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## Foreword

This ETSI Technical Report (ETR) has been produced by the Network Aspects (NA) 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.

This ETR has been produced in response to step 1 of the European Commission's mandate BC-T-305 [1].

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## 1 Scope

This ETSI Technical Report (ETR) is the result of the work for meeting the requirement for step 1 at the European Commission (EC) mandate BC-T-305 [1]. In particular, it contains a workplan for ETSI, in order to perform step 2 of the mandate.

The text of this ETR does not fulfil the complete scope of the mandate of the commission. This has been due to a lack of participation by independent service provider organizations. These organizations are essential to defining the specific access requirements from the network.

## 2 References

This ETR incorporates by dated or undated reference, provisions from other publications. These 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 ETR only when incorporated in it by amendments or revision. For undated references, the latest edition of the publication available at the date of this ETR publication referred to applies.

- [1] EC Mandate BC-T-305: "ONP Intelligent Network (IN) Standardization".
- [2] ITU-T Recommendation D.280: "Principles for charging and billing, accounting and reimbursements for universal personal telecommunication (UPT)".
- [3] ITU-T Recommendation Q.1290: "Glossary of terms used in the definition of intelligent networks".
- [4] ETS 300 208: "Integrated Services Digital Network (ISDN); Freephone (FPH) supplementary service; Service description".
- [5] ETR 164: "Integrated Services Digital Network (ISDN); Intelligent Network (IN); Interaction between IN Application Protocol (INAP) and ISDN User Part (ISUP) version 2".
- [6] ETR 186: "Intelligent Network (IN); Interaction between IN Application Protocol (INAP) and Integrated Services Digital Network (ISDN) signalling protocols".
- [7] CCITT Recommendation E.164: "Numbering plan for the ISDN era".
- [8] ITU-T Recommendation X.500: "Information technology - Open systems Interconnection - The directory: Overview of concepts, models and services".
- [9] CCITT Recommendation X.700: "Management framework for Open Systems Interconnection (OSI) for CCITT applications".

The following documents were also used in the preparation of this ETR:

- UCL report to the EC on network integrity;
- NA1 documents;
- NA6 documents (service life cycle, SIBs, internetworking, etc.).

## 3 Definitions

For the purposes of this ETR, the definitions in ITU-T Recommendation Q.1290 [3] apply.

## 4 Abbreviations

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

CD	Call Distribution
CPM	Customer Profile Management
CRA	Customized Recorded Announcements
CRL	Credit Limit
CS	Capability Set
EC	European Commission
FOC	Follow-On Calling
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
ISDN	Integrated Services Digital Network
LGS	Language Selection
LOG	call Logging
ODC	Origin Dependant Control
ONP	Open Network Provision
OUP	Originating User Prompter
PCI	Presentation of Charging Information
PDD	Pre-Defined Destination
PLD	Provider's Limitation on Destination
PRM	Premium Rate
PSTN	Public Switched Telephone Network
PTNX	Private Telecommunications Network Exchange
SAC	Service Access Centre
SCO	Service specific Calls Only
SDP	Service Data Point
SIB	Service Independent building Block
SLD	Subscriber's Limitation on Destination
SPD	Speed Dialling
STAT	Statistical information
TDC	Time Dependent Control
TDR	Time Dependent Routeing
TMN	Telecommunications Management Network
UPT	Universal Personal Telecommunication
VCC	Virtual Card Calling
VPN	Virtual Private Network

## 5 Guidelines

### 5.1 Introduction

The European Commission (EC) mandate covers the following major requirements:

- specification of five Intelligent Network (IN) services (Freephone, premium rate, virtual card calling, Virtual Private Network (VPN) and Universal Personal Telecommunication (UPT));
- resolution of the service interaction issues;
- identification of the best technical procedures to allow separate organizations to compete and / or cooperate to provide these services using IN;
- assessment of short term solutions such as mediation functions or devices;
- production of a workplan identifying a list of standards and their feasible milestone.

The impact of resolving service interaction problems on competition and, in particular, on service differentiation, needs to be studied.



Open Network Provision (ONP) should be taken into account in long-term evolution of the network architecture as being one of its aspects. Also, it is highly desirable that service providers be able to provide their specific services (5 target services or any variant of them defined by a selection of optional service features) without having to adapt to every specific network implementations.

For these reasons, interconnect between networks and with service providers should be independent from Internal network architecture implementations. However, the interconnect capabilities should be sufficiently open and transparent to enable service providers to access those functions needed to package a competitive offering. This may require the use of mediation devices that interwork with available IN standards (Capability Set 2 (CS2), etc.) for the short term (mid-1996). This workplan also covers longer term aspects (beyond 1996).

Results from the second step of the mandated work will determine the best technical procedure for IN ONP and will conclude as to the usefulness of mediation devices for opening access to CS1 and CS2 structured INs. The EC mandate requests that step 1 should assess the feasibility of mediation devices for short term solution with any existing architecture. In view of the diversity of such architectures and the overall technical regulatory and commercial complexity of the requirements for ONP, the use of mediation device as part of an overall technical approach can only be determined as part of the studies to be undertaken in step 2 and for CS2 architecture.

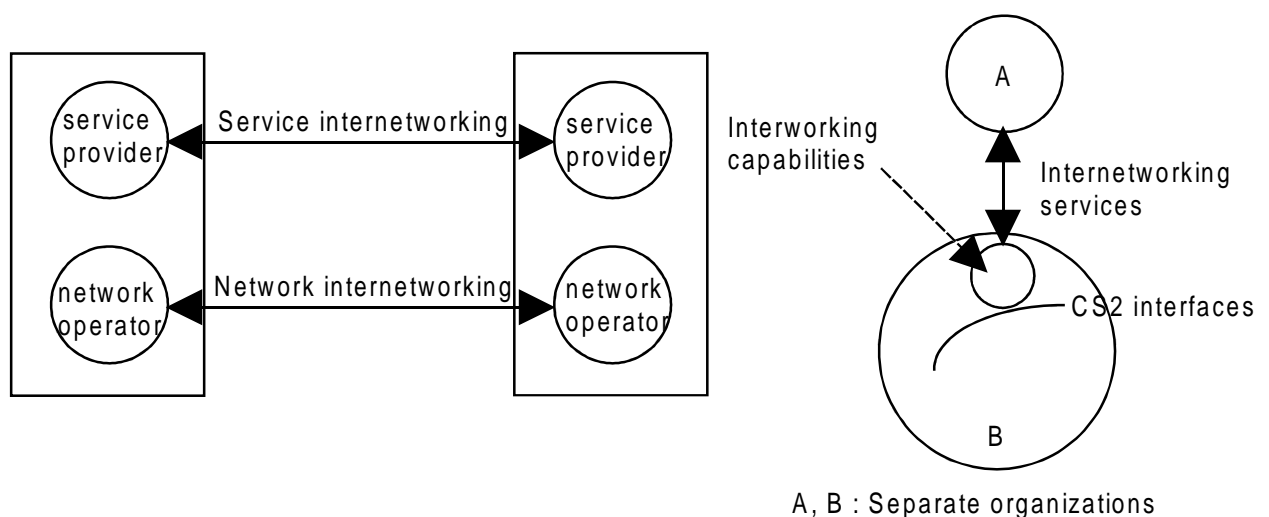
Each of the five target services are characterized by a set of core features, which should be identified and described in order to offer basic pan-European services (this may for instance require the standardization of some protocols). In general, the degree to which services are to be defined should not act as a restraint on service providers who wish to offer differentiated services in a competitive market as differentiation of services will be based on optional features.

All issues related to interconnecting, internetworking and interworking should be taken into account.

The network capabilities presented at the standard interconnect point should be sufficiently transparent to ensure non-discrimination between companies acting as both service provider and network operator and independent service providers.

## 5.2 Definitions

Interconnecting services, internetworking (at the service and the network level) and interworking refers to three different aspects as illustrated in the following figures.



**Figure 1: Interconnecting services, internetworking and interworking**

There should be no confusion between interconnecting services, internetworking aspects and interworking capabilities.

NOTE: Further work is needed to identify a stable list of identified interconnecting services.

Future work as proposed by this document will be done as follows:

- work into details each identified interconnecting service;
- in parallel, interworking capabilities needed between interconnecting services and CS2 interfaces would be defined (for specific interconnecting services, there might be no interworking capability needed);
- CS3 could be taken into account for management and service creation aspects as CS2 does not intend to define management in detailed aspects;
- no interworking capability with non CS2 architecture is to be defined;
- if some mapping between interconnecting services and CS2 is not technically possible, there is the need to contribute for subsequent CSs such as CS3.

### **5.3 Interconnecting services between network operators and with service providers**

#### **5.3.1 Technical concept**

An interconnecting service describes the action that one organization is performing for another. In some cases invocation of the action may require a physical interface. In others it may be invoked by actions within the providing organization.

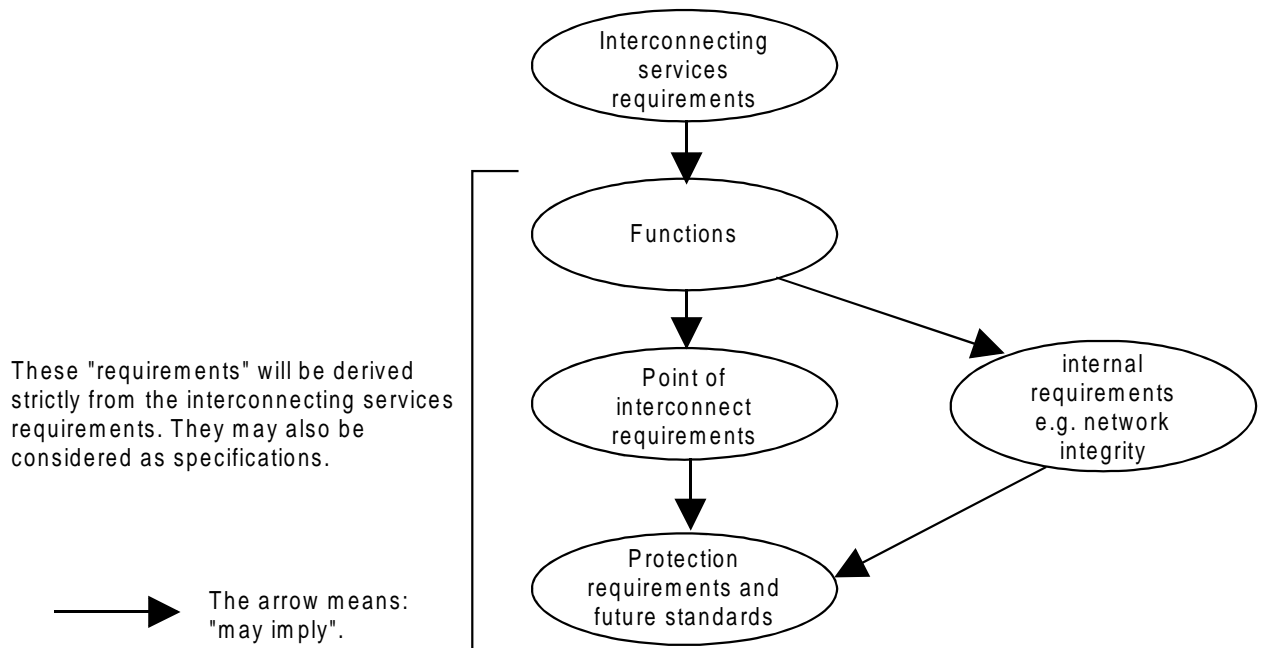
From a technical or standards perspective interconnecting services are intended to be used as the basis of defining the interface between both organizations or point of interconnect. An interconnecting service describes a set of management or/and network capabilities. These capabilities could provoke sequences of operations which are invoked in one network in response to a request from the interconnecting organization.

In a multi organization environment, Organization A would use Interconnecting Services from several organization in order to provide a more global service.

The rationale for introducing the interconnecting service approach is: (i) to define interfaces which are more closely related to the needs of interconnecting organizations; and (ii) that the interfaces are independent of the interconnecting architectures.

The interconnecting service approach should make use of the existing modelling plane technique. In this case the starting point will be the identification and description of the inter-connecting services and the end point may be a physical interface or point of interconnect (see diagram below).

The interconnecting services that need to be identified will be dependent on the specific needs of interconnecting organizations and on the end services they wish to deliver (cf. the five target services).



**Figure 2: Interconnecting services requirements identification and description**

### 5.3.2 Relationship of interconnecting service concept to the requirements of the EC mandate

The EC mandate calls for the development of technical procedures which would enable independent service providers to provide or co-operate in the provision of the five targeted end user services.

The following requirements are taken directly from the EC mandate BC-T-305 [1]:

**"ETSI should focus the work on inter-networking issues, following the current work on IN interface specifications, which may allow independent service providers, for example:**

- **to customize their offering:**
  - **e.g. access at an appropriate at the service creation level;**
- **to customize the offering at the service provision level (e.g. to create customers):**
  - **e.g. access at an appropriate point of the service management level;**
- **to customize the offerings with some degree of control of the service execution:**
  - **e.g. access at an appropriate point at the service control level;**
- **to have direct interconnection at the switching level, enabling better control of the service than the option above:**
  - **e.g. interconnection at an appropriate point between the service switching function / call control function and the network (another call control function);**
- **to interconnect their database facilities to the facilities of the IN infrastructure provider:**
  - **e.g. access at an appropriate point at the service database level;**
- **to interconnect their specialized resource facilities to the facilities of the IN infrastructure provider:**
  - **e.g. access at an appropriate point at the specialized resource level."**

In order to meet the requirements listed above, the interconnect service approach first requires the definitions of interconnecting services that an interconnecting organization (e.g. an independent service provider) would require from another interconnecting organization (e.g. a network operator).

The aim of this approach would be to identify administrative and/or technical interfaces which support all the required interactions and/or messages between the interconnecting organizations.

The interface(s) should present interconnecting organizations with functionalities identified in the interconnecting services, enabling interconnecting organizations to offer their particular services (e.g. UPT, Freephone, VPN, etc.) to their end users.

### **5.3.3 Aspects of interconnecting services**

In determining the range of interconnecting services that would be made available to interconnecting organizations, account needs to be taken of service quality, performance and network integrity. In particular the following aspects of interconnecting services need to be fully studied and taken into account in the identification and development of a list of (technical) interconnecting services. The following lists of interconnecting services are not exhaustive but provide the basis of further study in step 2.

#### **A Charging & accounting**

Charging, accounting and apportionment are generally considered outside the ETSI scope, but there are a number of charging and related aspects for consideration in the provision of inter-connecting IN services/capabilities offered between interconnecting organization. Organizations (service providers / network providers) may have a requirement to charge for the following aspects that are related to all interconnecting services:

- use of the signalling system, including non-call related service feature, e.g. unsuccessful or inefficient call attempts including the use of protocol resources;
- management of services: e.g. trigger table update, testing;
- statistics, call records, data collection;
- service creation;
- service execution: use of special resources, switch based or supplementary services, conveyance, transport switching of call;
- per call basis and call attempts;
- computer processing time;
- network management: resource allocation.

Charging and accounting services would typically be part of the interconnecting service package that one organization offers to another.

## **B Service interaction**

Several types of interaction can be identified. The most prominent are identified below:

- interaction between the 5 services mentioned in the mandate. In this case a more detailed identification can be made;
- interaction between the core features;
- interaction between the core and the optional features;
- interaction between the optional features. There can also be interactions within a specific service; in particular the interaction between optional and core features of the specific service would need special attention;
- interaction of the 5 services mentioned in the mandate with Integrated Services Digital Network (ISDN) supplementary services: for each of the 5 services, the interaction with each of the standardized ISDN supplementary services needs to be described. Good references are the NA 1 service descriptions for the individual services. Other relevant documents are ETR 186 [6] and ETR 164 [5];
- interaction of the 5 services mentioned in the mandate with (non-) standardized Public Switched Telephone Network (PSTN) services.

This issue may be difficult to analyse, since the PSTN services may be non-standardized. However the operation of these (already in place) PSTN services must not be affected. Interworking issues for the 5 services with mobile and private networks need to be considered as well.

NOTE: The Eurescom project P230 'Enabling Pan-European IN' has already performed a lot of work on these issues. Especially Task 3 of this project was devoted entirely to service interactions.

## **C Traffic management**

Two aspects that require study and appropriate procedures/mechanisms for standardization are:

- aspects associated with the traffic of interconnecting services. This requires the management of traffic across the interface in order to fulfil the requirements of the inter-organization contract (e.g. rate of messages);
- the management of traffic within the network. This includes the need for mechanisms within the network to ensure network integrity in the event of high-traffic levels generated by service-providers' actions (e.g. call gapping).

## **D Service management**

There are two aspects related to service management:

- management of the interconnecting services by the providing organization (e.g. by network operators);
- management of the service provided by the service providers to their customers.

In both cases, the service management includes ordering, provisioning, billing, fault reporting, ceasing. For the second case, these management operations could be partially or totally sub-contracted to another organization (e.g. billing by a network operator on behalf of a service provider). An example could be the update of trigger tables in switches.

## **E Network management**

The additional network management capabilities that are required for the support of the service providers need to be studied.

## **F Management services**

Management services are the tools for an interconnecting organization to manage a service/network. Because this organization cannot manage the service/network directly, it uses these management services. Therefore, management services would typically be part of the package of interconnecting services.

## **G Identification of organizations**

In an environment comprising more than one organization, there will be a need to identify those particular organization which are involved in the provision of the service to customers. Identities will be required to support, for example, billing, security, physical interfaces. Studies in this area need to consider existing addressing schemes (e.g. CCITT Recommendation E.164 [7], C7 addressing schemes and Telecommunications Management Network (TMN)) and the possible need for new schemes.

## **H Security**

The requirements emerging from ONP which need to be taken into account in the security aspects of covers a number of broad issues. Some of the security will depend on requirements of regulatory and/or legal bodies.

The choice of security policies, services and mechanisms should be based on asset risk analysis. A system can never be one hundred percent secure, some vulnerabilities will always remain

Refer to annex C for more details

## **6 List of work items**

The following subclauses identify the proposed work items to be undertaken in step 2 of the mandate.

### **6.1 Interconnecting model (including the enterprise model) and terminology**

Responsible STC: NA6

Target duration: 4 months

As a first priority work item, it is necessary to describe aspects of the interconnecting model in order to identify standard requirements to enable ETSI to carry out step 2 technical work. It is expected that additional requirement identification would be needed during step 2 when working on the terminology.

### **6.2 Elaboration and analysis of interconnecting services**

Responsible STC: NA6

Other STC: NA1

Target duration: t0 + 7 months

Based on list of interconnecting service list in step 1 and interconnecting model (refer to subclause 5.3.3).

### 6.3 Service description

Responsible STC: NA1

Target duration: t0 + 9 months

Identify core features for each of the five targeted services (available ETSI material is given in annex B).

Aid pan-European harmonization of the target services

List possible optional service features (available ETSI material is given in annex B).

The description of the target services for future IN capability sets should include the core features identified.

Guidelines for this work: as stated in subclause 5.1, each of the five target services are characterized by a set of core feature. In general, the degree to which services are to be defined should not act as a restraint on service providers who wish to offer differentiated services in a competitive market as differentiation of services will be based on optional features. Therefore:

- it is not the objective to describe in full details the 5 services;
- only mandatory core features should be fully described;
- minimal specification for optional service feature as required for solving service feature interaction issues;
- harmonise and standardize access procedure as necessary.

### 6.4 User access to the service

Responsible STC: NA1

Other STC: NA6, SPS

Target duration: t0 + 12 months

Users will rely on network operators to access independent service provider's services. Requirements on this access should be studied. It should be noted that NA7 has worked on human factor aspects: that may be relevant to this work item.

### 6.5 Service life-cycle

Responsible STC: NA6

Target duration: t0 + 12 months

This topic is already well-covered in ETSI studies, but not from an ONP perspective. Existing work items should be amended accordingly.

## 6.6 Interconnecting, internetworking and interworking issues

### 6.6.1 Service interactions

Responsible STC: NA6

Other STC: NA1

Target duration: t0 + 15 months

Study interactions among core and optional features of each of the five target services.

Study interactions with standardized switch-based services.

Study any other interactions coming the provision of services in a competitive environment.

Responsible STC: SPS2.

Other STC: SPS1, SP3.

Target duration: t0 + 12 months.

Study impact on signalling.

Responsible STC: NA6.

Other STC: SPS3.

Target duration: t0 + 12 months.

Study the need of introducing "multipoint of control" capabilities.

NOTE: The above sentence is important, related to requirements for ONP.

For cases where service interaction difficulties have been identified, investigate the solutions needed to overcome the difficulty.

### 6.6.2 Security

Responsible STC: NA6.

Target duration: t0 + 12 months.

Technical issues related to ONP requirements need to take into account of national regulatory requirements and future requirements emerging from the European Union. Contributions are expected to be forwarded to ITU-T.

Two aspects are to be studied:

- cooperation between organizations to offer security to:
  - users (security features of the five services);
  - government or law agencies (interception, localization of malicious calls);
  - themselves (detection and prevention of fraud);
- protection of the organization's resources or revenues (network or service integrity, contractual enforcement).

Annex C gives more information on this work item.



### **6.6.3 Network Integrity**

Responsible STC: NA6.

Other STC; SPS, NA4.

Target duration: t0 + 12 months.

### **6.6.4 Charging and accounting**

Responsible STC: NA4.

Other STC: NA1 (NA2 may have an involvement).

Target duration: t0 + 12 months.

### **6.6.5 Network routing functions**

Responsible STC: NA2.

Target duration: t0 + 12 months.

NOTE: This work item may need to take into consideration the identification of organizations.

### **6.6.6 Performance**

Responsible STC: NA6.

Other STC: NA2 or NA4.

Target duration: t0 + 12 months.

### **6.6.7 Protocol/signalling conversion**

Responsible TC: SPS.

Target duration: t0 + 12 months.

### **6.6.8 Handling of logical resources (numbers, announcements, etc.)**

Responsible STC: NA6.

Other STC: NA4 and NA2.

Target duration: t0 + 12 months.

NOTE: The start of this work item is dependant on completion of the interconnecting services.

## **6.7 Management issues**

Responsible STC: NA4 and NA6.

Target duration: t0 + 12 months.

Relation of a call to a service provider (implying modification of triggering tables, etc.).

Applicable numbering plan (existing or new one).

Definition of administrative interfaces.

## 6.8 Identification of the best technical procedures

Responsible STC: NA6.

Target duration: t0 + 12 months.

The objective is to define the technical procedures as a "stand alone" standard that is not dependent upon the set of standards that describe CS2 networks. The approach is already well established within standards bodies - an example is the international ISUP.

Describe the relationship of ONP and the INCM (service plane / GFP).

NOTE: This is a critical to the identification of the best technical procedures.

Study the impact on SIBs, information flows and the functional model.

Study the impact on signalling.

Demonstrate the adopted approach with service examples.

Define the access provided to the network operator's resources, without assuming anything on the way they are actually implemented (the "black box" approach).

The usage of mediation devices between CS2 interfaces and interfaces for interconnection services is part of this work item.

## 6.9 Standards

Responsible STC: NA6.

Other (S)TC: SPS, NA1, NA2, NA4.

Target duration: t0 + 12 months.

Report to the EC on standardization requirements (including requirements on signalling systems).

NOTE: This item of work should lead to contributions being forwarded to the ITU-T, in order to help global standards emerge, focusing on technical requirements on IN evolution coming from competitive service provision.

## **Annex A: Regulatory concept**

Interconnecting services is a relatively new concept which is being progressed by some Administrations in the context of a regulatory interconnect regime. They may also form part of voluntary interconnect agreements. They are briefly outlined here for information purposes only.

It is not intended to suggest that there should be any specific link between the on-going regulatory work on interconnecting services by some Administrations and the work that needs to be progressed in the technical area. If common European principles emerge in the future in the context of interconnection policy then there may be a need to account for this in the technical standards work.

Interconnecting services are in essence the services that one organization offers to another interconnecting organization (e.g. another network operator or independent service provider). The interconnecting services may be presented at a physical interface or point of interconnect and tariffed in accordance with national regulation.

An interconnecting service within the regulatory domain may be broken down into specific cost components which is related to the actual usage of the interconnecting services.

The components of interconnecting services would typically be made available to interconnecting organizations for purchase at the point of interconnect.

## **Annex B: Prose description of the five services (excerpts from available draft ETSI texts)**

### **B.1 Description of Freephone**

The following description is taken from clause 5 of ETS 300 208 [4].

#### **B.1.1 Core requirements**

The FPH supplementary service shall be available to users who are attached to the network via a basic access or a primary rate access.

The FPH supplementary service enables to allocate to the served user the charges for calls placed to the freephone number.

NOTE 1: For an interim period, some service providers may allocate charges to the calling user.

#### **B.1.2 Optional requirements**

##### **B.1.2.1 General**

The optional requirements contain functionalities additional to the core requirements, that customize the service according to specific subscriber's needs. These additional parts may be either offered to all service provider's customers, or to a group or even to a single customer.

Some possible service provider's options are listed hereafter, but the service provider may offer other additional options.

##### **B.1.2.2 Time dependent control**

The served user is enabled to modify the handling of the call according to the time interval (e.g. time of day, day of week) in which the call is placed.

##### **B.1.2.3 Time dependent routeing**

The served user is enabled to specify the routeing destination(s), e.g. access arrangement(s) or announcement(s), according to the date and time when the call was originated. The time interval may be specified by the served user.

##### **B.1.2.4 Origin dependent control**

The served user is enabled to select the origination (e.g., calling line identity, geographic area) from which the service may be used.

##### **B.1.2.5 Origin dependent routeing**

The served user is enabled to specify the routeing destination(s), i.e. access arrangement(s) or announcement(s), according to the area from which the call was originated. The routeing area(s) may be specified by the served user.

##### **B.1.2.6 Call limiter**

The served user is enabled to specify the maximum number of simultaneous calls to a given access arrangement. Alternative action shall be taken on calls exceeding the call limit, e.g. rejection.

### **B.1.2.7 Call distribution**

The served user is enabled to specify the distribution mechanism for calls to be shared between different access arrangements.

The distribution mechanism is outside the scope of this ETR. It may be, for example, percentage-based, i.e. the calls are routed to the different access arrangements according to a percentage, or circular, i.e. the calls are routed to the different access arrangements with a uniform load.

### **B.1.2.8 Alternative destination on busy/no reply**

The served user is enabled to re-route to an alternative access arrangement freephone calls meeting busy condition or no positive response at the scheduled destination.

### **B.1.2.9 Call queueing**

The served user is enabled to place in queue freephone calls meeting a busy condition, and to connect them as soon as a free condition is detected. The calling user shall be given an indication that the call is queued. The queueing mechanism is outside the scope of this ETR.

### **B.1.2.10 Indication of freephone call**

The served user may receive an indication that the incoming call is the result of an invocation of the FPH supplementary service.

### **B.1.2.11 Presentation of freephone number**

The served user may receive the freephone number which is at the origin of the invocation of the FPH supplementary service.

### **B.1.2.12 Customer service profile management**

The served user may customize one or several handling service profiles (or records) either in operation or not in operation. The management mechanism is outside the scope of this ETR.

### **B.1.2.13 Statistical information**

The served user is enabled to obtain, from the network, statistical information on freephone incoming calls, which may include itemized billing. The procedures for the generation and reporting of such information are outside the scope of the ETR.

## **B.2 Description of Charge Card Calling**

### **B.2.1 Core requirements**

The Virtual Card Calling (VCC) service allows the user to be automatically charged to the service subscriber's account, which is a telecommunications account subscribed with the service provider or may be optionally an account managed by some other commercial organization, for any outgoing call. The use of non telecommunications accounts is dependant on agreements between the service provider and such commercial organizations. The call shall be free of charge for the line the call originates from.

The user accesses the service by dialling the Service Access Centre (SAC) then, on request, enters the card number, the PIN and the destination number. Appropriate indications shall be provided to guide the entering and dialling process.

## B.2.2 Optional requirements

The optional requirements contain functionalities additional to the core requirements, that customize the service according to specific service subscriber's needs. These additional parts may be offered either to all the service provider's customers, or to a group or even to a single customer.

Some optional features may require extra information to be entered by the user.

Some possible optional service features are listed hereafter, but a service provider may offer other additional service features.

- Provider's Limitation on Destination (PLD);
- Subscriber's Limitation on Destination (SLD);
- Origin Dependant Control (ODC);
- Time Dependent Control (TDC);
- Credit Limit (floor limit) (CRL);
- Follow-On Calling (FOC);
- Speed Dialling (SPD);
- Pre-Defined Destination (PDD);
- Language Selection (LGS);
- Customer Profile Management (CPM);
- call Logging (LOG).

## B.3 VPN description

### B.3.1 Core requirements

The core service features are listed hereafter.

The VPN service is a virtual networking service which provides private network functions to users at geographically dispersed locations. It may be offered to subscribers over the PSTN or ISDN.

This business oriented service enables to interconnect Private Telecommunications Network Exchanges (PTNXs) as well as simple user installations serving the same subscriber, in order to create the equivalent of a private network by using public network facilities.

Although the VPN service may be offered within a single network only, it is generally likely that the service will span multiple networks (including private networks). In the latter case, the VPN participating service providers should provide the necessary internetworking in order to provide a consistent end-to-end service offering to the end-users.

The subscriber's network configuration is defined per the subscriber's direction using subscriber-specific service information which may reside in multiple networks.

VPN allows the subscriber to define a private numbering plan for some or all of their dialling needs. The number of digits sent and received between the subscriber's equipment and the VPN service control point will be at the subscriber's discretion, within a given range, specified by each VPN participating service provider. The subscribers should have the capability to define an on-net location with a subscriber-defined private number or a public number.

Access to the VPN service is provided through one or more of the following access mechanisms:

- on-net direct access;
- on-net indirect access;
- off-net access.

A variety of routing privileges may be assigned to VPN calls. VPN users can make calls to other users within their VPN and to non-VPN users. VPN calls can also be made from non-VPN locations. At the subscriber's request, appropriate verification of the calling party may be required.

All calls made from an on-net location may terminate to an on-net or off-net location. If terminating to an on-net location, it could be done via a dedicated or a switched access. The user may dial a private or a public number to reach on-net or off-net locations.

### **B.3.2 Optional requirements**

The optional requirements contain functionalities additional to the core requirements, that customize the service according to specific service subscriber's needs. These additional parts may be offered either to all the service provider's subscribers, or to a group or even to a single subscriber.

Some possible optional service features are listed hereafter, but the service provider may offer other additional service features.

- centralized operation, administration, maintenance and provisioning;
- call screening;
- customized recorded announcements;
- authorization code;
- accounting code;
- sub-networking (sub-grouping);
- alternate destination on busy/no reply;
- public number;
- abbreviated dialling;
- speed dialling;
- hotline;
- attendant;
- customer profile management;
- call logging;
- statistical information;
- origin dependent routing;
- time dependent routing;
- call forwarding unconditional.

## **B.4 Description of premium rate**

### **B.4.1 Core requirements**

The Premium Rate (PRM) service allows a service subscriber to provide value added services to calling users. From the user's point of view, the premium rate service is the value added service offered by the service subscriber. The calling user pays a premium rate for this call and this revenue is collected by the service provider/network operator. The generated revenue is partially transferred to the service subscriber. The calling user should be made aware of the charge rate to be applied to the service, however the methods used to supply charging information are outside the scope of this ETR.

This ETR does not detail the way in which the service subscriber provides value added services (for example information services, entertainment services, consultancy services, mail order services, etc.). However, three basic example scenarios can be envisaged:

- 1) the use of private equipment (that might have also interactive capabilities);
- 2) the use of network based facilities (e.g. routing features, announcement capabilities, digit collection, information stored into the network);
- 3) the use of private equipment in conjunction with some network based capabilities.

The last two scenarios, that allow the service subscriber to have several destinations reachable using the same premium rate number, are not considered in the core service feature description.

The service provider/network operator shall provide the communication path between the calling user and the service subscriber, shall collect the revenue generated by the call, and shall transfer the portion allocated to the service subscriber.

The service subscriber is required to provide value added services to callers (e.g. using private equipment connected to service subscribers termination(s)).

### **B.4.2 Optional requirements**

The optional requirements contain functionalities additional to the core requirements, that customize the service according to specific service subscriber's needs. These additional parts may be offered either to all the service provider's customers, or to a group or even to a single customer.

Some possible optional service features are listed hereafter, but the service provider may offer other additional service features.

- Presentation of Charging Information (PCI);
- Call Distribution (CD);
- CPM;
- Customized Recorded Announcements (CRA);
- Originating User Prompter (OUP);
- Origin Dependent Routing (ODR);
- Statistical information (STAT);
- Time Dependent Routing (TDR);
- TDC;
- Service specific Calls Only (SCO).



## B.5 Description of UPT

Universal Personal Telecommunication (UPT) enables access to telecommunication services while allowing personal mobility. It enables each UPT User to participate in a user defined set of subscribed services, and to initiate and receive calls on the basis of a unique, personal, network independent UPT Number across multiple networks at any terminal, fixed, or mobile, irrespective of geographical location, limited only by terminal and network capabilities and restrictions imposed by the network provider. Calls to UPT Users may also be made by non-UPT users.

### B.5.1 Core requirements

#### Definition:

**core service feature:** Particular service feature fundamental to the telecommunication service, i.e. in the absence of this service feature, the telecommunication service does not make sense as a commercial offering to the service subscriber.

This subclause supplies the core requirements applying to the core service features.

The restricted UPT service scenario (phase 1) includes the following UPT core requirements:

- Incall registration (registration for incoming calls);
- remote Incall registration;
- UPT user identity authentication;
- direct outgoing UPT call;
- UPT service profile interrogation;
- UPT service profile modification;
- global follow-on;
- Outcall follow-on;
- UPT-specific indications.

### B.5.2 Optional requirements

The optional requirements contain functionalities additional to the core requirements, that customize the service according to specific service subscriber's needs. These additional parts may be offered either to all the service provider's customers, or to a group or even to a single customer.

Some possible optional service features are listed hereafter, but the service provider may offer other additional service feature.

The restricted UPT service scenario (phase 1) includes the following optional UPT requirements and a set of UPT supplementary services.

- access to groups of UPT service profiles;
- operator-assisted services;
- provision of identity information.

### B.5.3 UPT supplementary services

- UPT call forwarding on busy;
- call forwarding UPT on no reply;
- variable routing.

## **Annex C: Input for the security aspects related to the usage of interconnection services between separate organizations**

NOTE: This annex should be re-examined when the list of interconnecting services is defined.

Security could be a service or a facility to ensure a given quality of other services.

We have to consider security between customers and providers and between organizations.

Then we have to examine the cooperation between organizations to offer or manage the five services selected for ONP:

- security features of these services (e.g. authentication, confidentiality, access control);
- management facilities, including fraud management.

It seems that the cooperation between organizations introduce nearly the same kind of problems, and requires similar protection mechanisms as in internetworking. The point of study will be mainly to verify this assertion and select the appropriate solutions.

At first glance, we could give security facilities and security requirements which may be useful to resolve a part of problems listed afterward in this annex :

- accountability:
  - authentication;
  - access control;
  - integrity of information;
  - non repudiation;
- management of network integrity:
  - security of management;
  - non repudiation.

### **C.1 A better system description is needed**

**The following types of interface need clarification:**

- the application of ONP on IN will imply three levels of Internetworking:
  - network;
  - service;
  - management;
- the type of interconnection, the real time constraints could change the security mechanisms to set. We need to know, for example:
  - if the management is on-line or off-line;
  - if the flows of network and service could be related;
  - if the flows go through an interface.

## C.2 Security risk protection

Security requirements need to include protection against the following risks:

- a) lack of quality in implementation of service logic and management functions.

Poor quality could have an impact on network integrity and the occurrence of faults generates cost of management resources. The contractual aspects (billing, charging, warranty of the consequence of these events) are out of scope of this group but perhaps methods to measure criteria of quality have to be considered, and also the tools for the resolution of service interaction;

- b) misuse of uncharged resources.

There is generally a lack of concern about the use or abuses of free items (signalling systems, processing capabilities). For example, a provider could tailor a service without economize signalling exchanges or a service provider could keep extensively busy a resource.

There should be build in mechanisms to prevent a service provider to make use of the signalling system to transfer information it is not authorized for (e.g. transferring files between two Service Data Points (SDPs)).

Accounting or protection against the misuse at signalling is required.

## C.3 What need accounting and with what level of detail

### C.3.1 Sharing of responsibility

A organization can lose money (interruption of service or outage of network) due to an action which engages the responsibility of another organization. For example:

- a customer of a service provider may defraud another organization;
- a malfunctioning device or a careless agent may damage the system of a third party;
- a subscriber may disagree about the billing of service offered by a third party.

To counter these undesirable situations and limit contentious issues, rules and procedures need to be drawn up. Security mechanisms (authentication, non-repudiation) may however have to be defined to manage them correctly.

### C.3.2 Quality of processing

In some situations<sup>1)</sup>, it could be profitable to a party to make an unfair discrimination in the provision of resources (lines, services). Security facilities to protect against denial of service already exist. But some complementary studies have to be made to cover support of quality of service (which parameters have to be contractual and which mechanisms monitor these values).

### C.3.3 Non repudiation of exchanged flow

If an atmosphere of mutual trust is to be maintained, it is clear that the management flows between operator and providers will need a non repudiation facility. When this mechanism is run, huge storage and large processing overhead are needed to keep copies of the flow and its credentials. It would be too costly to apply non repudiation on all flows related to two parties (call control messages, Intelligent Network Application Protocol (INAP) operations). Some recorded values have very strong statistical properties and hence don't need non-repudiation of each steps leading to them (see ITU-T Recommendation D.280 [2]).

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1) For example, the previous situation about misuse of signalling.

## **C.4 Studies in security modelling and the enhancement of standards to settle more adequate models is required**

### **C.4.1 Security policy**

Up to now each organization has its own security policy. The storage of information belonging to other organization and the sharing of tasks will need a common policy agreement, as well as implementing a minimum set of security facilities with an acceptable quality level.

The current privileges for access control is too static and lacks granularity. In internetworking, policy may include rules like "give to an authenticated organization read access to the user profile only when this user makes a call".

Under ONP, for instance, an operator may need a policy rule in order to authorize a provider to access data which is owned by another organization.

It is crucial to identify access control mechanisms with a better granularity, with proxy and discretion of authorize parties.

### **C.4.2 Inference problems**

When data or resources are shared and distributed, it may possible to deduce information by cycling or gathering of available data. (A complete cycle of all public numbers gives by complement the list of non-attributed or ex-directory numbers.)

### **C.4.3 Service of security provided**

If security service features (authentication, confidentiality, signature) are to be provided in the short term there may be a need to enhance existing standards in the context of ONP.

There is a need to avoid situations in which existing standards could be distorted by implementers in an inconsistent manner since this could lead to problems of inter-operability.

We suggest contribution to ITU to enhance security functions in the standards (ITU-T Recommendation X.500 [8] and CCITT Recommendation X.700 [9]) to ease their uses in ONP context.

## History

Document history	
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