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Foreword

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

1 Scope

The present document defines:

- 1) directory number formats for the subscribers to the CTM service;
- 2) an identification plan for these subscribers;
- 3) routing numbers (roaming numbers and fixed part addresses).

Radio identities are outside the scope of the present document.

2 References

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case 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] | ITU-T Recommendation E.164: "Numbering plan for the ISDN era". |
| [2] | ITU-T Recommendation E.212: "Identification plan for land mobile stations". |
| [3] | ITU-T Recommendation E.214: "Structure of the land mobile global title for the SCCP". |
| [4] | TR 101 074 (June 1997): "European Numbering Task Force; Management of the European Telephony Numbering Space (ETNS)". |
| [5] | ETS 300 189: "Private Telecommunication Network (PTN); Addressing". |
| [6] | prEG 201 096-1: "IN Architecture and functionality for the support of CTM". |

3 Definitions and abbreviations

3.1 Definitions

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

portable part: The CTM subscriber's radio terminal.

home network: The network, public or private, with CTM facilities, of the CTM service provider.

home database: The service provider's database, in the Home Network (HN), where the subscriber's profile is stored, and where the location of the CTM subscriber is updated (SDF-sl in EG 201 096-1 [6]).

visited network: The network, with CTM facilities, where the CTM subscriber is roaming. Roaming between public and private networks should be possible, whenever a public and a private operators have an agreement. The Visited Network (VN) may contain a Visited Database to facilitate the management of the location updating.

fixed part: The CTM radio equipment, at the edge of the fixed network, linked to the Portable Part (PP).

third network: The other network involved in a communication with the CTM subscriber. The third party may be the called or the calling party. Some of the CTM procedures do not involve a third network, e.g. location registration.

3.2 Abbreviations

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

CC	Country Code (see ITU-T Recommendation E.164 [1])
CTM ID	CTM IDentity
CTMN	CTM Number
ENTS	European Telephony Numbering Space
ESI	European Service Identifier (see TR 101 074 [4])
IMSI	International Mobile Station Identity (see ITU-T Recommendation E.212 [2])
IN	Intelligent Network
ISDN	Integrated Services Digital Network
MCC	Mobile Country Code (see ITU-T Recommendation E.212 [2])
MGT	Mobile Global Title (see ITU-T Recommendation E.214 [3])
MNC	Mobile Network Code (see ITU-T Recommendation E.212 [2])
NDC	National Destination Code (see ITU-T Recommendation E.164 [1])
SCCP	Signalling Connection Control Part
HN	Home Network
VN	Visited Network
PP	Portable Part

4 CTM service overview

Figure 1 shows a very simplified CTM architecture; its only purpose is to illustrate the definitions below. It does not make any distinction between public and private networks; it does not indicate the interfaces, nor the circuits or the signalling links. It shows the elements relevant to numbering and identifying issues. To have a complete description of the functional architecture of the CTM service, see EG 201 096-1 [6]. It is based on the Intelligent Network capabilities of the fixed public networks and of the private networks, and on the CTM air interface, that can be based on DECT or CT2 technology.

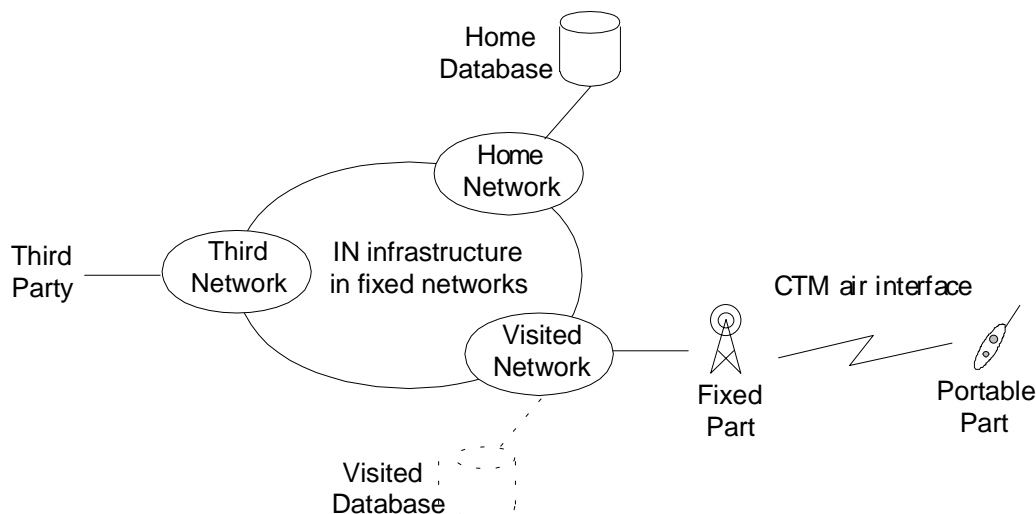


Figure 1: CTM elements relevant to the document

The calling party can reach a CTM subscriber by dialling his national or international directory number (part 5). Somewhere in the network, in order to terminate the call, this directory number is translated into a routing number (part 7). Identities (part 6) are used by the networks rather than directory numbers to identify a subscriber. The identity is used internally by service providers and network operators (e.g. to register a roaming subscriber in its home database), while the directory number is the subscriber's "public identity".

The CTM "equipment identity" globally and uniquely identifies an equipment related to the CTM service (portable or fixed part). It contains a manufacturer code, attributed by ETSI to recognized manufacturers, and a serial number, attributed by the manufacturer. It cannot be used for routing purpose, as it contains no information on the service provider. It is used for example to find a stolen equipment. This identity will not be further discussed in the present document.

5 CTM Number

5.1 Requirements and definition

The definition and requirements for the CTM Numbers (CTMN) are:

- it is a permanent number, globally and uniquely identifying a CTM subscriber;
- it is dialled by the calling party to reach the CTM subscriber, wherever he is roaming.

The CTMN is therefore a E.164 number.

It is used by the networks (originating or home) to address the home database, where is updated the location of the CTM subscriber. If CTM Numbers are not portable, the identity of the service provider can be retrieved from the number (service providers are allocated blocks of numbers branded with a CTM code). On the contrary, if CTM Numbers are in some extent portable, e.g. within a given country, special routing and database triggering are required to cope with the absence of service provider identity.

5.2 Structures

Four structures are possible for the CTMN, determining:

- 1) the authority(ies) responsible for number assignment (national administration and/or service provider);
- 2) the scope of each of the following two types of portability:
 - service portability: the possibility for a subscriber to keep his fixed geographic E.164 number when he moves to a CTM subscription. The possibility to keep a mobile number e.g. GSM has not been considered in the service description;
 - service provider portability: the possibility for a subscriber to the CTM service to change his service provider without changing his current CTM directory number.

The first two scenarios are based on national numbering schemes. The "+" symbol is not part of the number, nor of the dialling procedure. Scenarios are summarized in table 1.

5.2.1 Structure (a): Nothing in the number indicates that the CTM service is required

The CTM Number is any geographic E.164 number. The national administrations are responsible for number assignment in their countries.

Note: This number structure requires specific routing.

5.2.2 Structure (b): A national CTM code in the number indicates that the CTM service is required

In the national scheme, non-geographic National Destination Codes are reserved for the CTM service:

$$\text{CTMN} = \text{CC} + \text{NDC(CTM code)} + \text{Subscriber Number}$$

Which NDCs are reserved for the service is a national matter.

Sub-structures are possible:

(b1) Each CTM service provider is allocated a specific code, and manages itself its pool of numbers:

$$\text{NDC(CTM code)} = \text{NDC(CTM service provider)}$$

(b2) The same code is shared by all the service providers. The national administration manages the pool of numbers:

$$\text{NDC(CTM code)} = \text{NDC(CTM service)}$$

(b3) A combination of the last two cases, where some codes are shared while others are not. This could occur during a transition phase from (b1) to (b2).

5.2.3 Structure (c): European scenario

Here it is assumed that CTM Numbers are taken out of the European Telephony Numbering Space (ENTS) NA-02abcd. Their structure is:

$$\text{CTMN} = \text{ESI(CTM service)} + \text{Subscriber Number}$$

According to ETNS standards, a pan-European service number is portable between service providers.

5.2.4 Structure (d): Global scenario

Here it is assumed that ITU-T has reserved a Country Code for a global service of mobility, and that CTM Numbers could be taken out if this space:

$$\text{CTMN} = \text{CC(mobility service)} + \text{Global Subscriber Number}$$

NOTE: The exact terminology is subject to variation according to current revision of ITU-T Recommendation E.164 [1].

Such a scenario hasn't been considered yet in ITU-T, and will therefore not be mentioned anymore in the present document.

Table 1: CTM Number formats and attributes

structure	format	number assignment	number portability
a	geographic E.164 CC + N(S)N	national administration	subscriber can change SP and keep his geographic E.164
b 1 to 3	CC + NDC(CTM code) + SN(CTM subscriber number)	NDC(s) by national administration	subscriber cannot keep his geographic E.164
b1	NDC = CTM service	SN by national administration	subscriber can change SP
b2	NDC = CTM service provider (SP)	SN by service provider	subscriber cannot change SP
b3	b1 and b2	b1 and b2	b1 or b2
c	ESI(CTM service) + SN	ESI and SN by European administration	subscriber cannot keep his geographic E.164 subscriber can change SP
d	CC(mobility service) + GSN	CC and GSN by ITU-T	see note
NOTE: Portability of these numbers will depend on the ITU-T Recommendations.			

5.3 Remarks

5.3.1 Dialling procedures

Structures (a) and (b) authorize a shorter dialling in national use for calls to the CTM subscriber. The choice of whether to implement or not national dialling is a national matter.

Table 2: Dialling formats

structure	dialling procedure
a and b	national dialling within the home country international dialling from outside the country
c	international dialling everywhere

5.3.2 European service branding

Only the European scenario (c) enables a European service branding. On the contrary, with national structure (b) it will be impossible to harmonize the CTM codes, and there is absolutely no CTM branding at all in scenario (a).

5.3.3 Geographic versus non-geographic structures

Although structure (a) has not been considered for GSM, and has not been retained for UPT, it is said in the service description that, "as a network option [and if agreed nationally], a CTM subscriber will be allowed to keep his E.164 number when shifting from his fixed subscription to the CTM service". For example, a subscriber may change his residential fixed line, or his professional fixed line, to a CTM access, and keep his current number. Structure (a) must therefore not be precluded.

5.3.4 Private networks

Private networks can develop any private numbering scheme for their CTM application, provided that it complies with ETS 300 189 [5].

When the DDI service is used, the private CTM Number is embedded into a public number. From the public network point of view, this public number is a geographic one, like any other belonging to the block of numbers allocated to the private network. The public network does not know that this number has been allocated to a CTM subscriber.

5.4 Conclusion

A mixture of the different structures can be implemented in the public networks.

The decision to offer CTM Numbers with structure (c) shall not imply that structures (a) and (b) are precluded, if it appears that it better fits the customers needs.

In a given country, the decision to have structure (a) or (b) CTM Numbers, or both, is a national matter.

6 CTM Identity

6.1 Requirements and definition

The definition and requirements for the CTM Identity (CTM ID) are:

- it globally and uniquely identifies a CTM subscriber;
- as roaming is theoretically possible between public and private CTM networks, there are not public CTM IDs on one side and private CTM IDs on the other side. The CTM identification plan is shared by all the networks that want the CTM label;
- it is only known by the service provider, the network operators. It doesn't need to be known by the subscriber. For security purposes, it has not to be publicly known;

NOTE: IF CTM procedures include in the future any kind of manual authentication, the CTM ID could nevertheless be used by the users, in association with a PIN code, preferably to the CTM Number.

- it can be changed without changing the CTM Number, i.e. it is not portable;
- it is used by the networks to address the home database;
- it is not a dialable number.

6.2 Structure

6.2.1 Information contained in the CTM ID

Whatever the structure chosen for the CTM ID (order and length of the fields), it must provide the following pieces of information:

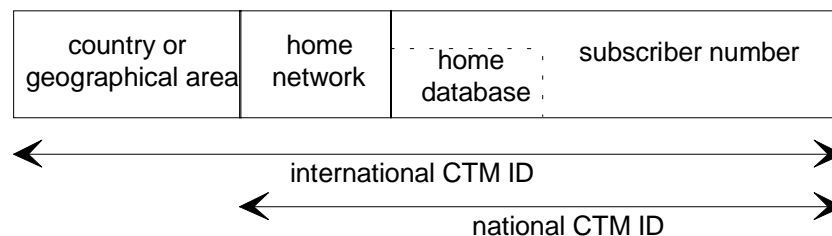


Figure 2: Information contained in the CTM ID

The "country or geographical area" field determines an administration responsible for the management of the block of national identities.

The "home network" field identifies the service provider in the area identified by the first field. The number of digits of this field should be carefully chosen to meet the supply of service in each country.

It may be necessary to indicate in the "subscriber number" field a particular "home database" in the "home network". This "home database" field is under the responsibility of the service provider identified in the previous field.

6.2.2 Structure of the CTM ID

Two structures have been considered for the CTM ID

6.2.2.1 (a) E.212 structure:

IMSI (see ITU-T Recommendation E.212 [2]) and CTM ID having the same purpose, GSM and CTM can share their identity plan.

Blocks of numbers from the E.212 plan should therefore be reserved to the CTM service. In each country the national administration allocates some Mobile Network Codes to GSM service providers, and others to CTM service providers. The structure for CTM ID is therefore:

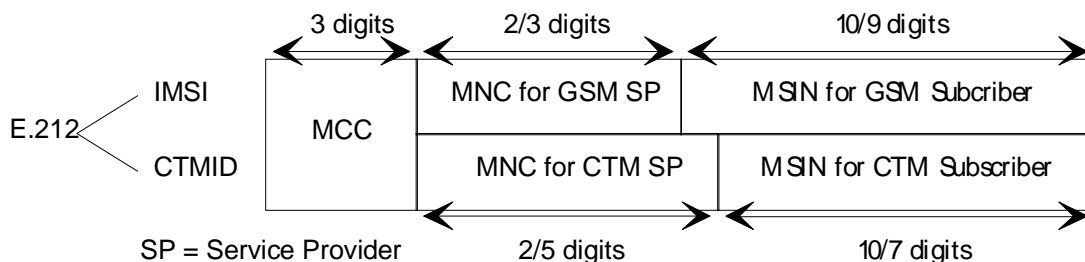


Figure 3: Structure of the CTM ID in the E.212 plan

In scenario (c), the CTM ID must begin either with a national MCC of a European country, or with a European MCC.

NOTE: A study item is defined in ITU-T Study Group 2 to enhance ITU-T Recommendation E:212 [2].

6.2.2.2 (b) pseudo-E.164 structure:

Another possibility is to consider internal E.164-like numbers as CTM IDs. It is very important to note that the CTM ID can have the value of any E.164 number already in use, and vice-versa. The two schemes use the same encoding of the fields, but as they are used in separate parameters and in separate procedures, no confusion is possible. The "pseudo-E.164" CTM Identity is not necessarily the E.164 CTM Number.

6.2.3 Use of the E.212 CTM ID in the international public network

The CTM ID belonging to the E.212 plan, the mechanisms for the derivation of the subscriber's home database signalling address by the SCCP gateways are already defined in ITU-T Recommendation E.214 [3]. These principles are summarized in the figure 4:

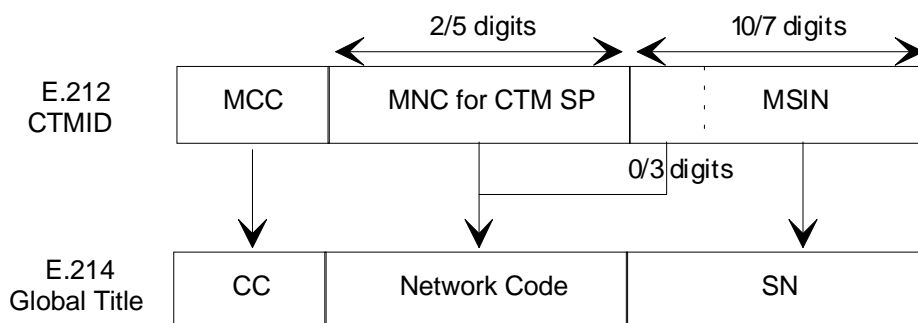


Figure 4: CTM ID in the international public network

In the international network, routing is based on the first seven digits of the Global Title, as it is the case for E.164 numbers. Further analysis in the international network must be agreed on a bilateral basis.

6.2.4 Unicity of the CTM ID scheme

As stressed in the requirement section, a unique scheme is preferable to support roaming. Otherwise, an interworking function is necessary, or a duplication of the procedures in the SCCP.

Therefore, a choice had to be made between the two possible structures, and E.212 was elected. The preference for this identity scheme was justified by:

- the availability of the GSM technology, and the fact that no modification of the SCCP was required for routing on an E.212 number;
- the consistency with the European policy on mobility identities, both IMSI and IPUI.

7 CTM routing numbers

7.1 Requirements and definition

The definition and requirements for the routing numbers are:

- they are E.164 numbers used to route the call, through the visited network, to the mobile party;
- they are not dialable;
- they are granted to the service provider so that he can operate the call and address his equipment. They do not belong to the pool of directory numbers offered to the CTM subscribers, i.e. they cannot be allocated as public numbers;
- they belong to the numbering scheme of the country where the equipment is settled.

7.2 Routing options

Two options are identified to terminate the call in EG 201 096-1 [6] and are illustrated below:

- case 1 "GSM-like" option: use of a roaming number, to address the visited database;

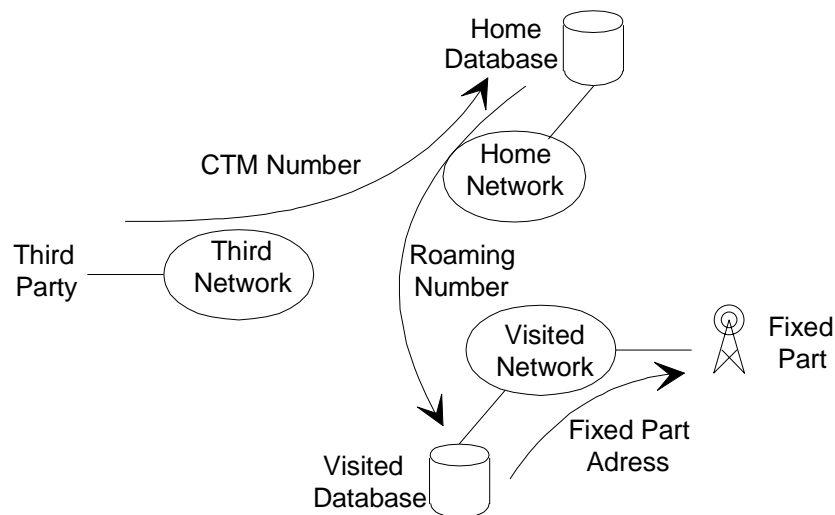


Figure 5: "GSM-like" routing

- case 2 "direct" option: the call is directly routed to the fixed part.

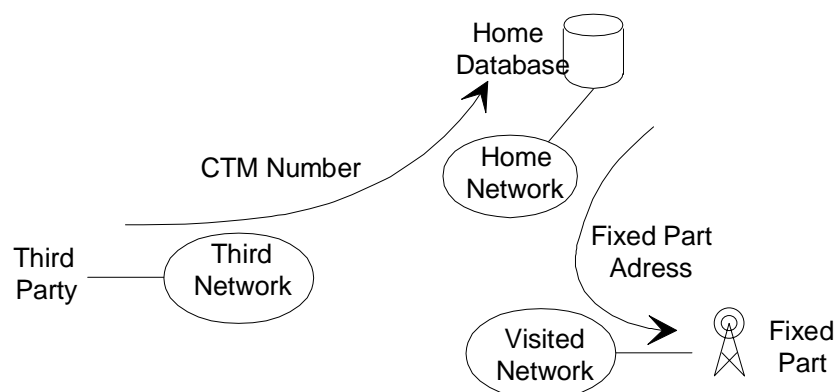


Figure 6: Direct routing

7.3 Roaming number

The first routing number is the roaming number, which identifies the visited system that will trigger the visited database, and the registered terminal in this database:

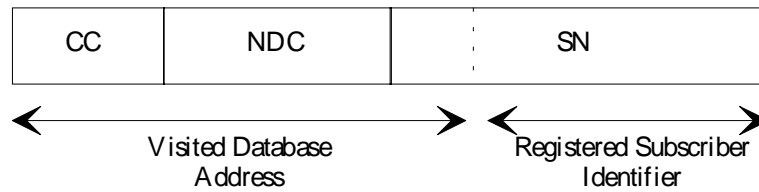


Figure 7: E.164 roaming number

The NDC used in a roaming number may be a geographic NDC or a NDC specific to the CTM service.

A roaming number is a temporary number associated with a portable part when it registers and as long as it stays in the visited network.

The network routes the call to the visited database according to the beginning of the number: CC + NDC + possibly the first digits of SN. The visited database identifies the called subscriber with the last digits of the number.

7.4 Fixed part address

Like any terminating point of a public network, the fixed part has its own E.164 number. This is the second routing number, the fixed part address. This E.164 number may be completed with a sub-address used to identify a particular location area behind the fixed part.

A roaming number is translated into a fixed part address in the visited database.

History

Document history		
V1.1.1	August 1997	Publication