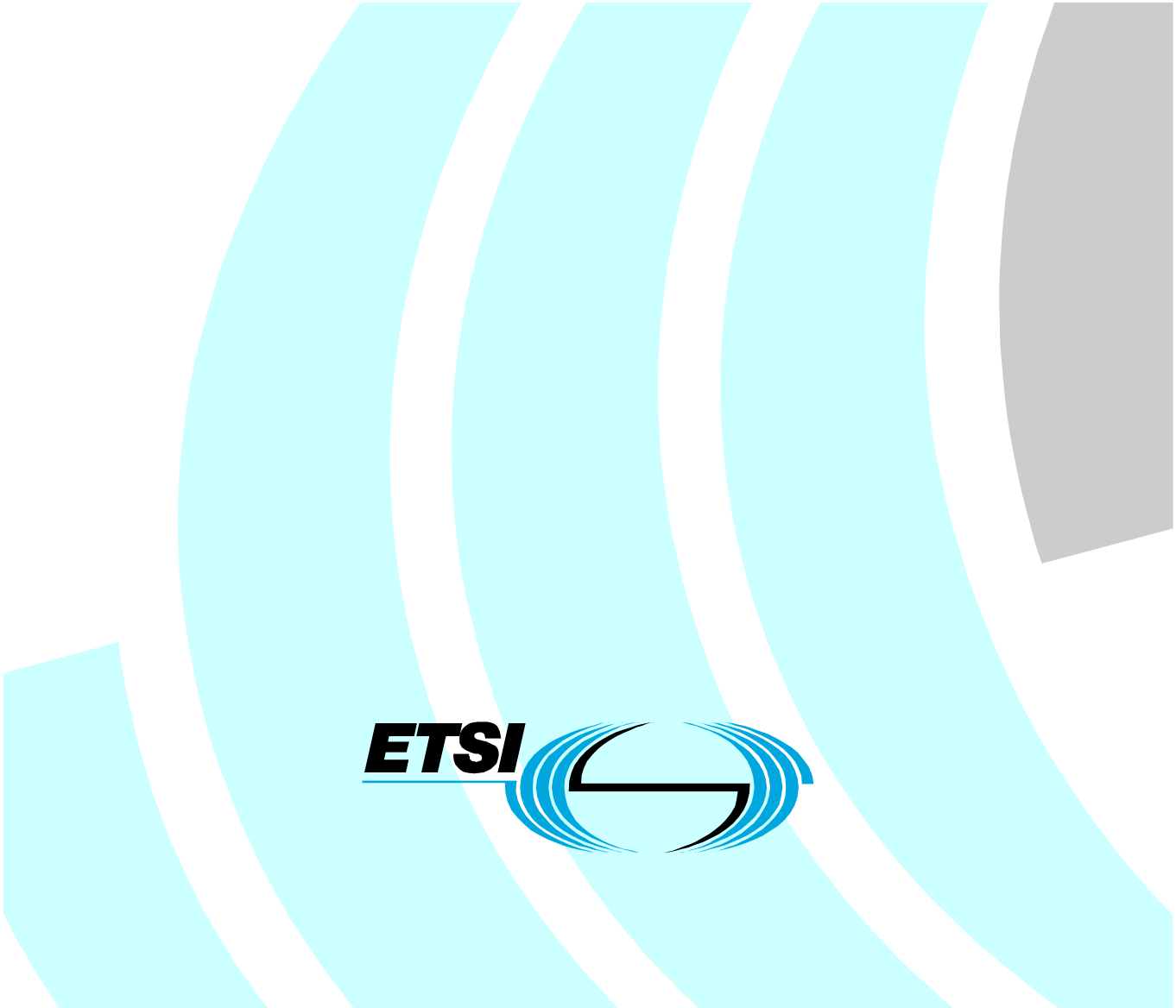
ETSI EN 301 160 V1.2.1 (2002-01)

European Standard (Telecommunications series)

Routeing of calls to European Telephony Numbering Space (ETNS) services



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Contents

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Foreword

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

National transposition dates	
Date of adoption of this EN:	18 January 2002
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1 Scope

The present document specifies the routeing methods that shall be used for implementation of the European Telephony Numbering Space (ETNS), the alternative structures of the routeing numbers and the addressing between networks.

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] ETSI EN 301 161 (V1.1.1): "Management of the European Telephony Numbering Space (ETNS)".

[2] ETSI EN 301 070-1 (V1.2.2): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 interactions with the Intelligent Network Application Part (INAP); Part 1: Protocol specification [ITU-T Recommendation Q.1600 (1997), modified]".

[3] ETSI EN 301 464 (V1.1.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 interactions with the Intelligent Network Application Part (INAP); Part 1: Protocol specification [ITU-T Recommendation Q.1601 (1999), modified]".

[4] ETSI TR 101 092: "Network Aspects (NA); Report on Carrier Selection".

[5] ETSI ETS 300 121: "Integrated Services Digital Network (ISDN); Application of the ISDN User Part (ISUP) of CCITT Signalling System No.7 for international ISDN interconnections (ISUP version 1)".

[6] ETSI EN 300 356-1 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1999) modified]".

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

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

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

[10] ITU-T Recommendation Q.767: "Application of the ISDN user part of CCITT signalling system No. 7 for international ISDN interconnections".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

administrator: has the responsibility 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 an ETNS number

ETNS country: CEPT member country participating in the ETNS

ETNS number: number from the ETNS numbering resource

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

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 routeing number: 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 is an alternative in the future.

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

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

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

ETNS service: service that has been assigned a European Service Identity (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 ITU-T Recommendation 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 European Service Numbers (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

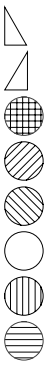
serving network: network, with one or more serving exchanges

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:



called party (symbol needs to correspond to figure)

calling party

combined serving and service exchange

ETNS service provider database

ETNS translation database

originating, transit or destination exchange

service exchange

serving exchange

3.3 Abbreviations

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

AN	Assisted Network
CC	ITU-T Recommendation E.164 Country Code
CEPT	European Conference of Postal and Telecommunications Administrations
CN	Corporate Network
CNID	Corporate Network IDentity
CNSN	Corporate Network Subscriber Number
CS	Connected Subaddress
DR	Direct Routeing
DT	Double Translation
En	ETNS number
ESI	European Service Identity
ESNs	European Service Numbers
ETNS	European Telephony Numbering Space
GVNS	Global Virtual Network Service
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
INRAs	International Network Routeing Adresses
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
NDC	National Destination Code identifying the Rn series of addresses
NDCx	National Destination Code identifying a series of terminating numbers in country x
NN	National Numbers
NNA	National Numbering Authority
NNR	National Number Resource
NoA	Nature of Address
NP	Numbering Plan
RA	Routeing Address
Rn	Routeing number
RNIC	Routeing Number Identification Code
SA	Signalling Address
SC	Signalling Capability
SCCP	Signalling Connection Control Part
ScN	Service Network
SD	Subsequent Digits
SgN	Serving Network
SN	Subscriber Numbers within the Rn series of addresses
SNIC	Service Network Identification Code
SNx	Subscriber Numbers within the Tn series of numbers in country x
SS7	Signalling System N°7
ST	Single Translation

TN	Terminating Network
Tn	Terminating number
TrN	Transit Network
VLR	Visitor Location Register (GSM)

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 4.1 and 4.2. 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.

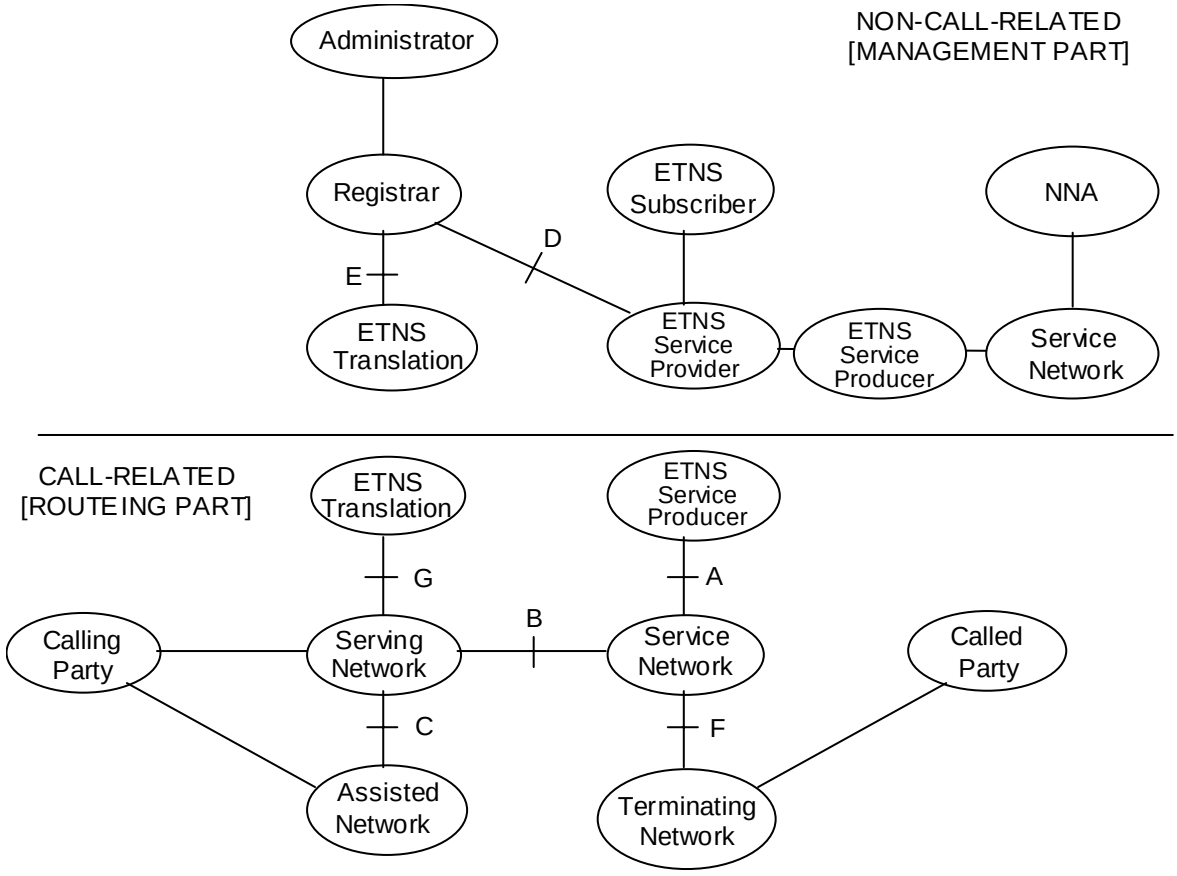


Figure 1: Actors and reference points

The reference points in the call-related part of figure 1 are used in the present document, while the reference points in the non call-related part are used in EN 301 161 [1]. For simplicity transit networks are not shown in figure 1, but these could be present between any of the networks.

The ETNS Service Provider is the entity that is relevant in the process of number assignment. The service producer and service network are entities that are relevant in call processing. The ETNS Service Provider, ETNS Service Producer and the service network may or may not be a single legal entity. Such a distinction leads to the recognition of two concepts under the term "service provision":

- the function of the first is to sell a service to an 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 ETNS Service Producer and the service network.

The Serving Network (SgN) is responsible for routeing a call from the calling party to the service network. The service network participates through the service exchange in the provision of ETNS services.

ETNS numbers are managed by an independent body, identified as the registrar and 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. A call to an ETNS number (En) can be divided in two parts.

4.1.1 Getting the ETNS Routeing number (Rn)

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

Based on the ESI [1], 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 multiple SgNs.

The serving exchange, analysing the ESI, triggers the ETNS translation database using the incoming En to derive an outgoing ETNS Routeing Number or ETNS signalling address. The ETNS translation database can be inside or outside the SgN. Several SgNs may share the same ETNS translation database. The Routeing information from one En can vary from one SgN to another.

When the SgN and the ScN are the same, the serving and service exchange within the network can be the same, and reference point B in figure 1 will then be internal.

4.1.2 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.

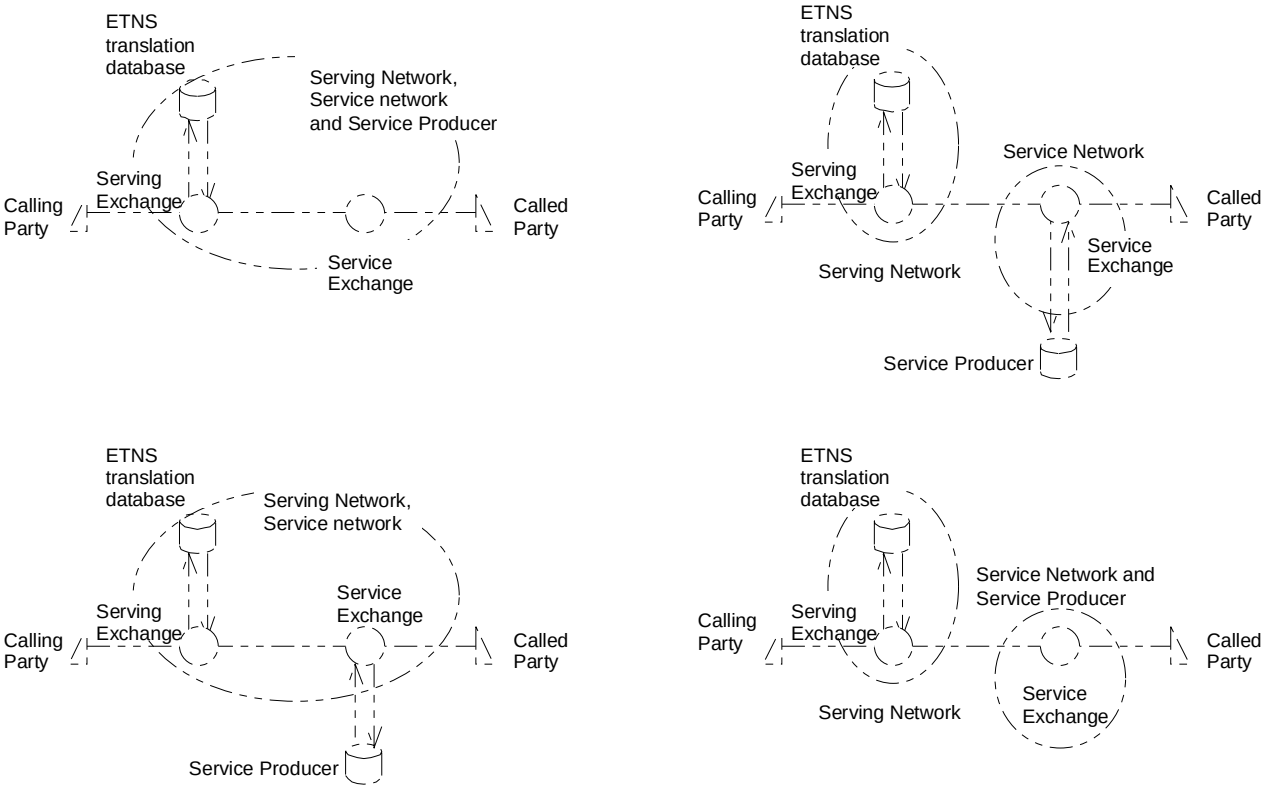
The nature of the service will determine the path of the call.

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, see clause 5. The implementation of reference point "A" between the service network and the Service Producer depends on the service, technical constraints and the requirements from the regulatory environment.

4.1.3 Examples of Call Handling

Figure 2 shows some examples of call handling. The examples show simplified network diagrams where the Calling Party is shown as directly connected to the Serving Network and the Called Party is connected to the Service Network. In practice an Assisted Network could separate the Calling Party from the Serving Network and a Terminating Network could separate the Service Network and the Called Party.

Note that the translation database provides the capability to translate the ETNS number into a routeing number or signalling address. The translation database capability can be provided in a number of ways, e.g., Intelligent Network or internal switch translations.



NOTE: In the figure the ETNS translation database could be outside the serving network.

Figure 2: Examples of call handling

4.2 Non-call related (Management part)

Two functions are performed by the registrar. The first is the number assignment process. The second is the distribution of routeing numbers bound to ETNS 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. The procedures are outlined in the ETO Report [7].

4.2.2 Obtaining Routeing numbers (Rns)

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

4.2.3 Distribution of ETNS Routeing numbers (Rns)

The distribution of routeing information to the SgNs occurs, for example, 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 ETNS Routeing numbers.

The procedure for the distribution of the ETNS Rns to the SgNs takes place through the registrar. It is assumed that the ETNS Service Provider has obtained the ETNS Rns from the ETNS service producer(s) it has agreement with, who in turn has obtained the Rn from the service network(s) it has agreement with. The service network will have obtained routeing numbers directly or indirectly from the national numbering authority. Figure 3 illustrates an example of the distribution of routeing numbers when updating the ETNS translation databases.

The ETNS Service Provider informs the registrar of the ETNS numbers and its connected ETNS Routeing numbers. The registrar distributes ETNS numbers and their connected ETNS Routeing numbers to the relevant SgNs (see reference point E in figure 1):

- SgN1 would need to use Rn(a);
- SgN2 does not receive an Rn as in this example the customer has stated that they do not require service from this location;
- SgNs 3 and 4 use a common number Rn(b).

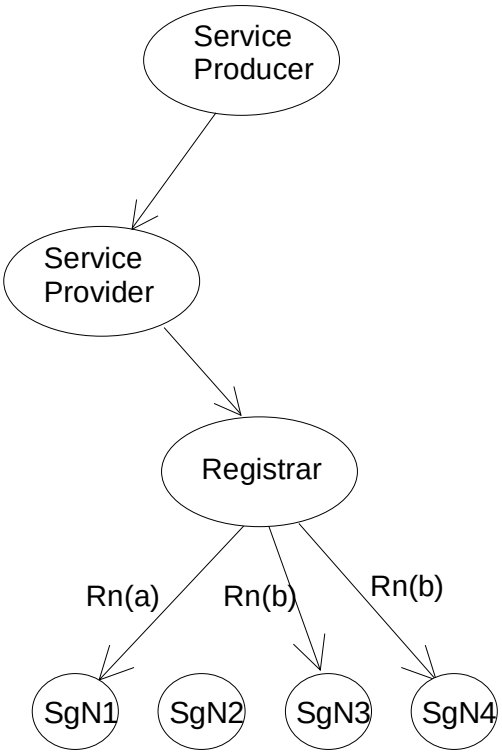


Figure 3: Distribution of Routeing Numbers

5 Routeing

The present document describes the requirements to enable the routeing of ETNS calls, i.e. the routeing method, the structure of the ETNS Routeing numbers and the addressing between networks.

5.1 Routeing methods

In general double translation shall be used for the routeing of calls between the calling and called party although in some cases this could be reduced to a single translation as an implementation option.

5.1.1 Single translation

Void.

5.1.2 Double translation

Double translation can be implemented in two ways as illustrated in figure 4:

- implementation A: utilizing the speech path between the serving exchange and the service exchange and the signalling path between the service exchange and the ETNS service producer database;
- implementation B: utilizing only the signalling path between the serving/service exchange and the ETNS service producer database.

Each routeing decision is based upon analysing a minimum of the following addressing parameters: the dialled En, an ETNS Rn, an ETNS signalling address or the Tn.

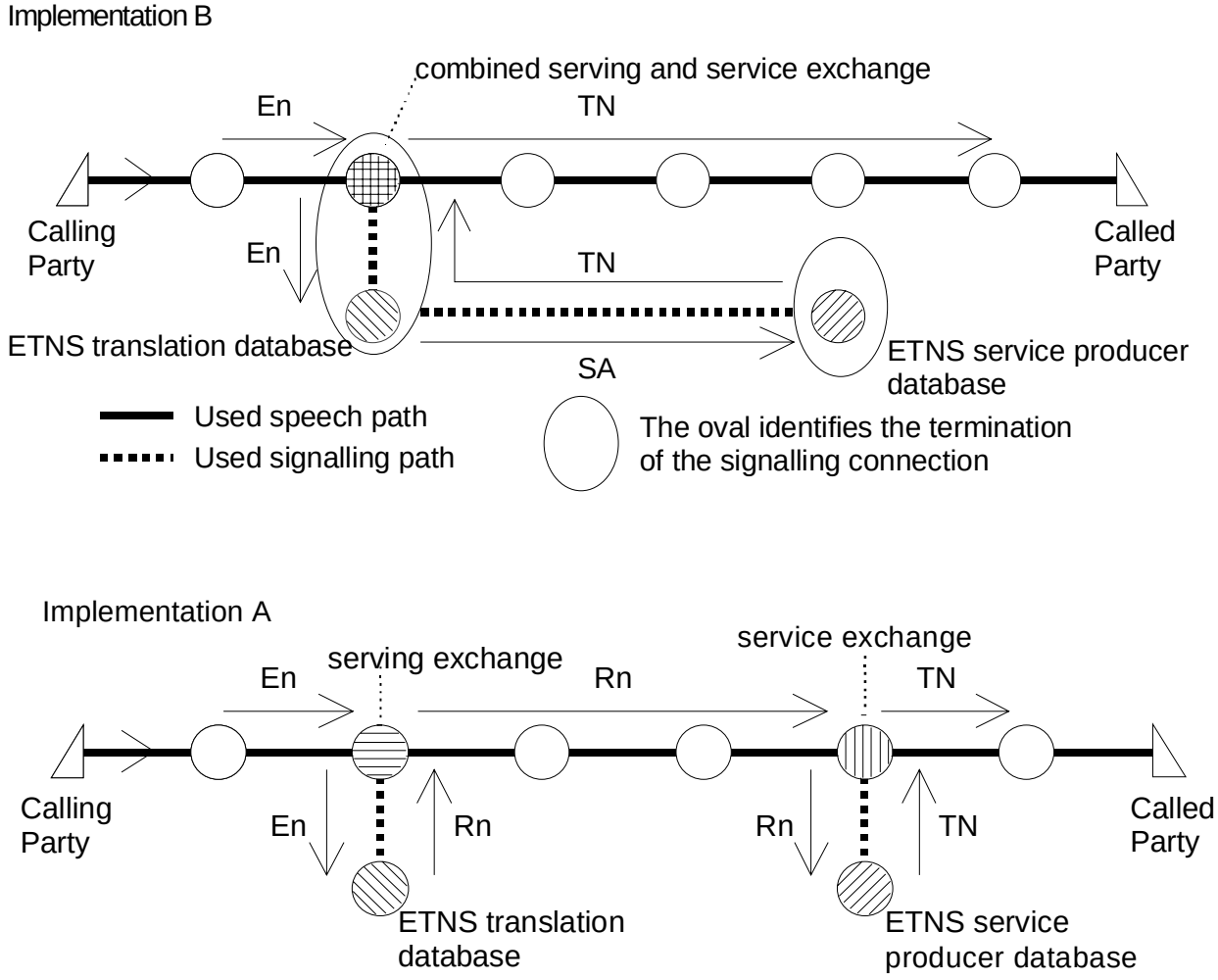


Figure 4: Double translation

If the ETNS translation database is not in the same network as the serving exchange then a standardized interface is required between the two entities.

Implementation method B requires a standardized signalling interface between the ETNS translation database and the ETNS Service Producer database. For example a standardized translation between the Intelligent Network (IN) signalling and ISDN User Part (ISDN ISUP) v2 [6]. The combined serving/service exchange and the ETNS translation database are normally co-located within one network. The oval illustrates that the exact termination of the signalling connection within the IN-architecture is not decided. The consequence of direct interrogation between the databases is effectively to co-locate the service exchange and the serving exchange functional entities.

Non-standardized interfaces or any combinations of the above methods can be used between networks by bilateral agreements.

NOTE: Double Translation Implementation Method B may, where not precluded by national licensing and regulatory conditions, provide choice to the ETNS subscriber by allowing the ETNS service Producer to utilize Carrier Selection Code(s) as defined in TR 101 092 [4] within or as a prefix to the ETNS Terminating Number (ETNS Tn). This is the case when the ETNS Service Network and the network selected by the Carrier Selection Code(s) are within the same national numbering scheme.

5.2 Structure of ETNS Routeing numbers

The ETNS Routeing numbers shall, as a minimum, identify the service network.

The creation of an Rn series for ETNS is a national matter. ETNS Routeing numbers are assigned to service networks. These ETNS Routeing numbers are a demand on national numbering resources.

The structure of ETNS Routeing numbers shall be a national matter.

Change of service network means change of ETNS Rn, while change of ETNS service provider within one service network should not necessarily mean a change of Rn.

5.3 Addressing between networks

Implementation A identified for double translation in clause 5.1.2 utilizes Routeing numbers to locate the ETNS service network database. The addressing can take place in two ways, determined by what the Routeing numbers identify and how they are transferred between the ETNS translation database and the ETNS service network. The two addressing methods can be described as:

1) ETNS Rn identifying the called party and the ETNS service network (Rn1);

2) ETNS Rn identifying ETNS service network only (Rn2).

Implementation B identified for double translation in clause 5.1.2 utilizes Signalling Addresses to locate the ETNS service producer database.

To understand the differences between the two addressing methods for double translation, we need to look at the addresses at the reference points identified in the call-related part of figure 1. Figure 5 shows 3 interfaces between a calling and called party at which the transferred addresses will be identified. These interfaces are:

C) in front of the Serving exchange;

B) between the serving and service exchange (this applies for implementation A) and between the signalling termination points (this applies for implementation B);

F) after the service exchange.

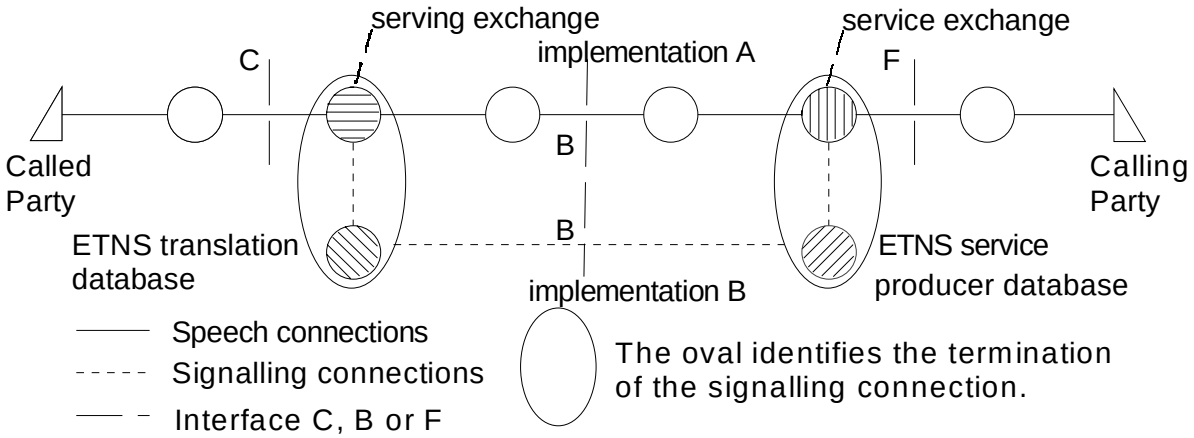


Figure 5: Interfaces where addresses are identified

Table 1 shows the addresses in the call setup direction, at the three mentioned interfaces for double translation utilizing addressing methods 1 and 2. For double translation the differences between addressing methods 1 and 2 are identified.

Table 1: Addresses for double translation

Addressing method	Interface C	Interface B	Interface F
Implementation A, Addressing method 1	En (see note)	Rn1	Tn
Implementation A, Addressing method 2	En (see note)	Rn2 and En towards the ETNS Service Network.	Tn
Implementation B,	En (see note)	Signalling address plus En towards the ETNS Service Producer database, and Tn from it.	Tn
NOTE: The international prefix is not part of the En.			

One En can be translated into different Routeing numbers and signalling addresses depending upon the origin of the call.

With addressing method 1 (implementation A), there is a one-to-one translation from En via Rn1 to Tn. Rn1 identifies both the called ETNS subscriber and the ETNS service network. The trigger for the first translation from En to Rn1 takes place within the SgN, and the trigger for the second translation from Rn1 to Tn takes place within the ETNS service network. Addressing method 1 is an initial solution. In addressing method 1 part of the subscriber dependant digits may be used to address the Service Producer, see clause B.1.

With addressing method 2 (implementation A), the first translation of En, in the ETNS Serving Network creates Rn2, which is the address of the ETNS Service Network. The ETNS Service Network forwards the call to the ETNS Service Producer. When the ETNS Service Producer receives the En, it translates the En to the Tn. Addressing method 2 (implementation A), requires advanced signalling systems, see annex C. Extra digits may be required to be carried with the Rn2 to identify the ETNS Service Producer at the ETNS Service Network. This should remain a national matter.

One ETNS Service Network can have more than one identity (Rn2), for different purposes.

With addressing method 2 (implementation A), it is required that both Rn2 and En be transferred across interface B.

Addressing method 2 (implementation A),should be used as soon as the capability for this is available between any Serving Network/Service Network pair.

Implementation B shall be implemented with standard signalling systems, for details see annex C.

Dialled calls to Routeing numbers shall be barred.

6 Number portability within the ETNS

Number portability within the ETNS means a change of ETNS Service Provider. Porting of ETNS numbers involving a change of service network will require a change of Routeing numbers. Porting of ETNS numbers not involving a change of service network may not require a change of Routeing numbers.

Annex A (Informative): Routeing of calls to corporate networks (CN)

A.1 Model for actors involved

Figure A.1 shows a model of the actors involved in the routeing of calls to a corporate network (CN) implemented within the ETNS.

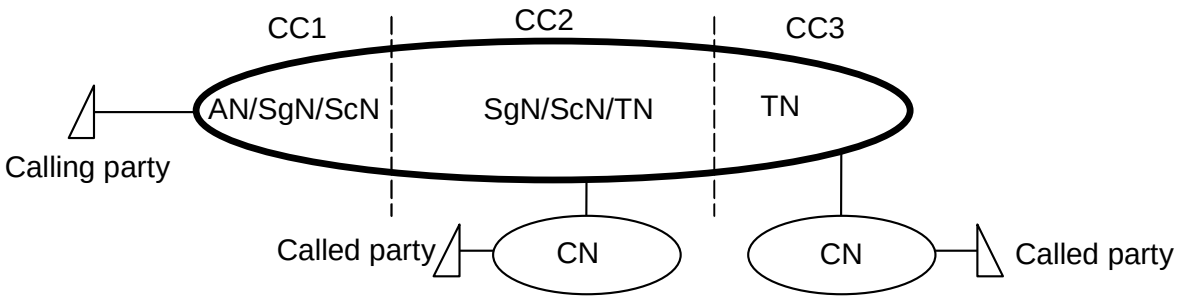


Figure A.1: Actors and reference points

The model shows 3 countries (CC1, CC2 and CC3), in which the actors, represented by their function(s), are located. In CC1 we have assisted networks (ANs), serving networks (SgNs) or service networks (ScNs) and/or combinations of these. In CC2 we have SgNs, ScNs or terminating networks (TNs) and/or combinations of these. In CC3 we have only TNs. In the model the functions are divided between 3 countries, but all functions can of course be located within one country.

The bold oval in the figure represents the public network in these three different countries.

The two CNs in figure A.1 represent one (1) corporate network (CN), connected to the public network in 2 different countries (CC2 and CC3). Each part of the CN may utilize its own ScN.

A.2 Routeing methods

Three different methods for routeing of calls to CNs have been identified:

- double translation;
- single translation;
- direct routeing.

For each of these methods we have in the following clauses described the routeing, the utilized numbering/addressing formats, the necessary actions to implement number portability for each of the methods, and the consequences for the involved public actors if the individual parts of the CN are not interconnected. Figure A.2 shows the interfaces where the numbering/addressing formats are identified.

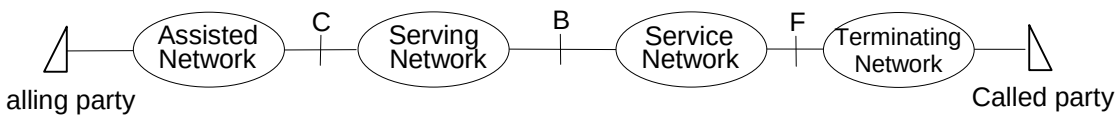


Figure A.2: Interfaces

Interface C is in front of the SgN, interface B is between SgN and ScN and interface F is after the ScN.

A.2.1 Double translation

Four examples of double translation are described below. Each example is characterized by the location of SgN and ScN, and whether the traffic is routed into the CN through 1 or 2 access points.

A.2.1.1 Example 1: SgN and ScN located in different countries and 2 access points into the CN

Figure A.3 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN and ScN, and where in the call set up procedure the Ens (ETNS numbers), the Rns (Routeing numbers) and the Tns (Terminating numbers) are used.

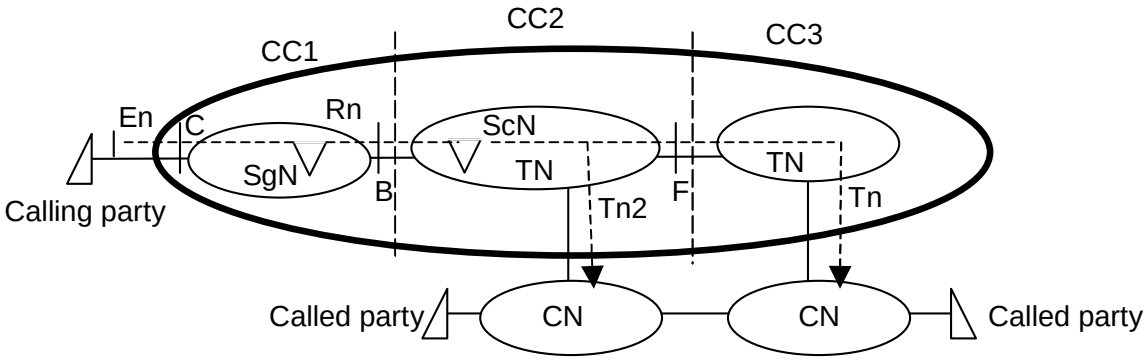


Figure A.3: Routeing of calls in example 1

The horizontal dashed line represents the route of the call, and the dips on the line represent SgN and ScN. Figure A.3 shows that the SgN is located in CC1, one or more ScN are located in CC2, and that both access points into the CN are used.

Table A.1 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.1: Formats for example 1

One or more ScNs	In front of SgN	Between SgN and ScN	After the ScN
One ScN per corporate network	En: 38835+CNID+CNSN	Rn: CC2+NDC+SN	Tn2: NDC2+SN2 Tn3: CC3+NDC3+SN3
More ScNs per corporate network (see note)	En: 38835+CNID+CNSN	RnA: CC2+NDC(ScN1)+SN	Tn2: NDC2+SN2
	En: 38835+CNID+CNSN	RnB: CC2+NDC(ScN2)+SN	Tn3: CC3+NDC3+SN3
NOTE: The ScNs may be located in different countries.			

When a CN is served by more ScNs, the routeing numbers address the individual ScN, as shown in table A.1. RnA and RnB address the two ScNs, serving the part of the CN that is located in CC2 and CC3 respectively.

The numbering/addressing formats shown in the table are independent of whether the individual parts of the CN are interconnected or not.

Tn2 can optionally be in the international format CC2+NDC2+SN2.

Service provider portability is achieved through change of Rns.

A.2.1.2 Example 2: SgN and ScN located in different countries and 1 access point into the CN

Figure A.4 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN and ScN, and where in the call set up procedure the Ens, the Rns and the Tns are used.

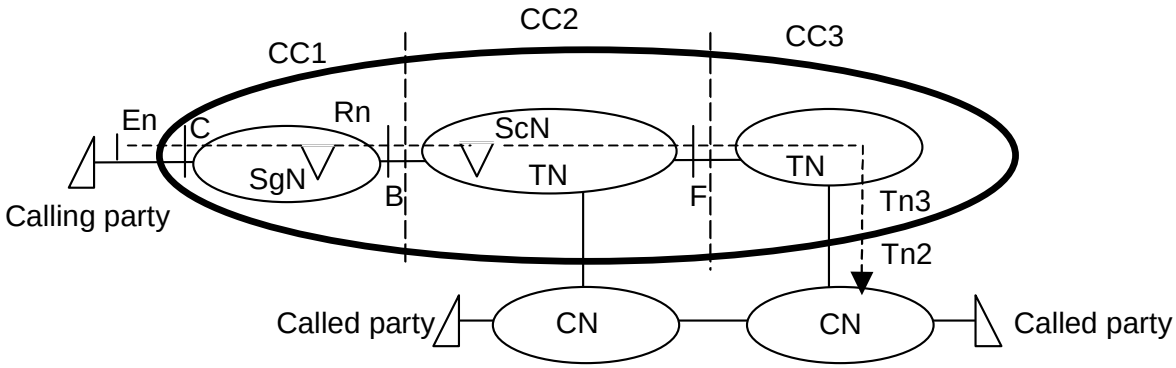


Figure A.4: Routeing of calls in example 2

The horizontal dashed line represents the route of the call, and the pits on the line represent SgN and ScN. Figure A.4 shows that the SgN is located in CC1, ScN is located in CC2, and that only the access point in CC3 is used to reach the CN.

Table A.2 shows the numbering/addressing formats of the identified parameters at the C, B and F interface.

Table A.2: Formats for example 2

One or more ScNs	In front of SgN	Between SgN and ScN	After the ScN
One ScN per corporate network	En: 38835+CNID+CNSN	Rn: CC2+NDC+SN	Tn2: CC2+NDC2+SN2 Tn3: CC3+NDC3+SN3
More ScNs per corporate network (see note)	En: 38835+CNID+CNSN	RnA: CC2+NDC(ScN1)+SN	Tn2: CC2+NDC2+SN2
	En: 38835+CNID+CNSN	RnB: CC2+NDC(ScN2)+SN	Tn3: CC3+NDC3+SN3
NOTE: The ScNs may be located in different countries.			

When a CN is served by more ScNs, the routeing numbers address the individual ScN, as shown in table A.2. RnA and RnB address the two ScNs, serving the CNs terminating numbers in CC2 and CC3 respectively.

To be able to reach all called parties in the CN, the individual parts of the CN has to be interconnected as shown in figure A.4. Without this internal connection the involved public networks would have to utilize both access points into the CN. The numbering/addressing formats after the ScN will then have to be as in table A.1.

Service provider portability is achieved through change of Rns.

A.2.1.3 Example 3: SgN and ScN located in 1 country and 2 access points into the CN

Figure A.5 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN and ScN, and where in the call set up procedure the Ens, the Rns and the Tns are used.

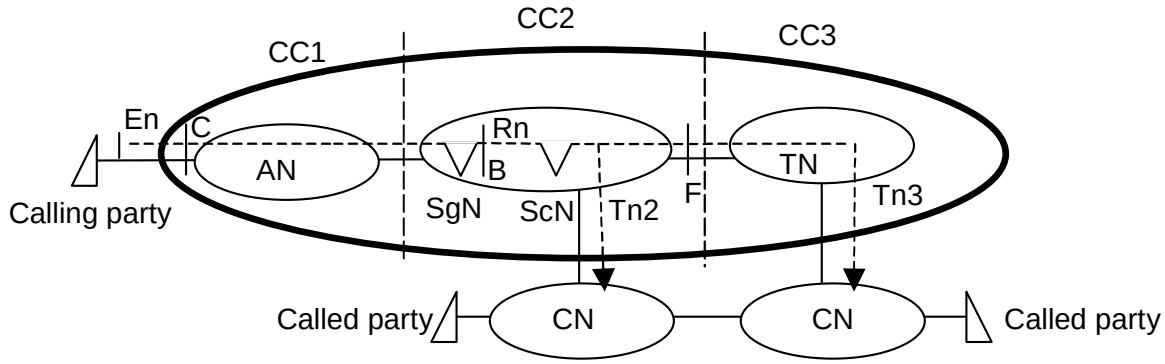


Figure A.5: Routeing of calls in example 3

The horizontal dashed line represents the route of the call, and the dips on the line represent SgN and ScN. Figure A.5 shows that SgN and ScN are both located in CC2, and that both access points into the CN are used.

Table A.3 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.3: Formats for example 1

One or more ScNs	In front of SgN	Between SgN and ScN	After the ScN
One ScN per corporate network	En: 38835+CNID+CNSN	Rn: NDC+SN	Tn2: NDC2+SN2 Tn3: CC3+NDC3+SN3
More ScNs per corporate network (see note)	En: 38835+CNID+CNSN	RnA: NDC(ScN1)+SN	Tn2: NDC2+SN2
	En: 38835+CNID+CNSN	RnB: NDC(ScN2)+SN	Tn3: CC3+NDC3+SN3
NOTE: The ScNs may be located in different countries.			

When a CN is served by more ScNs, the routeing numbers address the individual ScN, as shown in table A.3. RnA and RnB address the two ScNs, serving the part of the CN that is located in CC2 and CC3 respectively. The numbering/addressing formats shown in the table are independent of whether the individual parts of the CN are interconnected or not.

Tn2 can optionally be in the international format CC2+NDC2+SN2.

Service provider portability is achieved through change of Rns.

A.2.1.4 Example 4: SgN and ScN located in 1 country and 1 access point into the CN

Figure A.6 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN and ScN, and where in the call set up procedure the Ens (ETNS numbers), the Rns (Routeing numbers) and the Tns (Terminating numbers) are used.

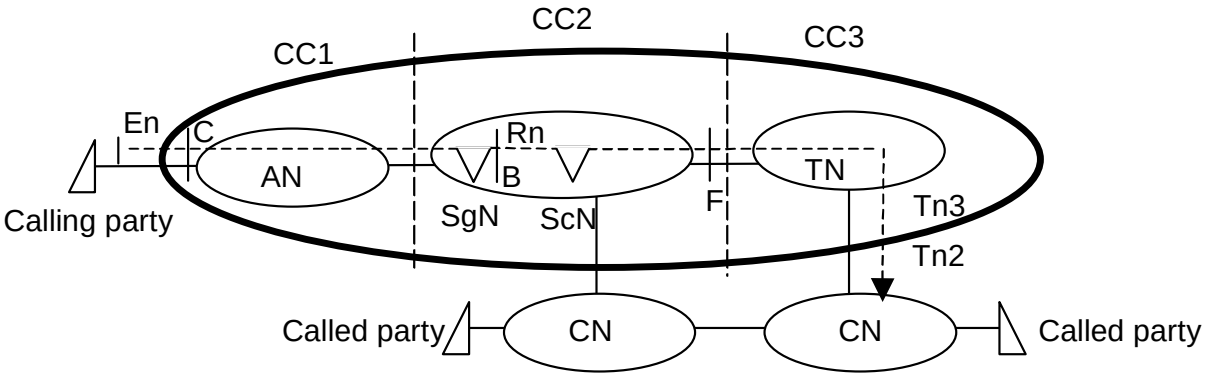


Figure A.6: Routeing of calls in example 4

The horizontal dashed line represents the route of the call, and the dips on the line represent SgN and ScN. Figure A.6 shows that the SgN and ScN are both located in CC2, and that only the access point in CC3 is used into the CN.

Table A.4 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.4: Formats for example 4

One or more ScNs	In front of SgN	Between SgN and ScN	After the ScN
One ScN per corporate network	En: 38835+CNID+CNSN	Rn: NDC+SN	Tn2: CC2+NDC2+SN2 Tn3: CC3+NDC3+SN3
More ScNs per corporate network (see note)	En: 38835+CNID+CNSN	RnA: NDC(ScN1)+SN	Tn2: CC2+NDC2+SN2
	En: 38835+CNID+CNSN	RnB: NDC(ScN2)+SN	Tn3: CC3+NDC3+SN3
NOTE: The ScNs may be located in different countries.			

When a CN is served by more ScNs, the routeing numbers address the individual ScN, as shown in table A.4. RnA and RnB address the two ScNs, serving the CNs terminating numbers in CC2 and CC3 respectively.

To be able to reach all called parties in the CN, the individual parts of the CN has to be interconnected as shown in figure A.6. Without this internal connection the involved public networks would have to utilize both access points into the CN, and the routeing and the numbering/addressing formats after the ScN will then have to be as in table A.3.

Service provider portability is achieved through change of Rns.

A.2.2 Single translation

From a numbering and addressing point of view single translation can take place in 4 different ways, characterized by whether the location of SgN/ScN is within the same country or not as the access points into the CN, and whether the traffic is routed into the CN through 1 or 2 access points. With single translation the SgN and ScN are one inseparable entity. Rns are not used with single translation.

A.2.2.1 Case 1: SgN/ScN located in another country than the CN and 2 access points into the CN

Figure A.7 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN/ScN, and where in the call set up procedure the Ens and the Tns are used.

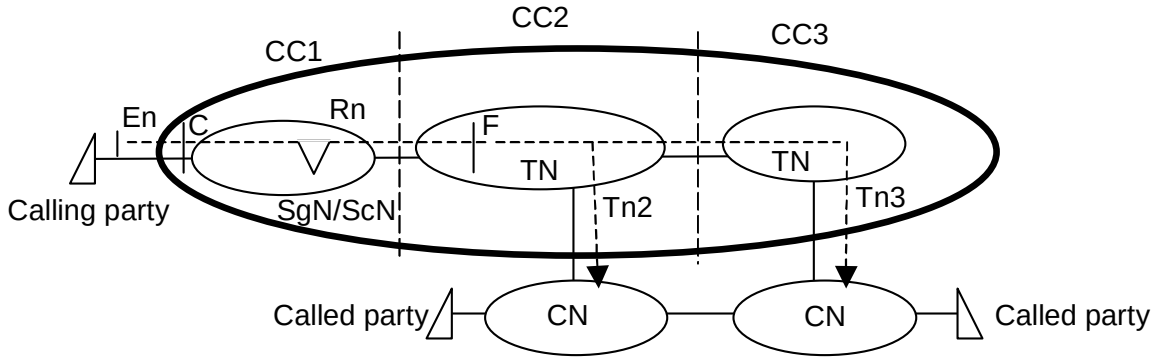


Figure A.7: Routeing of calls for case 1

The horizontal dashed line represents the route of the call, and the dip on the line represents SgN/ScN. Figure A.7 shows that the SgN/ScN is located in CC1, and that both access points into the CN are used.

Table A.5 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.5: Formats for case 1

In front of SgN/ScN	After the SgN/ScN
En: 38835+CNID+CNSN	Tn2: CC2+NDC2+SN2 Tn3: CC3+NDC3+SN3

The numbering/addressing formats shown in the table are independent of whether the individual parts of the CN are interconnected or not.

Service provider portability is only possible through change of SgN/ScN, i.e. change of routeing between the calling party and the provider that is responsible for the SgN/ScN.

A.2.2.2 Case 2: SgN/ScN located in another country than the CN and 1 access point into the CN

Figure A.8 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN/ScN, and where in the call set up procedure the Ens and the Tns are used.

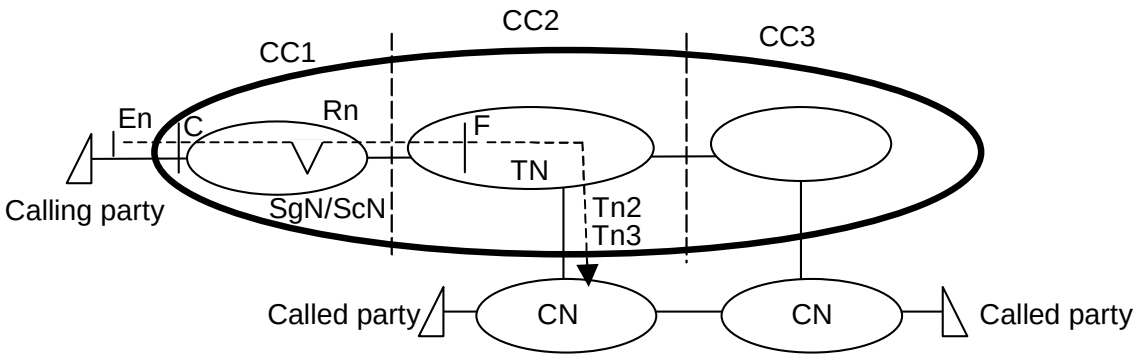


Figure A.8: Routeing of calls for case 2

The horizontal dashed line represents the route of the call, and the dip on the line represents SgN/ScN. Figure A.8 shows that the SgN/ScN is located in CC1, and that only the access point in CC2 is used.

Table A.6 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.6: Formats for case 2

In front of SgN/ScN	After the SgN/ScN
En: 38835+CNID+CNSN	Tn2: CC2+NDC2+SN2 Tn3: CC3+NDC3+SN3

To be able to reach all called parties in the CN through only 1access point, the individual parts of the CN has to be interconnected as shown in figure A.8. Without this internal connection the involved public networks would have to utilize both access points, and the routeing will then have to be as in figure A.7.

Service provider portability is only possible through change of SgN/ScN i.e. change of routeing between the calling party and the provider that is responsible for the SgN/ScN.

A.2.2.3 Case 3: SgN/ScN located in the same country as CN and 2 access points into the CN

Figure A.9 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN/ScN, and where in the call set up procedure the Ens and the Tns are used.

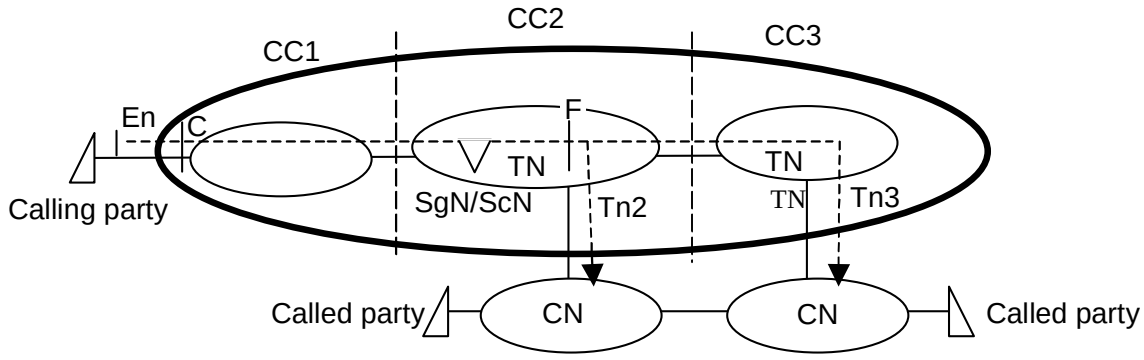


Figure A.9: Routeing of calls for case 3

The horizontal dashed line represents the route of the call, and the dip on the line represents SgN/ScN. Figure A.9 shows that the SgN/ScN is located in CC2, and that both access points into the CN are used.

Table A.7 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.7: Formats for case 3

In front of SgN/ScN	After the SgN/ScN
En: 38835+CNID+CNSN	Tn2: NDC2+SN2 Tn3: CC3+NDC3+SN3

The numbering/addressing formats shown in the table are independent of whether the individual parts of the CN are interconnected or not.

Tn2 can optionally be in the international format CC2+NDC2+SN2.

Service provider portability is only possible through change of SgN/ScN i.e. change of routeing between the calling party and the provider that is responsible for the SgN/ScN.

A.2.2.4 Case 4: SgN/ScN located in the same country as CN and 1 access point into the CN

Figure A.10 shows the routeing of calls from the calling party in the public network to the CN, the location of SgN/ScN, and where in the call set up procedure the Ens and the Tns are used.

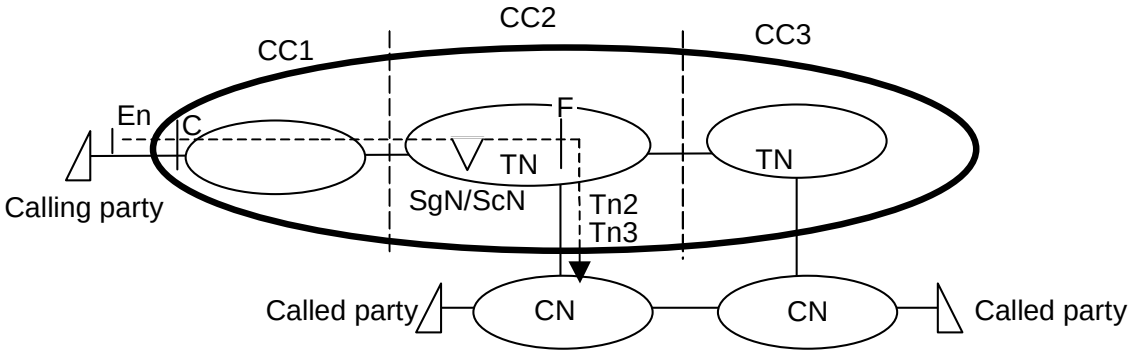


Figure A.10: Routeing of calls for case 4

The horizontal dashed line represents the route of the call, and the dip on the line represents SgN/ScN. Figure A.10 shows that the SgN/ScN is located in CC2, and that only the access point in CC2 is used.

Table A.8 shows the numbering/addressing formats of the identified parameters at the interfaces.

Table A.8: Formats for case 4

In front of SgN/ScN	After the SgN/ScN
En: 38835+CNID+CNSN	Tn2: NDC2+SN2 Tn3: CC3+NDC3+SN3

To be able to reach all called parties in the CN through only 1access point, the individual parts of the CN has to be interconnected as shown in figure A.10. Without this internal connection the involved public networks would have to utilize both entrances into the CN, and the routeing will then have to be as in figure A.9.

Tn2 can optionally be in the international format CC2+NDC2+SN2.

Service provider portability is only possible through change of SgN/ScN, i.e. only through change of routeing between the calling party and the provider that is responsible for the SgN/ScN.

A.2.3 Direct routeing

This clause is included for completeness. Direct routeing can only be implemented in one way as shown in figure A.11.

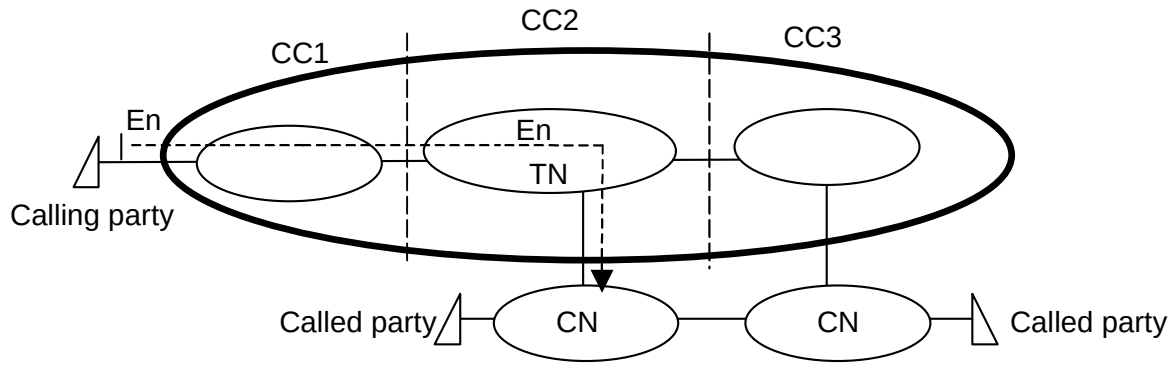


Figure A.11: Direct routeing

Direct routeing does not utilize the translation functionality of SgNs and/or ScNs.

Routeing is based on En only: 38835+CNID. With the recommended maximum digit analysis of 7 digits, as specified in [2] for routeing and charging purposes, the CNID should not exceed 2 digits. This would limit the number of corporate networks to 100 per 5-digit ESI, and each corporate network would have to be given a numbering resource equivalent to 100 million numbers irrespective of need. Such an approach cannot be justified. **As a consequence of this direct routeing cannot be recommended as one of the routeing methods to be implemented for CNs within the ETNS.**

As the En has no service provider identification within it, change of service provider, to obtain service provider portability, can only take place through change of the direct routeing to the CN.

A.3 Necessary digit analysis

For international charging and routeing ITU-T Recommendation E.164 [8] states that the digit analysis should not exceed 7 digits to set up an international call.

Table A.9 shows the necessary digit analysis with double translation (DT), single translation (ST) and direct routeing (DR).

Table A.9: Necessary digit analysis

Reference	En	Rn	Tn Note 1
DT: example 1	38835	CC2+NDC	Tn2: NDC2 Tn3:CC3 (see note 2)
DT: example 2	38835	CC2+NDC	Tn2: CC2+NDC2 (see note 2) Tn3: CC3 (see note 2)
DT: example 3	38835	NDC	Tn2: NDC2 Tn3:CC3 (see note 2)
DT: example 4	38835	NDC	Tn2: (CC2+) NDC2 (see note 2) Tn3: CC3+NDC3
ST: case 1	38835	Not applicable	Tn2: CC2 (see note 3) Tn3: CC3 (see note 3)
ST: case 2	38835	Not applicable	Tn2: CC2 (see note 3) Tn2: NDC2 (see note 4) Tn3: CC3 (see note 3) Tn3: CC3+NDC3 (see note 4)
ST: case 3	38835	Not applicable	Tn2: NDC2 Tn3: CC3 (see note 2)
ST: case 4	38835	Not applicable	Tn2: NDC2 (see note 4) Tn3: CC3+NDC3 (see note 4)
DR	38835+CNID	Not applicable	Not applicable

NOTE 1: The NDCs used in this column are the CNIDs in the geographic number series.
NOTE 2: Necessary digit analysis in CC2 to route towards CC3.
NOTE 3: Necessary digit analysis in CC1.
NOTE 4: Necessary digit analysis in CC2.

Annex B (informative): Structures of the ETNS Routeing numbers

B.1 Structures of the ETNS Routeing numbers

Figure B.1 illustrates two options for the structure of ETNS Routeing numbers. These routeing numbers, in the short-term, shall be assigned from national numbering plans and therefore be ITU-T Recommendation E.164 [8] numbers in the ScNs. However, there may be instances in the future where non-ITU-T Recommendation E.164 [8] numbers are used as routeing numbers.

a) a) National specific Rns

b) b) Network specific Rns

CC: ITU-T Recommendation E.164 [8] Country Code
RNIC: Routeing Number Identification Code
SD: Subsequent Digits to complete the call
SNIC: Service Network Identification Code

Figure B.1: Structures of routeing numbers

All international Routeing numbers shall be less than 15 digits, and the routeing and management parameters shall be identified within the first 7 digits of the ITU-T Recommendation E.164 [8]. It should be noted that the use of routeing numbers of a different length to the normal national numbers in a given country could be problematic.

Figure B.1 only identifies two possibilities that can be used as options or in parallel and for some services or specific purposes the ETNS Routeing numbers do not need to be structured like figure B.1. Therefore, other structures may be developed but it will be decided on a service by service basis. However, for some services, a format of the routeing numbers may need to be agreed upon and used consistently across all assisted networks and SgNs.

In a given country, the RNIC may or may not apply just for ETNS. A structure for National-specific Rns may already apply in some countries.

B.1.1 Choice of Structure

The choice of scheme between National specific Rns and Network specific Rns is a national matter and it is not recommended nor should it be necessary to use more than 1% of the national number resource.

B.2 Comparison of the 2 alternatives for routeing numbers (Rns): National specific Rns and Network specific Rns

B.2.1 National specific Rns:

CC+RNIC+SNIC+SD

Assumptions:

- maximum 7 digit analysis for routeing purposes;
- RNIC identifies a national routeing number series only i.e. routeing takes place after analysing the SNIC.

Table B.1 shows the part of the national number resource (NNR) that is reserved for routeing numbers and the maximum number of ScNs for a 2 or 3-digit CC (country code).

Table B.1: Part of NNR that is reserved for Rns and maximum number of ScNs

			RNIC			
2-digit CC	**1 digit**	**2 digits**	**3 digits**	**4 digits**	**5 digits**	
SNIC 1 digit	10 % 10	1 % 10	0,1 % 10	0,01 % 10	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 2 digits	10 % 100	1 % 100	0,1 % 100	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 3 digits	10 % 1000	1 % 1000	NA	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 4 digits	10 % 10000	NA	NA	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 5 digits	NA	NA	NA	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
			RNIC			
3-digit CC	**1 digit**	**2 digits**	**3 digits**	**4 digits**	**5 digits**	
SNIC 1 digit	10 % 10	1 % 10	0,1 % 10	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 2 digits	10 % 100	1 % 100	NA	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 3 digits	10 % 1000	NA	NA	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
SNIC 4 digits	NA	NA	NA	NA	NA	% of NNR reserved for Rns Maximum number of ScNs
NOTE: NA: Not applicable due to more than 7 digits analysis for routeing.						

Table B.2 shows the maximum capacity of routeing numbers pr. SNIC with different numbers of digits in RNIC and SNIC and for 3 different lengths of the national numbers (NN). The result is independent of the length of the CC.

Table B.2: Capacity of Rns pr. SNIC with 3 different lengths of NNs

2 digit CC	# digits in NN	RNIC 1 digit	RNIC 2 digits	RNIC 3 digits	RNIC 4 digits	RNIC 5 digits
SNIC 1 digit	8 digits 9 digits 10 digits	10^6 10^7 10^8	10^5 10^6 10^7	10^4 10^5 10^6	10^3 10^4 10^5	NA
SNIC 2 digits	8 digits 9 digits 10 digits	10^5 10^6 10^7	10^4 10^5 10^6	10^3 10^4 10^5	NA	NA
SNIC 3 digits	8 digits 9 digits 10 digits	10^4 10^5 10^6	10^3 10^4 10^5	NA	NA	NA
SNIC 4 digits	8 digits 9 digits 10 digits	10^3 10^4 10^5	NA	NA	NA	NA
SNIC 5 digits	8 digits 9 digits 10 digits	NA	NA	NA	NA	NA
3 digit CC	**# digits In NN**	**RNIC 1 digit**	**RNIC 2 digits**	**RNIC 3 digits**	**RNIC 4 digits**	**RNIC 5 digits**
SNIC 1 digit	8 digits 9 digits 10 digits	10^6 10^7 10^8	10^5 10^6 10^7	10^4 10^5 10^6	NA	NA
SNIC 2 digits	8 digits 9 digits 10 digits	10^5 10^6 10^7	10^4 10^5 10^6	NA	NA	NA
SNIC 3 digits	8 digits 9 digits 10 digits	10^4 10^5 10^6	NA	NA	NA	NA
SNIC 4 digits	8 digits 9 digits 10 digits	NA	NA	NA	NA	NA
NOTE: NA: Not applicable due to more than 7 digits analysis for routeing.						

B.2.2 Network specific Rns

CC+SNIC+RNIC+SD

Assumptions:

- maximum 7 digit analysis for routeing purposes;
- routeing takes place after analysing the SNIC. The RNIC identifies a network specific Rn series.

Table B.3 shows the part of the national number resource (NNR) that is reserved for routeing numbers and the maximum number of ScNs for a 2 or 3 digit CC (country code).

Table B.3: Part of NNR that is reserved for Rns and maximum number of ScNs

	RNIC					
2 digit CC	**1 digit**	**2 digits**	**3 digits**	**4 digits**	**5 digits**	
SNIC 1 digit	1 % 10	0,1 % 10	0,01 % 10	10^{-3} % 10	10^{-4} % 10	% of NNR reserved for Rns Maximum number of ScNs
SNIC 2 digits	0,1 % 100	0,01 % 100	10^{-3} % 100	10^{-4} % 100	10^{-5} % 100	% of NNR reserved for Rns Maximum number of ScNs
SNIC 3 digits	0,01 % 1000	10^{-3} % 1000	10^{-4} % 1000	10^{-5} % 1000	10^{-6} % 1000	% of NNR reserved for Rns Maximum number of ScNs
SNIC 4 digits	10^{-3} % 10000	10^{-4} % 10000	10^{-5} % 10000	10^{-6} % 10000	10^{-7} % 100000	% of NNR reserved for Rns Maximum number of ScNs
SNIC 5 digits	10^{-4} % 100000	10^{-5} % 100000	10^{-6} % 100000	10^{-7} % 10^{7}	10^{-8} % 10^{8}	% of NNR reserved for Rns Maximum number of ScNs
SNIC 6 digits	NA	NA	NA	NA	NA	
	RNIC					
3 digit CC	**1 digit**	**2 digits**	**3 digits**	**4 digits**	**5 digits**	
SNIC 1 digit	1 % 10	0,1 % 10	0,01 % 10	10^{-3} % 10	10^{-4} % 10	% of NNR reserved for Rns Maximum number of ScNs
SNIC 2 digits	0,1 % 100	0,01 % 100	10^{-3} % 100	10^{-4} % 100	10^{-5} % 100	% of NNR reserved for Rns Maximum number of ScNs
SNIC 3 digits	0,01 % 1000	10^{-3} % 1000	10^{-4} % 1000	10^{-5} % 1000	10^{-6} % 1000	% of NNR reserved for Rns Maximum number of ScNs
SNIC 4 digits	10^{-3} % 10000	10^{-4} % 10000	10^{-5} % 10000	10^{-6} % 10000	10^{-7} % 10000	% of NNR reserved for Rns Maximum number of ScNs
SNIC 5 digits	NA	NA	NA	NA	NA	
NOTE: NA: Not applicable due to more than 7 digits analysis for routeing.						

The SNIC series is allocated according to the demand that each SNIC has for a number series for national services. The number of digits in RNIC may then be an ScN internal matter.

Table B.4 shows the maximum capacity of routeing numbers per RNIC with different numbers of digits in RNIC and SNIC and for 3 different lengths of the national numbers (NN). The result is independent of the length of the CC.

Table B.4: Capacity of Rns pr. RNIC with 3 lengths of NNs

	# digits	RNIC				
2 digits CC	**in NN**	**1 digit**	**2 digits**	**3 digits**	**4 digits**	**5 digits**
SNIC 1 digit	8 digits	10^6	10^5	10^4	10^3	10^2
	9 digits	10^7	10^6	10^5	10^4	10^3
	10 digits	10^8	10^7	10^6	10^5	10^4
SNIC 2 digits	8 digits	10^5	10^4	10^3	10^2	10
	9 digits	10^6	10^5	10^4	10^3	10^2
	10 digits	10^7	10^6	10^5	10^4	10^3
SNIC 3 digits	8 digits	10^4	10^3	10^2	10	1
	9 digits	10^5	10^4	10^3	10^2	10
	10 digits	10^6	10^5	10^4	10^3	10^2
SNIC 4 digits	8 digits	10^3	10^2	10	1	(see note 1)
	9 digits	10^4	10^3	10^2	10	1
	10 digits	10^5	10^4	10^3	10^2	10
SNIC 5 digits	8 digits	10^2	10	1	(see note 1)	(see note 1)
	9 digits	10^3	10^2	10	1	(see note 1)
	10 digits	10^4	10^3	10^2	10	1
SNIC 6 digits	8 digits					
	9 digits					
	10 digits	NA	NA	NA	NA	NA
	# digits		**RNIC**			
3 digits CC	**in NN**	**1 digit**	**2 digits**	**3 digits**	**4 digits**	**5 digits**
SNIC 1 digit	8 digits	10^6	10^5	10^4	10^3	10^2
	9 digits	10^7	10^6	10^5	10^4	10^3
	10 digits	10^8	10^7	10^6	10^5	10^4
SNIC 2 digits	8 digits	10^5	10^4	10^3	10^2	10
	9 digits	10^6	10^5	10^4	10^3	10^2
	10 digits	10^7	10^6	10^5	10^4	10^3
SNIC 3 digits	8 digits	10^4	10^3	10^2	10	1
	9 digits	10^5	10^4	10^3	10^2	10
	10 digits	10^6	10^5	10^4	10^3	10^2
SNIC 4 digits	8 digits	10^3	10^2	10	1	(see note 1)
	9 digits	10^4	10^3	10^2	10	1
	10 digits	10^5	10^4	10^3	10^2	10
SNIC 5 digits	8 digits					
	9 digits					
	10 digits	NA	NA	NA	NA	NA

NOTE 1: The number of digits in NN is exceeded.
NOTE 2: NA: Not applicable due to more than 7 digits analysis for routeing.

Annex C (informative): Impact of Routeing on Signalling

This annex provides guidelines on the impact of the described routeing techniques on the signalling used in the reference points in figure C.1 copied below.

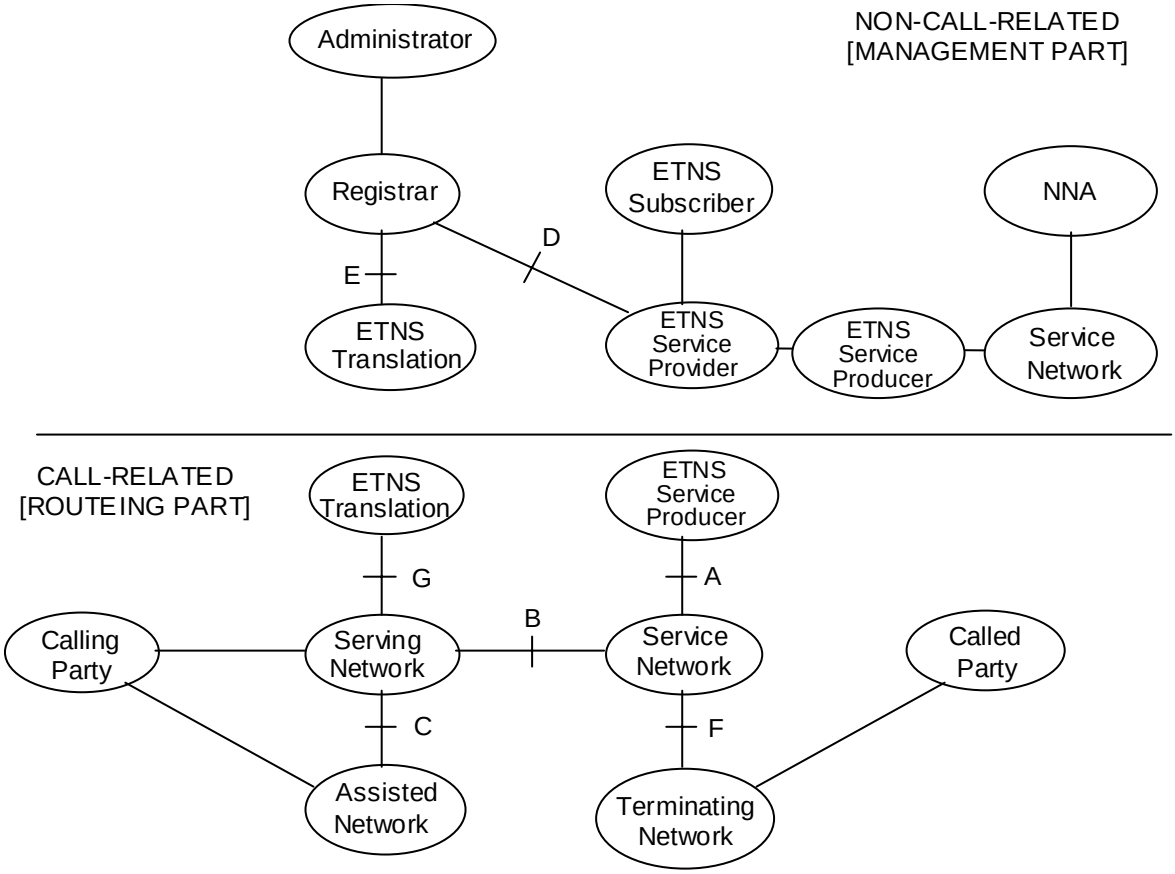


Figure C.1: Actors and reference points

The reference points in the call-related part of figure C.1 are used below.

This analysis considers the implications on the network signalling systems of:

- Implementation A, Addressing Method 1, Rn1 Routeing;
- Implementation A, Addressing Method 2, Rn2 Routeing;
- Implementation B, which is Routeing in the signalling network using SCCP Global Titles, based on the Routeing Address (RA).

C.1 General Implications

It is assumed that the implications on the reference points C and F and the implied signalling systems are the same as those for a basic ISDN call.

It is assumed that the implications on the reference point G and the implied signalling systems are the same as those for a single database dip to translate a dialled ITU-T Recommendation E.164 [8] number to a defined Routeing Number (including retrieval of the associated indicators).

C.2 Rn1 Routeing method

Rn1 Routeing method has no signalling implications and can be supported by ISDN ISUP v1 (ETS 300 121) [5], or beyond.

Use of the Rn1 Routeing method does imply that across Reference Point B both the routeing to the service network and the identification of the called party needs to be supported by ITU-T Recommendation E.164 [8] conformant numbers in the Called Party Number parameter. Such numbers are restricted to 15 digits. The numbers shall be a concatenation of the CC of the country where the service network resides followed by a digit string identifying the service network and an (implicit) identification of the called party.

This method implies the allocation of number resources in the respective national numbering plans for each called party that is served by the service networks in a particular country.

C.3 Rn2 Routeing method

C.3.1 Introduction

The main difference with the Rn1 Routeing method is that across Reference Point B with this routeing method the number for routeing is signalled in an ISUP parameter different from a parameter carrying the number for the identification of the called party.

Based on the analysis given below the definition of appropriate signalling procedures for the Rn2 Routeing method requires further study. These investigations should also take into account the studies underway in ITU-T SG11 for the support of the ITU-T Recommendation E.353 [9] for INRA.

The following solutions have been explored so far based on the following prerequisites:

- Only 1 method shall be defined for the international interface;
- The routeing shall be based on the Called Party Number parameter;
- The length of the number for routeing is restricted to 15 digits (ITU-T Recommendation E.164 [8]).

C.3.2 E.164 number as Rn for routeing to service network

From a signalling perspective ISDN ISUP v2 (EN 300 356-1) [6], or beyond, needs to be supported end-to-end between the serving network and the service network. As a minimum the ISUP compatibility mechanism (see note 1) shall be supported to transfer the original called ETNS number either in e.g. the Called Directory Number parameter (see note 2) or the Called IN Number parameter (see note 3) or in a new ISUP parameter for ETNS as unrecognized signalling information.

NOTE 1: Although it may be envisaged to rely on the compatibility procedures to transfer a parameter as unrecognized signalling information at the intermediate exchanges across Reference Point B (provided ISDN ISUP v2 (EN 300 356-1) [6], or beyond, is supported at these exchanges), this parameter will have to be recognized at gateway exchanges (where pass-on is not possible) and at the exchanges where this parameter shall be acted upon in the serving and service networks.

NOTE 2: The Called Directory Number parameter is currently specified for national use only in the context of Number Portability. Its transfer across network boundaries is therefore problematic.

It cannot be transferred between networks unless a bilateral or multilateral agreement exists.

International exchanges would have to be upgraded to enable the transfer of this parameter as parameters for national use are normally discarded at the boundaries of national networks.

In addition, the Nature of Address (NoA) value "international number" is not defined as part of this parameter.

The logic supporting Number Portability is making use of this parameter and use of this parameter for ETNS may impact the existing implementations of Number Portability.

NOTE 3: The Called IN Number parameter (and Original Called IN Number parameter) is defined in the context of IN based services. Hence use of this parameter for ETNS may interfere with the existing implementations of IN services if ETNS will have to interwork with IN services.

In this solution an ITU-T Recommendation E.164 [8] number is allocated per service network in a particular country to limit the number resources allocated in the respective national numbering plans.

Additional functionality will be needed in the serving network to signal both the number for routeing to the service network in the Called Party Number parameter and separately the number for the identification of the called party in another parameter. Similarly, the service network shall use the number received in the separate parameter for the identification of the called party across reference point A to the ETNS service producer.

C.3.3 NRN as Rn for routeing to service network

For the identification of the Rn a separate Nature of Address (NoA) value may need to be supported in addition to the existing NoA value for ITU-T Recommendation E.164 [8] international numbers and/or a new Numbering Plan (NP) value. In addition, a separate parameter has to be used for the identification of the called party. The signalling implications due to the use of a separate parameter will be the same as explained in clause C.3.2.

In this solution special numbers need to be allocated per service network as these will be used as Rns in a particular country. As these Rns are distinct from the ITU-T Recommendation E.164 [8] numbering resources there is no impact on the number resources allocated in the respective national numbering plans. However this solution assumes that the structure of the Rn is known by each exchange involved in the routeing of the call between the serving network and the service network. The structure of the NRN should therefore be standardized. This solution also imposes that a special NoA value or a new NP value is recognized and acted upon in any exchange where it is used for routeing.

The use of an existing NoA value defined for the purpose of Number Portability has been envisaged. However these NoA values are defined for national use only. Moreover this solution may require additional signalling interworking both in the outgoing international gateway in the country of the serving network and in the incoming international exchange in the country of the service network in order to avoid interference with existing implementations of Number Portability. This extra functionality refers to the signalling interworking between distinct solutions used across the international interface and the national ISUP solutions for Number Portability.

C.3.4 Use of the ISUP procedures for GVNS

As part of ISUP codings have been defined for the Global Virtual Network Service (GVNS) that offer a similar separation in the ISUP between signalling information for routeing and the identification of the called party. A point of consideration is whether these ISUP extensions are supported generally across the international interface as the support of GVNS is based on bilateral arrangements and GVNS is not defined in ETSI standards (only specified in ITU-T recommendation Q.767 [10]).

C.3.5 Support of E.353 for INRA

In ITU-T SG11 work has started on the support of ITU-T Recommendation E.353 [9] by ISUP/BICC signalling for routeing across the international interface based on International Network Routeing Addresses (INRAs). This work has only started and the completion of this activity is planned as part of BICC CS3 (ITU-T Recommendation planned to be published by end 2002).

C.4 Implications of SCCP routeing

It is assumed that the implications on the reference point B to support the SCCP routeing method using the RA are null, as to support this option it is assumed that the ETNS Serving Network and the ETNS Service Network are functionally co-located. Clearly any combination of Rn1 or Rn2 routeing before SCCP (RA) routeing may be utilized, as the use of SCCP routeing places no constraint on the location of the ETNS Service Network. The use of SCCP routeing on the RA in the Global Title therefore places no constraints on reference point B. It is assumed that the implications on the reference point A to support the SCCP routeing method using the RA are the same as C.2 or C.3 depending either on the use of an Rn1, Rn2 or by the co-location of the two functions. The functions that are co-located are the ETNS Serving Network and the ETNS Service Network, as shown in clause 5.1.2, figure 4. The only requirement is that the ETNS Service Network and the ETNS Service Producer are not directly connected using layer 3 SS7 node to node addressing.

In this case the Signalling Address (SA) identifying the ETNS Service Producer from the ETNS Service Network may conform to any addressing scheme that SCCP allows, e.g. an ITU-T Recommendation E.164 [8] structure, etc. Where this SCCP Global Title crosses network interconnection points or international boundaries, regulatory guidance will be required as to the nature of this global Title addressing. For example, the GSM HLR is known to use an ITU-T Recommendation E.164 [8] structure to address to GSM VLR in a different country/network; this is one example of an SCCP Global Title with international significance. This choice is not an issue directly related to the definition of the ETNS service.

Hence, Implementation B may be implemented with standard signalling systems that use SCCP Global Titles. The Intelligent Network Application Part Signalling (INAP CS-1 and beyond) standard as defined uses the services of SCCP routeing addresses based on Global Titles. This is available today based on the availability of agreed Routing Addresses for utilization as Global Titles with inter-network/international significance.

Interworking is supported between Intelligent Network Application Part Signalling (INAP CS-1 and beyond) and ISDN USER Part (ISDN ISUPv2 [6] and beyond) provided that the mapping conventions laid out in EN 301 070-1 [2] and EN 301 464 [3] are adhered to.

C.5 Summary

The following table summarizes the signalling requirements.

Table C.1: Summary of the signalling issues

	Reference Point A	**Reference Point B**	**Reference Points G**	**Functions of the ETNS Serving Network and ETNS Service Network**
Rn1 Routeing	Two translation Transactions	At least ISUP v1 [x]	Retrieval of Rn1.	Number Translation invocation/triggering.
Rn2 Routeing	For further study*	For further study*	For further study*	For further study*
SA Routeing	Compliant with Rn1 or Rn2 or Both	None	Either of the above.	Number Translation invocation/triggering.

Annex D (informative): Bibliography

ETSI TR 101 074 (V1.1.1): "European Numbering Task Force; Management of the European Telephony Numbering Space (ETNS)".

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

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

ETSI ES 201 104 (V1.1.1): "Human Factors (HF); Human factors requirements for a European Telephony Numbering Space (ETNS)".

History

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