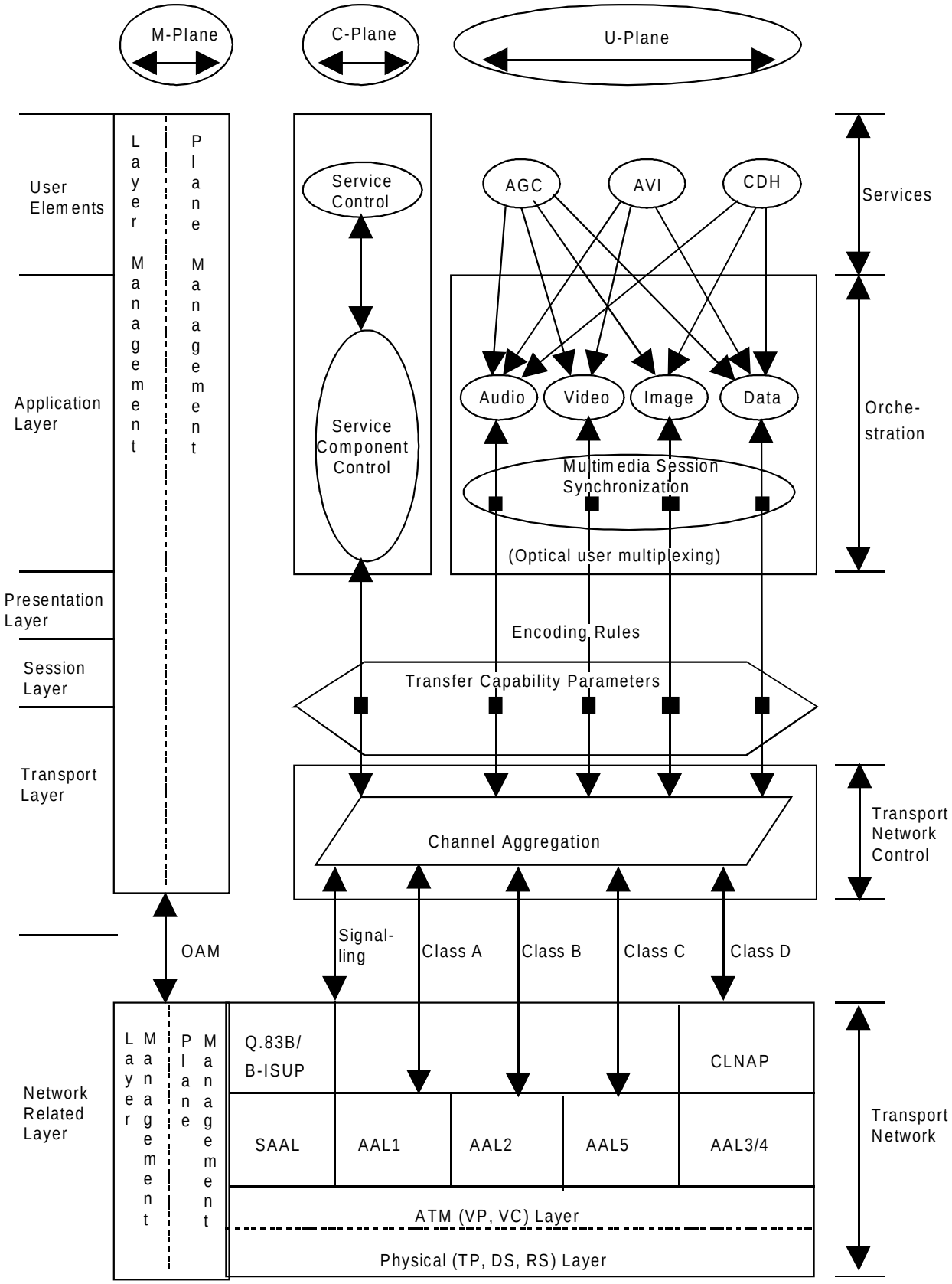
PTN - signalling at the S-reference point:

data link layer protocol (I-ETS 300 169);
generic keypad protocol for the support of supplementary services (ETS 300 190);
identification supplementary services (ETS 300 191);
circuit mode basic services (ETS 300 192);
generic feature key management protocol for the control of supplementary services (ETS 300 240).

PTN - inter-exchange signalling protocol:

layer 2 protocol at Q (I-ETS 300 170);
circuit mode basic services (ETS 300 172);
generic functional protocol for the support of supplementary services (ETS 300 239);
name identification supplementary services (ETS 300 238);
diversion supplementary services (ETS 300 257);
path replacement additional network feature (ETS 300 259);
call transfer supplementary service (ETS 300 261);
call offer supplementary service (ETS 300 362);
do not disturb and do not disturb override supplementary services (ETS 300 364);
call completion supplementary services (ETS 300 366);
call intrusion supplementary service (ETS 300 426);
supplementary service interactions (ETS 400 427).

Annex D: Multimedia reference model for B-ISDN



Functional model of multimedia services on B-ISDN

Figure D.1: Multimedia reference model proposed by ITU-T Recommendation I.374 [33]

History

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