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Management of the European Telephony Numbering Space (ETNS)

ETSI

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

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Date of adoption of this EN:	18 January 2002
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Introduction

ETSI, under a mandate from the CEU, has been requested to produce a standard for the number structure, possible evolution of ETNS numbers (Ens) towards a global scheme, and framework of functions regarding ETNS numbering conventions. ETO has, on behalf of ECTRA for the CEU, produced proposals for the management of the ETNS, and developed ETNS numbering conventions that have been agreed by ECTRA. The studies made in ETSI and the standards produced are a prerequisite to the necessary commercial agreements between the parties willing to participate in the ETNS.

The present document is based on the results of the ETSI studies on the topic, based on the prime requirement of the ETNS which is the ability to introduce services in an open competitive environment.

ECTRA having decided in November 1996 to base the ETNS on Country Code (CC) 388. At the March 2000 meeting of ITU-T Study Group 2, it was decided that the Country Code 388 and a one digit Identification Code whose current value is 3, was assigned to ETNS.

The present document has been designed for an early implementation of the ETNS. Improvements of the ETNS architecture may occur later and result in revisions of the present document.

1 Scope

The present document specifies the management of ETNS, including the number structure, the allocation of codes to the service described, number length and evolution from National numbers to pan-European to global numbers. It also describes the reference model for the ETNS and specifies the methods for routeing a call from the calling party to the called party and the management methods to be used for controlling such procedures.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

[1]   ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[2]   ETSI EN 301 160 (V1.1.1): "Routeing of calls to European Telephony Numbering Space (ETNS) services".

[3]   ETSI TR 101 073 (V1.1.1): "Number portability for pan-European services".

[4]   ETSI TR 101 079 (V1.1.1): "Network Aspects (NA); Routeing of calls to pan-European services using European Telephony Numbering Space (ETNS)".

[5]   Void.

[6]   ETO Report: "Management, Routeing and Portability aspects of the European Telephony Numbering Space (ETNS)".

[7]   Void.

[8]   Void.

[9]   ITU-T Recommendation E.353: "Routing of calls when using international routing addresses".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

administrator: responsible for the high level management of the ETNS

assisted network: network which routes a call to an ETNS number towards a serving network it has agreement with in order to complete the call

called party: entity that terminates a call to an ETNS number

calling party: entity that dials a ETNS number

ETNS country: CEPT member country participating in the ETNS

ETNS Registrar database: database maintained by the Registrar where all data, both administrative and operational, for each ETNS number are registered

ETNS routeing number: an ITU-T Recommendation E.164 number used to route to the service exchange

NOTE: It can also identify the called party, the ETNS service provider/producer, and/or the originating network. ITU-T Recommendation E.353 [9] is an alternative in the future.

ETNS signalling address: standardized address used to route signalling messages over the interface, that is not in the call path, between any pair of ETNS entities

NOTE: An example may be the use of SCCP Global Titles.

ETNS service producer: functional entity producing the ETNS service(s) in question, having real-time control of the service(s).

NOTE: See clause 4 for the relationship between service producer and service provider.

ETNS service provider: functional entity that provides one or more ETNS service(s) to its ETNS subscribers on a contractual basis and is not involved in real-time control of the service

ETNS service: service that has been assigned an ESI

ETNS subscriber: entity that requests a ETNS number from a ETNS service provider in order to offer access from a calling party to a ETNS service

ETNS translation database: capability, which in the call process, translates the ETNS number into a routeing number

ETNS: numbering resource identified by E.164 country code 388 and a one digit identification code whose current value is 3, used for the provisioning of the ETNS services

originating network: network, either assisted or serving, to which the calling party is connected

registrar: responsible for the day-to-day management of the ESNs behind each ESI

service exchange: exchange of the service network that triggers the provision of the service on reception of the routeing number, and then forwards the call

service network: network that operates one or more service exchange(s)

serving exchange: exchange, in the serving network, that can interrogate directly or indirectly an ETNS translation database to obtain a routeing number related to the ETNS number, and then forwards the call to the service network

serving network: network, with one or more serving exchange(s)

terminating number: number containing explicit information on the terminating point of the called party

NOTE: The number is used to route towards the called party.

3.2   Symbols

For the purposes of the present document, the following symbols apply:

◺   calling party

◹   called party

3.3   Abbreviations

For the purposes of the present document, the following abbreviations apply:

CC   E.164 Country Code
CEPT   Conférence Européenne des Postes et Télécommunications
CEU   Commission of the European Union
ECC   ETNS Country Code
ECTRA   European Committee for Telecommunications Regulatory Affairs
En   ETNS number

ESC   European Service Code
ESI   European Service Identity
ESN   European Subscriber Number
ETNS   European Telephony Numbering Space
ETO   European Telecommunications Office
GSN   Global Subscriber Number
NNA   National Numbering Authority
SgN   Serving Network
R   Registrar
Rn   Routeing number

4   Reference model for the ETNS

This clause provides a conceptual description of the implementation of the European Telephony Numbering Space (ETNS). Figure 1 shows the actors involved in the ETNS, and their relationship with each other. Also shown in figure 1 are the relevant reference points for the ETNS that are described in clauses 4.2 and 4.3. Figure 1 is divided into call-related and non call-related parts in order to clearly show the distinction between the routeing functions and the management functions. The following Reference Model reflects only the management and routeing aspects of the non-call and call related parts, respectively.
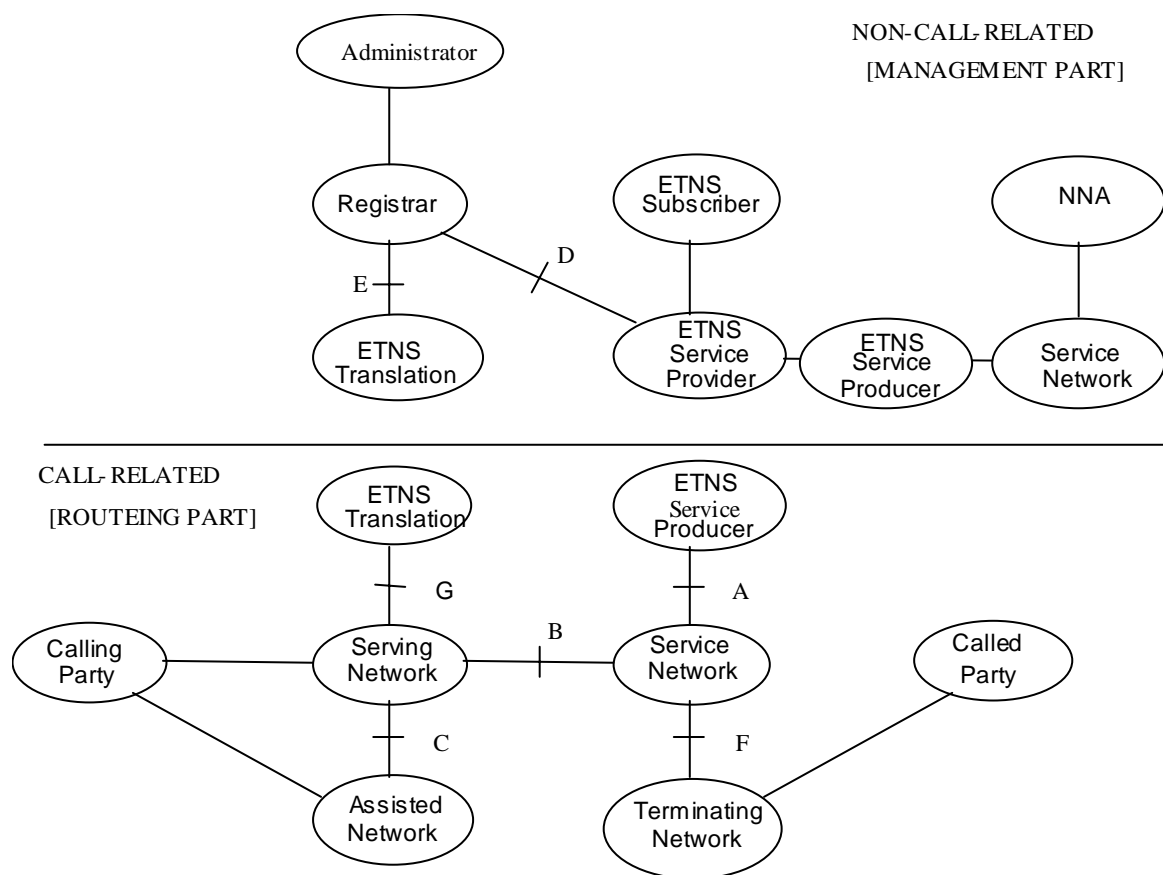

Figure 1: Actors and reference points

The reference points in the management (non call-related) part of the figure 1 are used in the present document, while the reference points in the call-related part are used in TR 101 079 [4].

The ETNS Service Provider is the entity that is relevant in the process of number assignment. The service network is the entity that is relevant in call processing. One single entity may be both the ETNS Service Producer and the service network, or they may be different entities; in the latter, the entity that assumes the function of ETNS Service Producer may or may not participate in the call process. Such a distinction leads to recognize two concepts under the word "service provision": the function of the first is to sell a service to a ETNS subscriber, and to be the sole interface with this ETNS subscriber, this is the role of the ETNS Service Provider; the function of the second is to operate the call, this is the role of the Service Producer.

The Serving Network (SgN) is responsible for routeing a call from the calling party to the service network. The service network (and potentially the Service Producer) is (are) responsible for providing the service itself.

ETNS numbers (Ens) are managed by independent authorities which are identified as the registrar and the administrator in figure 1.

4.1   Call-related [Routeing part]

This clause describes the principles for routeing a call from the calling party to the called party. This is studied in detail in TR 101 079 [4] and EN 301 160 [2]. A call to a ETNS number (En) can be divided in two parts.

4.1.1   First leg: getting the routeing number

The calling party shall dial the En in its international format.

Based on the European Service Identifier (ESI), clause 5, the call is routed to the serving exchange in the SgN. Potentially, this exchange may not be located in the calling party's network. The originating network is then called an assisted network, interconnected to the SgN through reference point C. An assisted network can be connected to different SgNs, e.g. for routeing differently depending on the ESI, or it can redirect all ETNS calls to one SgN.

The serving exchange, analysing the ESI, triggers the ETNS translation database to translate the incoming En into an outgoing Routeing number (Rn). The ETNS translation database can be inside or outside the SgN, e.g. when several SgNs share the same ETNS translation database. The Rns can vary from a SgN to another.

Whether the area from which a single En is accessible relies on a subscription or not, is service dependent.

This ends the first leg of the call which consists of routeing the call to the service exchange.

4.1.2   Second leg: providing the ETNS service

The proceeding of the call set up in the service network and beyond depends on the nature of the service on the one side, and on the relationship between the ETNS Service Producer and the service network on the other side.

The nature of the service will determine the path of the call, whether it terminates to the subscriber or to a recorded announcement, whether it needs a second number translation or not, etc. These features are service dependent and are outside the scope of the present document.

The relationship between the ETNS Service Producer and the service network will determine the responsibilities of each actor as regards service provision. The two actors can be the same entity which operates the service, or the ETNS Service Producer can rely upon the telecommunication infrastructure of a different service network and only operate e.g. a database when a double translation is required. The implementation of reference point A between the service network and the Service Producer depends on the technical constraints related to the service, and on the regulatory environment.

4.1.3 Service provision by the Serving network

Figure 2 depicts some examples of call configurations. Where the SgN and the service network are the same, the serving exchange and the service exchange can also be the same, and reference point B is then internal.
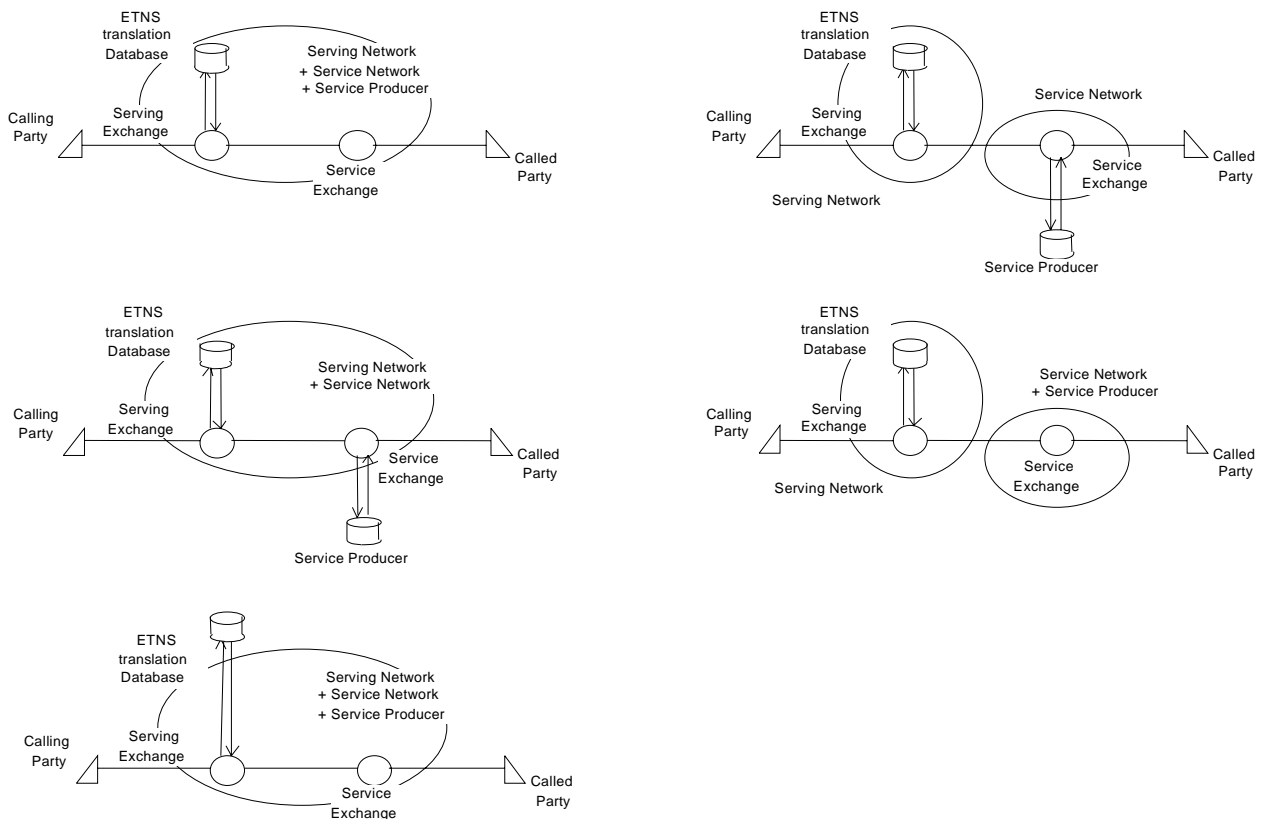

Figure 2: Examples of call configurations

Note that in figure 2, the calling and the called parties do not need to be directly connected to the serving and the service networks respectively. It should be noted that the translation database should provide the capability to translate the ETNS number into a routeing number. The translation database capability can be provided in a number of ways, e.g. Intelligent Network or internal switch translations.

4.2 Non-call related [Management part]

Two functions are performed in the management process. The first is the number assignment process. The second is the distribution of ETNS routeing numbers to SgNs.

4.2.1 ETNS number assignment

The ETNS registrar database is primarily used in the interaction between the registrar and the Service Providers for number assignment. Procedures are outlined in the ETO Report [6].

4.2.2 Obtaining Routeing numbers (Rns)

ETNS Service Providers will have to negotiate with the Service Producer and Service Network to obtain Routeing numbers, Rns.

4.2.3   Distribution of Routeing numbers (Rns)

The distribution of routeing information to the SgNs occurs e.g. when:

- a new En has been assigned;

- coverage of an En has changed;

- an En has been withdrawn;

- a change of ETNS Service Network has occurred;

- a change of ETNS Service Provider has occurred, that may entail new Rns.

The procedure for the distribution of the Rns to the SgNs shall take place through the registrar. It is assumed that the ETNS Service Provider has obtained the Rns from the Service Producer/Service network(s) it has agreement with.

The ETNS Service Provider shall inform the registrar of the Rns and its connected En. The registrar distributes Rns and their connected Ens to the SgNs. This is shown in figure 3. This topic is further addressed in clause 9.
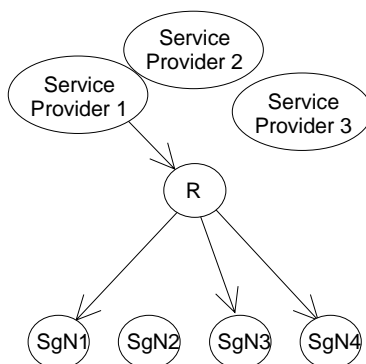

Figure 3: Distribution of Routeing Numbers

Figure 4 recaps the three previous figures for an overview of the ETNS architecture.
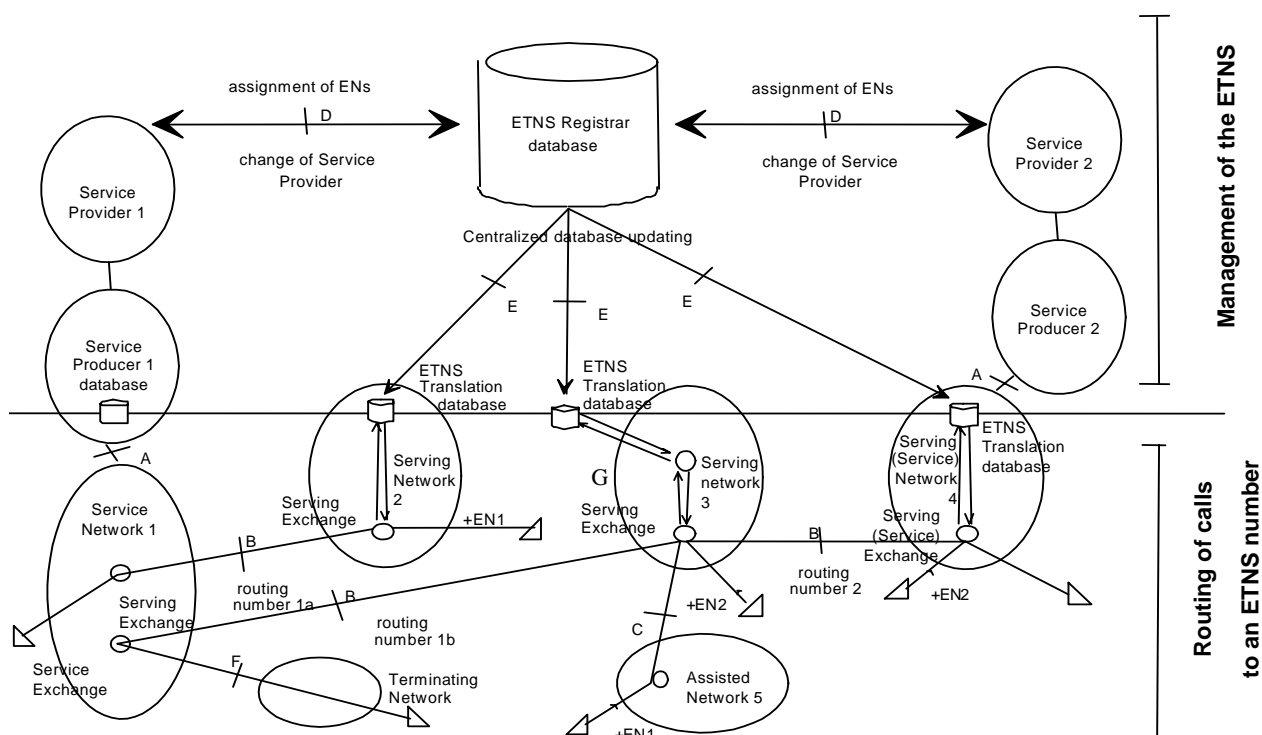

Figure 4: ETNS reference architecture

In the short-term it is anticipated that in the management part, the interfaces that require the transfer of information will be a manual process. In the long-term, it is anticipated that mechanized interfaces will be developed and deployed as the services grow and the number of subscribers and changes reaches a point where manual processes are no longer sufficient to accommodate the manual collection and distribution of information.

5 The ETNS number (En)

5.1 Requirements for ETNS numbers

The ETNS is part of the international public telecommunication numbering plan E.164 [1]. As such, the total length of the En shall not exceed 15 digits. The ETNS number space shall be seen as a non-geographic, overlay number space on top of all existing national numbering schemes of CEPT countries.

As a goal, additional digits that may be dialled by the calling party following the recognized En shall not result in a call failing.

The ETNS shall be designed to have a minimum of 100 European services and a potential of 10 million numbers per service.

The structure of the En shall facilitate evolution towards a global numbering scheme on a per service basis (see clause 6).

The structure of the En shall facilitate portability between ETNS Service Providers.

5.2 Structure of ETNS numbers

The ETNS uses E.164 [1] numbers, which are structured as shown in figure 5.

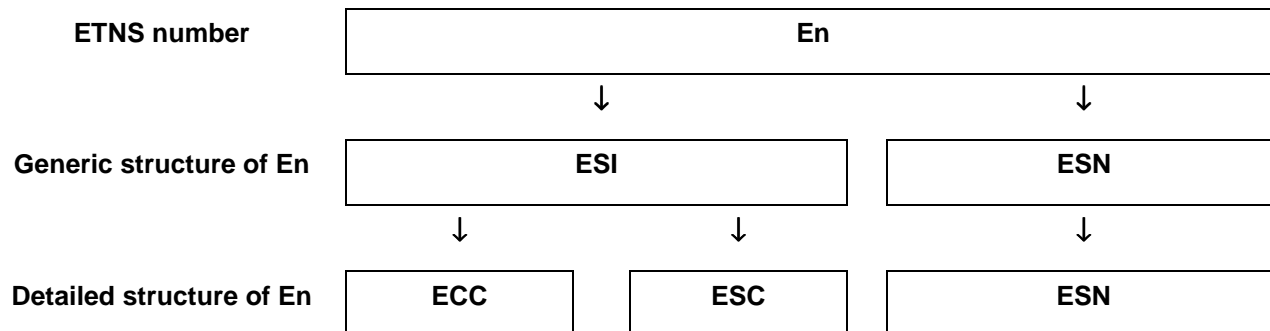| ETNS number	En			
	↓		↓	
Generic structure of En	ESI		ESN	
	↓	↓	↓	
Detailed structure of En	ECC	ESC	ESN	

Figure 5: Structure of ETNS numbers

The ETNS Country Code (ECC) is the E.164 [1] Country Code 388 and the current one digit identification code 3, that has been assigned by ITU-T for ETNS. Together this forms the ECC. The ETNS Service definition, defined by the ETO on www.eto.dk, defines the ECC = "3 883".

The En shall always be dialled in the international format i.e. +En (where "+" represents an international prefix before the international number).

For some services, e.g. a service that requires two stage dialling, the ESN is not required.

5.3 European Service Identity (ESI)

An ESI shall be assigned to a service or a family of services in some specific cases; this occurs when a range of closely related services are grouped behind one ESI.

Following the assignment of a shared CC for ETNS services, an ESI shall comprise the ECC 388 and the current one digit identification code 3 and a European Service Code (ESC).

The depth of analysis in the international network is restricted to 7 digits in accordance with ITU-T Recommendation E.164 [1]. Therefore, for the international network to be able to recognize the ETNS service directly, the ESI cannot be more than 7 digits long. The ESI length may vary between 5 and 7 digits (i.e. an ESC from 1 to 3 digits long), depending on capacity and service needs.

If tariff information to the calling party is to be contained within the En, it shall only be contained in the ESI.

5.4 European Subscriber Number (ESN)

The length and the structure of the ESN are service dependent.

The number length shall be determined by the capacity required. For instance for services which aim at reaching the goal of 10 millions numbers, a fixed length ESN shall be at least 7 digits long.

Additional digits that may be dialled by the calling party following the recognized ESN shall not result in the call failing.

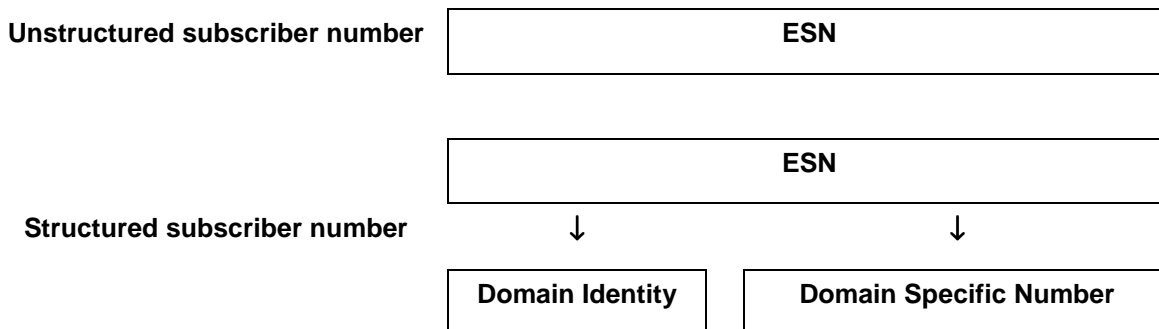The ESN can be either structured or unstructured (see figure 6).

Unstructured subscriber number	ESN

Structured subscriber number	ESN

↓   ↓

Domain Identity	Domain Specific Number

Figure 6: Structured and unstructured European subscriber numbers

Unstructured numbers:

The ESN is unstructured where no information about the subscriber can be derived from part of the field. The ESN shall have a fixed length for one specific ESI.

The whole ESN is managed by the registrar.

Structured numbers:

The ESN shall be divided into the domain identity and the domain specific number. Each ETNS subscriber is allocated a domain identity for each of their subscriptions. The domain identity can be of variable length depending on capacity needs. For structured ESNs the length of the En may be variable.

In this case the registrar only manages the domain identity of the ESN.

6   Evolution from ETNS to a global scheme

Evolution provides the possibility for a subscriber to a service using a first numbering scheme to subscribe to a similar service using a second numbering scheme, while retaining part of his first number. Although the subscriber would have to change his service number to gain advantage of the new scheme, he may want the new number to look like the old one as much as possible. This is achieved by embedding all or part of the old number into the new one.

Evolution shall be considered from a En to a global service number using an ITU-T defined scheme.

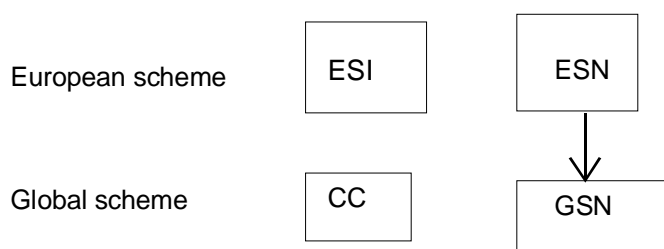Figure 7 shows the preferred method of evolution from a ETNS to a global scheme.

European scheme	ESI	ESN
Global scheme	CC	GSN

Figure 7: Embedding the ESN into the global subscriber number

In figure 7, only the ESN is retained and embedded in the GSN. The ETNS subscriber entirely changes their ESI to the global CC. The length of the header is reduced from between 5 to 7 digits to 3 digits. But the length of the subscriber number will increase by 1 digit or more to minimize conflicts between ETNS subscribers willing to retain their number and new subscribers applying for the same global number (the extra digit enables the two parties to have the other digits in common). As a total, the whole number length will not increase and is likely to decrease.

Other evolution paths, like the embedding of the whole En behind the global CC, cannot be excluded.

7   Management of the ETNS

7.1   Organizations involved in the management of ETNS

The framework for the top level management of the ETNS should be developed in conjunction with the relevant parties as detailed in the ETO Report [6].

The ETNS is managed at two levels. The first deals with the ESIs and how they are attributed to ETNS services. The second is on a per-service basis and describes how the ESN behind each ESI is managed. The following functions shall be performed:

-    the administration function, carried out by the administrator, is the responsibility for the high level management of the ETNS, i.e. the establishment and change of the ETNS numbering conventions. It includes the decision to introduce ETNS services, the choice of the ESIs they are assigned, and the management rules of the ESNs behind these ESIs.

ESI resources shall be carefully managed in order to prevent exhaustion. Similarly, ETNS numbering conventions for an assigned ESI shall be carefully set up by the administrator in order to prevent exhaustion; particular attention shall be paid to the length of the ESN field.

-    The registration function, carried out by the registrar, is the responsibility for the day-to-day management of the ESNs behind each ESI. For some ETNS services ESNs may not be used and therefore the registration function is not required. Some other ETNS services ESNs are structured, in which case the registrar shall have the responsibility for managing only the domain identity. The operational aspects of the registration function may be performed by a third party agency by agreement with the registrar.

-    The advisory function, carried out by an advisory body, is the responsibility to advise the administrator and the registrar.

The following parties will also be involved in the process of allocating ESNs:

-    as regards ESN request: the ETNS Service Provider sells the ETNS service to the ETNS subscriber, and requests a En on behalf of the ETNS subscriber to the registrar. The ETNS subscriber has no direct connection with the registrar, and is always represented by their ETNS Service Provider.

-    as regards ESI reservation: any party can propose the establishment of a ETNS service to the administrator. The proposal should comply with the information in annex A.

7.2   Criteria for the establishment of an ESI

This clause details the requirements that services must fulfil in order to be considered as ETNS services liable to be attributed an ESI. A proposal shall comply with the following items to be considered valid by the administrator:

-    ETNS services must not violate either ETSI standards or ITU-T Recommendations.

-    ETNS services must not violate specific criteria set by ITU-T when an international numbering resource is allocated for this purpose.

-    All national regulatory requirements have to be met in the countries where the proposed service will be offered.

-    The definition of a ETNS service shall not impose any specific constraints (in terms of service offering area and service accessing area) on any country participating in the ETNS.

-    Services implemented for a short period of time e.g. seasonal services (like a New Year service, an Olympic Games service) shall be supported, possibly from a specific ESI range.

-    The proposed ETNS service shall not currently exist as either an ETNS or global service.

-    The service description shall contain all information necessary to launch the service.

- Only one ESI shall be allocated per ETNS service except where exhaustion occurs. The length of the ESI requires careful consideration due to the scarcity of the resource.

- Service branding, e.g. 286 standing for CTM, should be considered in the choice of the ESI value, but ETNS Service Provider branding must not be taken into account, as it would provide an unfair competitive advantage.

8 ETNS numbering conventions

When the ETNS numbering conventions are established, they can only be changed, after consultation of the advisory body and other interested parties, by the administrator. These ETNS numbering conventions shall include the procedures, requirements and conditions for the opening up of (family of) ETNS services, the choice of ESIs and the management of the ESNs. These issues are not elaborated in the present document and are introduced in ETO Report [6].

9 Management and Distribution of routeing numbers

The centralized approach was introduced with figure 4.

The centralized management of Rns shall be performed by the registrar. It is understood that the following responsibilities are not inclusive of all the functions that need to be performed, but are only intended to define some high-level tasks. The Administrator will need to develop the detailed responsibilities, criteria, and procedures on a per service basis.

a) Receive from the ETNS Service Provider the list of Rns, associated to each En attached to the different areas from which the service is accessible.

b) Accept changes from the ETNS Service Provider.

c) Inform the SgNs of the updated list of Rns.

ETNS Service Providers will have to negotiate with the Service Producer and Service Network to obtain Routeing numbers, Rns.

ETNS Routeing numbers, Rns, are addressable points within ETNS Serving Networks.

It is recognized that the interfaces detailed in figure 1; D, and E, will consist of a manual process in the short-term. In the long-term, it is anticipated that mechanized interfaces will be developed and deployed as the services grow and the number of subscribers and changes reaches a point where manual processes are no longer sufficient to accommodate the manual collection and distribution of information.

10 ETNS Service Provider portability

Ens with an unstructured ESN shall be portable between ETNS Service Providers. Additional information related to ETNS number portability is contained in TR 101 073 [3].

Annex A (informative):
Information to file in a proposal for reservation of an ESI to establish service

A.1 Preferred ESI

The application can propose a particular value of an ESI for a service.

A.2 Description of service

The proposer shall provide a service description including at least details of:

- how the service is perceived by the end user:

  - how the calling party can access the service,

  - how the subscribers can subscribe/activate/deactivate the service,

  - how the subscribers can select the different options within the service,

- how the service is implemented:

  - capabilities of ETNS service networks and Service Providers required to implement the service within the stated timescale,

  - capabilities of other networks required to implement the service e.g. bandwidth (if applicable), switching and signalling capability required,

  - verification that it does not violate any ETSI or ITU Standards.

A.3 Charging Information

When proposing an ESI, the proposer shall provide general information regarding:

- charging of the calls from the calling party's point of view,

- charging of the calls from the called party's point of view.

For the two types of charging, the proposer shall identify:

- the network entities involved in the charging process,

- the number of digits in the En to be analysed to determine the charge,

- other information used for charging (e.g. geographical location of the caller and called party),

- additional mechanisms required during the charging process (e.g. announcement) and where these mechanisms need to be implemented.

The applicant should also give information element regarding billing (identify the body who will either the calling or called user) and accounting, mainly between ETNS service provider and network operators.

A technical description of the network mechanisms is all that is required.

A.4   Market Potential

The proposal should contain initial figures to assist in the estimation of the length of the ESN field.

A.5   Timescales

The proposal should contain an implementation schedule detailing the foreseen dates:

- for testing/trial periods,

- for earliest date for service launch.

A.6   Other considerations

It should be noted that additional information may also be requested to assist in evaluating any proposal such as:

- potential impact due to network overload/focused high volume, short term call attempts,

- confirmation that the proposed service is compliant with all national regulatory requirements in countries where the service will be provided.

History

Document history			
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V1.2.1	September 2001	One-step Approval Procedure	OAP 20020118: 2001-09-19 to 2002-01-18
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