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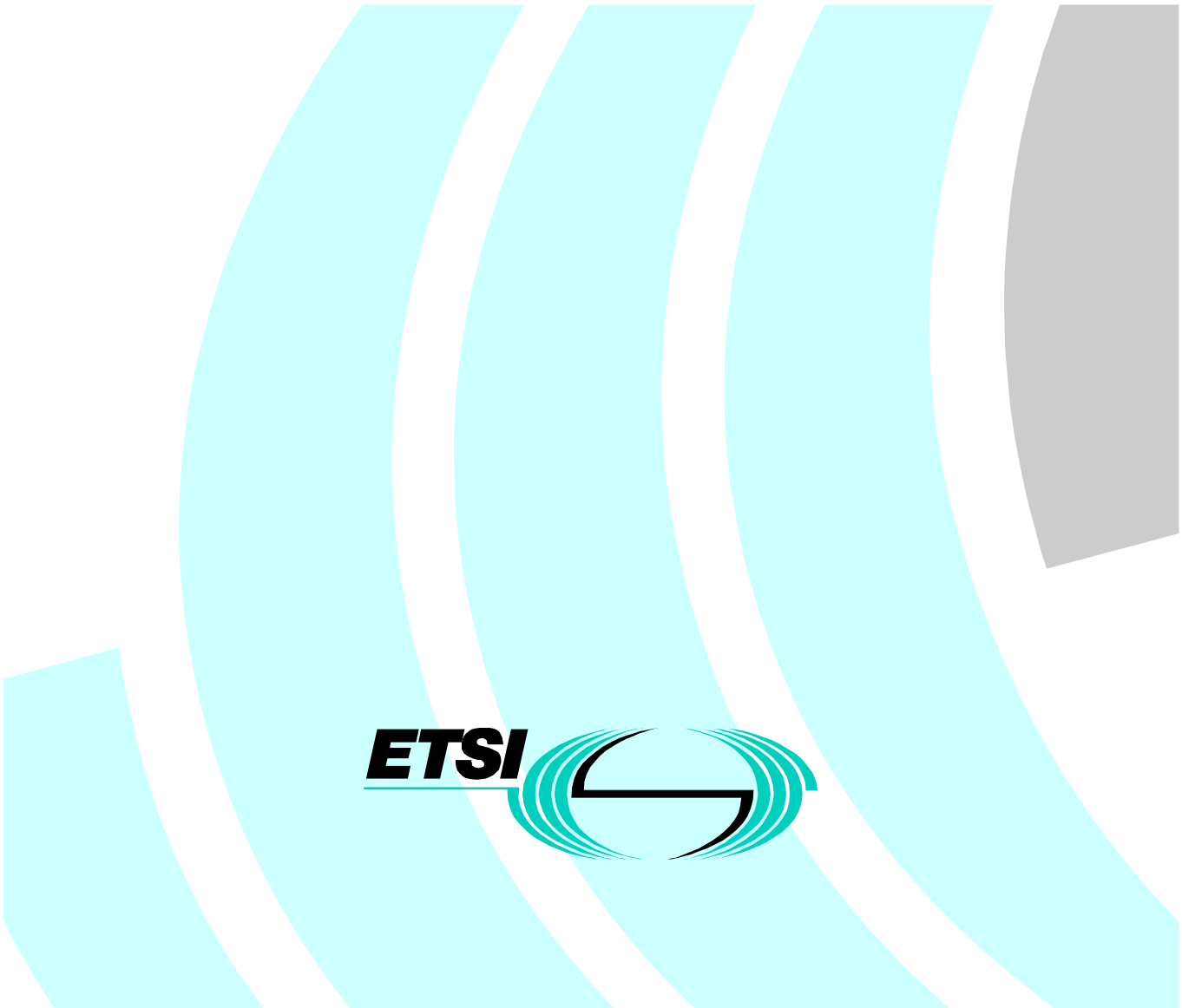
Technical Report

Network Aspects (NA); Considerations on network mechanisms for charging and revenue accounting for European Telephony Numbering Space (ETNS) services



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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Network Aspects (NA).

1 Scope

The present document intends to describe a basic frame for charging and revenue accounting for ETNS Services. The main frame and the technical conditions for ETNS (European Telephony Numbering Space) Services are described from different points of view in the documents referred to in clause 2 References.

The European Commission has initiated the issue of ETNS Services to be offered to the public by providers. ETNS calls are routed and transferred in the network operator's telecommunication network. The provision of ETNS Services, the translation of European Number (EN) to Routeing Number (RN) as well as the carrier connection through the public networks shall be managed by providers in competition.

In general ETNS Services shall be accessible worldwide by all customers in public networks. It means, that either the network operator (NO) per default or some of the NOs, which can be accessed e.g. by access code, should provide routeing capabilities to the ETNS Services. The provisioning of the ETNS Registrar Database, the entity administrating the linking between the European Numbers and the Routeing Numbers, might be licensed to a service company.

To call a European Service (an EN call), the Calling Party shall dial a European Number. The call will be transferred to a switch, which can enquire an ETNS Translation Database to translate this into a Routeing Number. The switch is then able to route the call to a switch, which can enquire an ETNS Service Provider Database in which the Routeing Number will be translated to a Terminating Number. The call can then be routed to the termination. In some cases the last translation can be omitted.

The complete documentation for ETNS Services should include the issues:

- Description by the responsible authorities of the ETNS service concept;
- Management of the European Telephony Numbering Space [1];
- Number portability for ETNS Services [2];
- Routeing of calls to ETNS Services [3];
- Guidelines to the Administrator (ECTRA);
- Descriptions of the relationship between commercial entities within the provision of ETNS Services;
- Charging alternatives relating to (1) the ETNS services themselves and (2) to call related issues;
- Technical requirements on charging;
- Technical requirements on revenue accounting between the commercial entities providing elements to the ETNS service provision.

Assumptions concerning ETNS Services:

- Calling Parties in Europe (and outside) should as a minimum be offered routeing capabilities to ETNS Services by one of the accessible NOs.
- Capabilities should be provided to allow the NOs to bar the ETNS service for a number of payment related reasons.
- Acknowledge procedures for Calling Parties may exist for certain ETNS Services either somewhere in the network or outside the network at the gate to the service.
- Number portability is automatically taken into account by the relationship EN/RN/TN.
- The Calling Party is by default accessing his own NO. He might also be able to access alternative NOs by an appropriate access code. The accessed NO should be responsible for establishment of European Service calls, i.e. that NO is the Call Contractor.
- The Call Contractor will by default be responsible for the charging.

- The Call Contractor might have possibilities to choose between alternative routeing of EN calls.
- The ETNS Service is consisting of the service itself and the access traffic from the Calling Party to the service location including the supporting services for that traffic.

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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] TR 101 074: "European Numbering Task Force; Management of the European Telephony Numbering Space (ETNS)".

[2] TR 101 073: "Number portability for pan-European services".

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

3 Definitions, symbols and abbreviations

3.1 Definitions

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

Assisted Network: a network which routes a call to the European Number towards a Serving Network it has agreement with in order to complete the call.

Call Contractor: the network operator responsible for establishment of a call (to an ETNS Service), which can contain contributions from a number of network and/or ETNS service providers. The Call Contractor has normally legal contracts with the Calling Parties. There might be exceptions, e.g. for calls from payphones.

Called Party: an entity that terminates a call to a European Number. The Called Party may be the ETNS Subscriber to the European Number, an entity delegated by the ETNS Subscriber, or terminating equipment of the Service Network (e.g. recorded announcement equipment).

Calling Party: an entity that dials a European Number. (The Calling Party has a legal contract with the accessed Call Contractor).

Central Settlement: Central Settlement means an entity to manage the billing of the paying entities, to receive the payment and to manage the revenue accounting between the contributing parties for a co-operating group of network providers and ETNS service providers. A central clearinghouse may carry out the settlements.

ETNS: the numbering resource identified by E.164 country code 388, used for the provisioning of the ETNS Services.

ETNS registrar database: the database maintained by the Registrar where all data, both administrative and operational, for each European Number are registered.

ETNS routeing number: an E.164 number used to route to the Service Exchange. It can also identify the Called Party, the ETNS Service Provider, and/or the originating network for routeing purposes.

ETNS service producer: an entity producing the ETNS service in question. The ETNS Service Producer could be the ETNS Service Provider.

ETNS service provider: an entity that provides one or more ETNS Service(s) to its ETNS Subscribers on a contractual basis.

ETNS service provider database: a database, which, in the call process, translates the Routeing Number (or the European Number) into the Terminating Number.

ETNS subscriber: an entity that requests an European Number from an ETNS Service Provider in order to offer access from a Calling Party to an ETNS Service.

ETNS translation database: a database, which, in the call process, translates the European Number into the Routeing Number.

European Number: a number out of the ETNS.

One Stop Charging: by One Stop Charging means charging, managed by one entity regardless of the number of parties contributing to the concerned service. The Call Contractor is normally the manager.

originating network: a network, either Assisted or Serving, to which the Calling Party is connected.

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

revenue accounting: the technical process of accounting the revenue collected from the Paying Entities by the Call Contractors to be distributed between the co-operating providers who jointly serve a group of Calling Parties.

Service Exchange: an 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: a network that operates one or more Service Exchange(s).

Serving Exchange: an exchange in the Serving Network, that can interrogate directly or indirectly an ETNS Translation Database to obtain a Routeing Number related to the European Number, and then forward the call.

Serving Network: a network with one or more Serving Exchange(s).

Terminating Number: a number containing explicit information on the Termination Point of the Called Party. The number is used to route towards the Called Party. It can be a Routeing Number, a European Number or a geographical number.

Termination Point: the physical termination of the Called Party.

3.2 Symbols

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

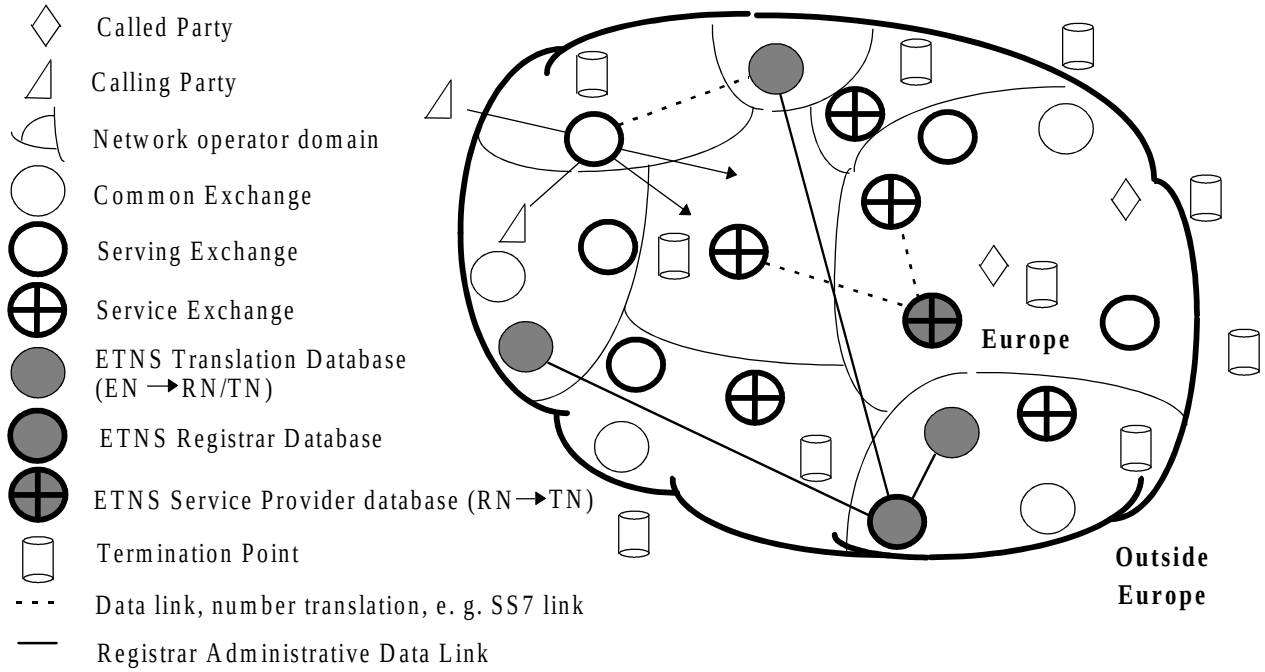

Figure 1: Overview showing the symbols

3.3 Abbreviations

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

DSS1	Digital Subscriber Signalling system No. 1
ECTRA	European Committee on Telecommunications Regulatory Affairs
EN	European Number
ESI	European Service Identity
ESN	European Subscriber Number
ETNS	European Telephony Numbering Space
ISDN	Integrated Services Digital Network
NO	Network Operator
PSTN	Public Switched Telephone Network
RN	Routeing Number
SS7	ITU-T signalling system No 7
TMN	Traffic Management Network
TN	Terminating Number
TP	Termination Point

4 Description of the ETNS Service Concept

A short description of the assumed concept and the actors for ETNS Service could be useful:

To emphasize the European feature it has been decided that the "intelligence" in the ETNS Service System shall be located inside Europe.

4.1 The elements in the structure

The numbering administration system

The numbering administration system has two elements interconnected by data links, see figure 2:

1) the *European Telephone Numbering Space (ETNS) Registrar Database*, which is a centre for administration of the numbering and interlinking between the *European Number (EN)* and the *Routeing Number (RN)*;

2) *ETNS Translation Databases*, centres in which the called EN will be transformed to a RN. In some cases the RN after further switching steps will be transformed to the *Terminating Number (TN)*. The ETNS service provider is responsible for this second translation. A call case for direct translation from EN to TN may also exist. The entity to translate the RN (or EN) to the TN is called the ETNS Service Provider Database.

The ETNS Registrar Database is an important equipment, and safety aspects needs to be considered. Due to the wide geographical area of Europe many ETNS Translation Databases might be established.

The relationship between EN and RN and the current changes in it will be stored in the ETNS Registrar Database. The ETNS Registrar Database will transfer the information e.g. via data links in a TMN structure to all the ETNS Translation Bases in Europe. See figure 2.

The routeing of the calls will follow the established telecommunication network. The equipment for service provision can be located inside Europe or outside.

The network elements in an ETNS call from the Calling Party to the Called Party:

- The terminal equipment at the Calling Party's premises from which the ETNS Services are called;
- The Originating Network;
- An Assisted Network, see the definition;
- The Serving Network, which interrogates an ETNS Translation Database;
- A Transit Network might be in between the Serving Network and the Service Network;
- The Service Network, which interrogates an ETNS Service Provider Database in case that function is included;
- The Terminating Network;
- The terminal equipment at the Called Party's premises.

The commercial entities involved in ETNS service provision, see 5.1.

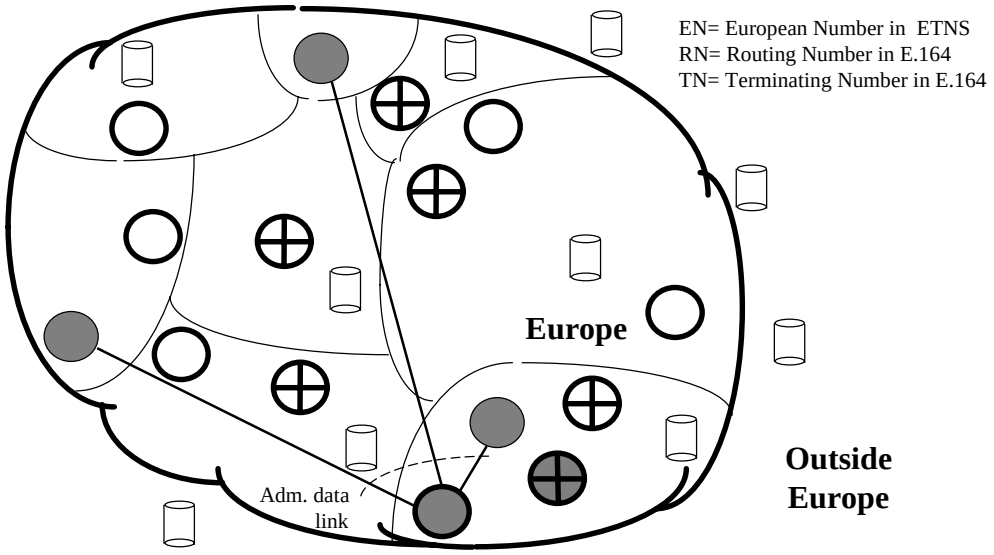

Figure 2: Numbering administration system (EN/RN)

The ETNS Registrar Database handles the current dynamic linking; ENs to RNs. Changes in the number linking EN/RN is transferred from the ETNS Registrar Database e.g. by data links to all European ETNS Translation Bases. It might be in a parallel adaptive updating procedure by TMN.

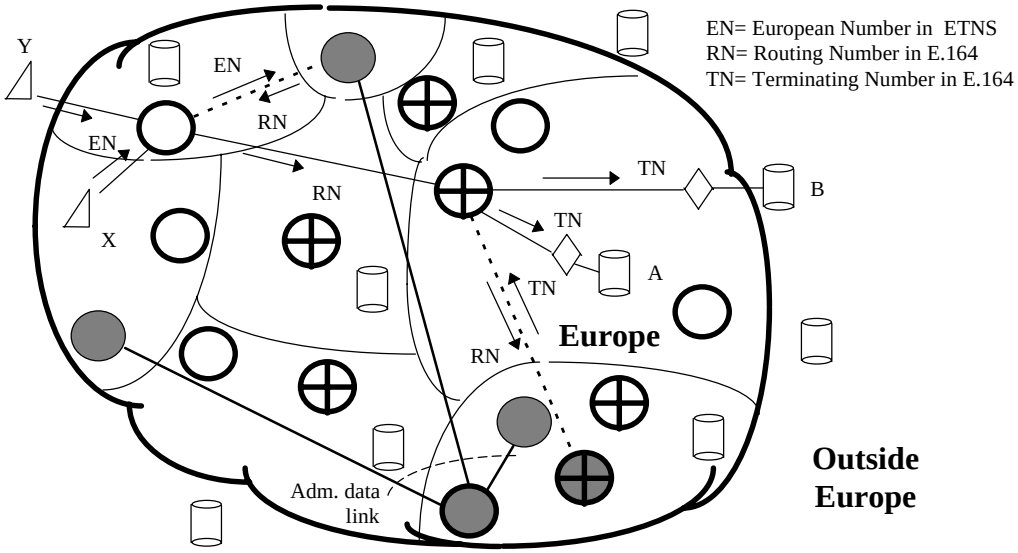

Figure 3: Calls from an European Calling Party (X) and from an external-European Calling Party (Y) to a Termination Point which can be situated inside (A) or outside Europe (B)

The showed call has a double translation from EN to RN and from RN to TN. ETNS Service Provider Translation Database handles the translation of RNs to TNs.

The *ETNS Subscriber* is a commercial entity, which provides ETNS Services to the public. The ETNS Service itself is produced under the responsibility of an *ETNS Service Provider*. It can be produced by the *ETNS Service Provider* himself or by an *ETNS Service Producer* behind the *ETNS Service Provider*. The *ETNS Service Producer*'s equipment in the Termination Point can be located inside or outside Europe.

An established physical service provision can be reorganized. The *ETNS Service Producer*'s equipment could be moved, or the service provision could be hosted in new equipment. This requires a dynamic framework for the ETNS Service provision.

4.2 Calling an ETNS Service

ETNS Services shall be accessible worldwide by all customers in public networks.

Calling an ETNS Service is decided as 00 + 388 xxxx. It appears as an international call procedure, 00 + "country code = 388" + E.164 number. The E.164 number may be grouped intending to link number series and service types. Relating to that the EN can be used to initiate the appropriate service charging in the ETNS charging scheme. The routeing of the call will follow one of three main call cases:

a) Routeing to the Called Party uses the EN only.

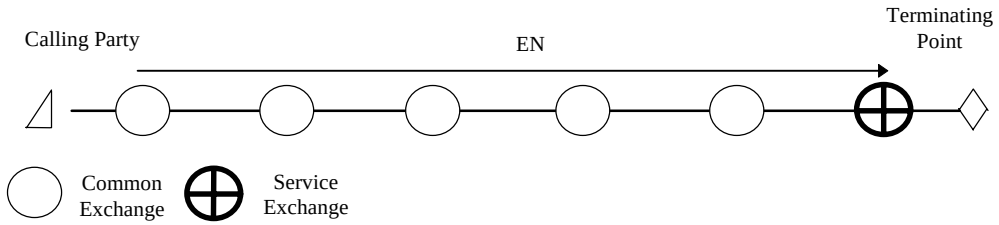

Figure 4: EN-call with direct routeing using the EN only

ad. a) The call case requires routeing according to the EN access code in every European switch point. For external-European calls, the call shall be routed to a European gateway. The EN is a normal E.164 number. The routeing to the Called Party can follow the normal procedures. See figure 4.

b) Routeing to the Called Party uses a single translation. EN is translated to TN.

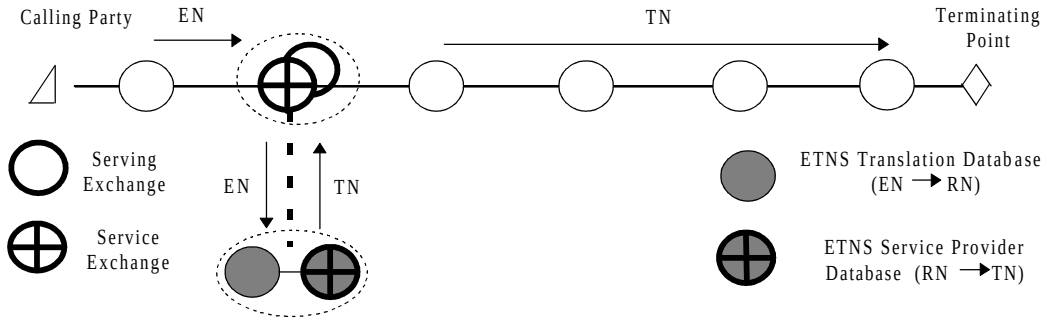

Figure 5: EN-call using single translation EN/TN

The translation is performed in a combined ETNS Translation Database/ETNS Service Provider Database.

ad. b) To handle current changes of the Called Party/Termination Point a translation of the EN to a TN might be necessary. The EN Numbering shall be stable. A number of switch points shall have a data link to the ETNS Translation Database. In Assisting Networks calls shall be routed to one of those switches points making inquiries for the TNs related to the ENs via the data link to the ETNS Translation Database. See figure 5. The data link might use signalling system ITU-T SS7. When the TN is received the call can be routed to the Called Party's premises.

c) Routeing to the Called Party using two translations: EN is translated to RN. RN is translated to TN.

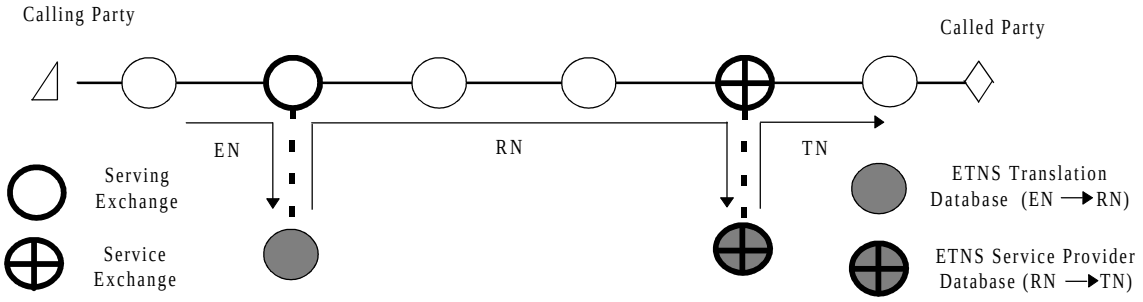

Figure 6: EN-call using double translation EN/RN and RN/TN

ad. c) In case of changes of the relations, locations etc. between *ETNS Service Producer*s, *ETNS Service Provider*s and *ETNS Subscriber*s, a second number translation to reach the Called Party/Termination Point might be necessary. An ETNS Service Provider Database manages the second translation. The concept is shown in figure 6:

1) The European Number, the public known number for the ETNS Service, to be dialled by the Calling Party should in general be unchanged and without geographical significance.

2) The Routeing Number (RN) relates to the *ETNS Service Provider's* present access in the telecommunication network and will for the fixed network depend on the geographical numbering scheme (E.164). The RN will follow the dynamics in the service access. The translation to the TN takes changes of the location of the Termination Point into account. TN is also a number in E.164.

4.3 Call Contractor access

The Calling Party might be given an opportunity to choose the Call Contractor e.g. by an access code. The choice of Call Contractor can be made on a call by call basis or based on preselection.

5 Charging of ETNS Services

The requirements for the present document were to describe guidelines for the future charging of ETNS Services. The content of the chapter is preliminary, because it cannot be related to any existing ETNS Service.

5.1 Commercial Entities considered in charging of ETNS calls

Commercial Entities involved in the provision of ETNS Services should be compensated for their contributions.

The Commercial Entities are the:

- Call Contractor;
- Transit NO;
- Serving NO (ETNS translation);
- Registrar;
- Service NO;
- ETNS Service Provider;
- ETNS Subscriber;
- Terminating NO;
- ETNS Service Producer.

The charging of the ETNS calls shall be addressed to the paying entities. These can be the Calling Party, the Called Party, a Third Party or a set of parties in split charging.

5.2 Elements to be considered related to charging

The ETNS Service is assumed to include the ETNS Service itself and the access traffic from the Calling Party to the service location.

The cost for an EN call is then combined of two basic elements:

1) the cost for the ETNS Service Usage; and

2) the cost for the ETNS Access Traffic.

5.2.1 Charging of the Service Usage

The charging concerns the usage of ETNS Services. Charging depends on the service and its characteristics, e.g. voice or data oriented. The charging of the service itself might be related to the market value of the service.

The Calling Parties shall be offered the ETNS Service on non-discriminating conditions. It means, that Calling Parties of equal category, within the same NO's network, shall be charged equally for the same utilization of ETNS Services.

Charging for utilizing an ETNS Service can follow the usual parameters in table 1a:

Table 1a: Charging Parameters for ETNS

Flat rate	Rate depending of the call time of the day/night
Call attempt fee, depending on certain conditions (note)	Rate depending of the calendar
Call set up fee	Rate depending of the multiple of 64 kbit/s channels
Rate depending of the duration of the utilization, fixed charging per time unit	User to user signalling service for ISDN
NOTE: The conditions might be that the call attempt is not disturbed by network congestion or network failure.	

Examples. The parameters happen to be applicable for both ETNS Access Traffic and the ETNS Service itself. The charging elements might be currently changed.

Reduction of charges within the principle of non-discrimination might be based on the following conditions:

Table 1b: Reduction opportunities for ETNS charging, examples

The charge for subscription utilization of services can be reduced compared to non-subscription-utilization of the same services
Rate decreasing continuously or stepwise during the call, i.e. decreasing charging per time unit
Reduction calculated from an accumulated volume of service utilization within a period
Bundling of services in subscription use (note)
Bundling of services in non-subscription use (note)
NOTE: Legal regulations shall be taken into account.

Any charging or reduction can be provided on short terms, on long terms or periodically.

5.2.2 Charging for ETNS Access Traffic

The charging concerns the ETNS Access Traffic, i.e. the routeing of the Calling Party's service request and the transport of the requested Service to the Calling Party. The charging for the ETNS Access Traffic can follow the usual charging ideas as seen in table 1a and b. The parameters for charging of ETNS Access Traffic happens to be applicable also for charging of the ETNS service itself.

5.2.2.1 Charging by the Call Contractor, One Stop Charging

The following alternatives are seen for the Call Contractor's profile as manager of One Stop Charging:

The Call Contractor might have two different positions:

1) The Call Contractor agrees with a number of NOs and an available ETNS Service Provider on the commercial conditions and sells the complete ETNS Service (Access traffic and Service Usage) to his Calling Parties on his risk and responsibility (The ShopKeeper Version). He might only know the nearest NO behind, or he might know more or all the elements of the chain.

2) The Call Contractor agrees with the NOs concerned and a selected ETNS Service Provider on offering the ETNS Service to his Calling Parties, but only as an agent for the other contributors. (The Agent Version)

In the ShopKeeper Version the Call Contractor sets the price for the EN service based on market conditions. Due to time for settling of new agreements with the partners the costs from the partners might be stable for some time. I.e. the shopkeeper version might have difficulties in supporting a dynamic price policy. Consequently transfer of charging related records between ETNS supporting entities might be of low importance.

In the Agent Version the Call Contractor and the other providers in the chain are independent in respect to settlement of new tariffs for their service at any time. They should only inform the Call Contractor(s) in due course, making him (them) able to charge the Calling Parties correspondingly. Consequently transfer of charging related records between ETNS supporting entities might be of higher importance.

The knowledge of the tariffs of the elements included in the EN calls might be given in the simple way by transfer of information by post, fax or by other means to the Call Contractor. This method fits into stable charging conditions. In case of dynamic changes in the charging, this simple way of transferring information might not meet the requirements.

A future implementation may include an automatic transfer to the Call Contractor of charging related information from the parties contributing to the ETNS Service, including the ETNS Service Provider. The transfer might be by separate datalinks or e.g. by an extended ITU-T signalling system No. 7 ISUP. This may open for a complete automatic charging of the call by the Call Contractor.

From a practical point of view a few elements in the commercial chain might favour the possibility for a realistic ETNS scenario.

5.2.2.2 Individual charging by the contributing parties to the ETNS Service

Individual charging by the contributing parties to the ETNS Service means, that the contributing parties will charge and bill the Calling Party individually. That scenario seems unrealistic due to the generally expected One Stop Charging. In practice charging for the total costs for the traffic provision including number translation might be handled by the Call Contractor in a similar way as for international traffic to day. From that point of view the situation is equal to the description in 5.2.2.1 (The Agent Version).

5.3 Revenue Accounting

If a service contributor require the income from the candidate for payment on behalf of other service or traffic providers, a Revenue Accounting is expected to follow. The Revenue Accounting process is performed at an appropriate time, delayed in relation to the call. The entity to require the income from a Calling Party could be the Call Contractor. The Call Contractor term relates to the specific call. All calls from Calling Parties accessing a certain exchange have that exchange as Call Contractor. In extended form, the term covers the Network Operator for an Originating Network managing the calls from all the accessing Calling Parties.

It should be underlined that the all Network Operators all are Call Contractors in respect to their accessing Calling Parties. They act as Call Contractors to each other in a mix.

Today the Call Contractors normally requires the charging for the traffic provision end to end. The traffic provision might consist of traffic parts from several NOs. Clearing and revenue accounting between NO's may be based on detailed recording. Even more advanced clearing methods are existing and further methods could be expected. The charging of the costs for the ETNS service provision itself could also be required by the Call Contractor, which leads to revenue accounting also for that item.

The entity to require the income from a certain Calling Party could also be an independent invoice company, requesting the income on behalf of a number of contributors for ETNS Services. This commercial billing procedure is called Central Settlement. A central clearinghouse might carry out the settlements.

History

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