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SERIES E: OVERALL NETWORK OPERATION, TELEPHONE SERVICE, SERVICE OPERATION AND HUMAN FACTORS

Operation, numbering, routing and mobile service – International operation – Numbering plan of the international telephone service

Numbering plan for the ISDN era

Reedition of CCITT Recommendation E.164 published in the Blue Book, Fascicle II.2 (1988)

NOTES

1   CCITT Recommendation E.164 was published in Fascicle II.2 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation E.164[1]

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NUMBERING PLAN FOR THE ISDN ERA

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1   Introduction

The rapid advances in telecommunications technology coupled with increased diversification of customer demands served by a number of different types of dedicated public switched networks (telephone, telex, data, etc.) have created a need to provide a uniform customer access and network structure. Such a structure is called the Integrated Services Digital Network (ISDN). Implementation of ISDNs have begun in a number of countries and eventually these will carry all existing and new services.

To facilitate ISDN evolution internationally, this Recommendation defines the numbering arrangements for an ISDN. The timetable for implementation of this numbering plan is described in Recommendation E.165.

2   Definitions

Within the integrated service environment, the terms used for all networks and services must be compatible and consistent. A list of terms and their definitions relating to numbering are contained in Recommendation E.160.

3   ISDN numbering plan principles

3.1   *General*

The ISDN numbering and addressing principles are described in Recommendation I.330. The ISDN numbering plan will be based on and evolve from the existing numbering plans applicable to national and international public telephone networks.

In view of the evolutionary nature of ISDN, the international numbering plan should provide for substantial capacity to accommodate future network requirements.

Where multiple destinations (i.e., RPOAs/networks) serve the called party's geographic area, the national ISDN numbering arrangement in the country[2] of destination shall provide for discrimination between these RPOAs/networks. The procedure for discrimination between multiple transit-RPOAs/networks is not considered to be a destination address requirement and shall therefore be excluded from the ISDN numbering arrangements.

Before the ISDN numbering arrangement attains global penetration, it must allow for interworking between the ISDN and other public networks. Such arrangements are discussed in Recommendation E.166. Interworking with private networks shall also be taken into account. The definition of private networks and the methods of interworking are for further study and will be covered in future Series E Recommendations.

The 10 digit decimal character set 0-9 is used throughout the ISDN numbering plan format including subscriber number, national (significant) number and the country code.

Prefixes and other information concerned with identifying selection procedures or network service parameters (such as quality of service or transit delay) do not form part of the ISDN number.

The ISDN numbering plan shall include an unambiguous identification of a particular country[2]. In addition, the ISDN number will identify networks and/or ISDNs within these countries[2], if required. In doing so, it shall retain the integrity of the telephone country code as defined in Recommendations E.160 and E.163.

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[1]   This Recommendation appears in the Series I Recommendations as Recommendation I.331 (Fascicle III.8).

[2]   Country or geographical area.

3.2   *Structure of the international ISDN number*

The international ISDN number is composed of a variable length of decimal digits arranged in specific code fields. The international ISDN number code fields are the country code (CC) and the national (significant) number.

The country code (CC) is used to select the destination country[3] and varies in length as outlined in Recommendation E.163.

The national (significant) number N(S)N is used to select the destination subscriber. In selecting the destination subscriber, however, it may be necessary to select a destination network. To accomplish this selection, the national (significant) number N(S)N code field comprises a national destination code (NDC)[4] followed by the subscribers number (SN).

The NDC field will be variable in length depending upon the requirements of the destination country. Each NDC may have one of the following structures:

a)   a Destination Network (DN) code, which can be used to select a destination network serving the destination subscribers;

b)   a Trunk Code (TC), the format of which is defined in Recommendation E.160;

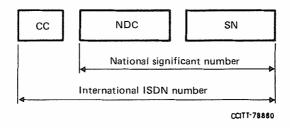c)   any combination of Destination Network (DN) code and Trunk Code (TC).

The NDCs of an Administration may consist of any of the above structures.

Note – The sequences DN-TC and TC-DN are a national matter. This is a subject for further study.

The subscriber's number (SN) varies in length depending on the requirements of the destination country[3] and is in accordance with Recommendation E.160.

Figure 1/E.164 shows the number structure.

Where appropriate, identification of an ISDN within the destination country[3] shall be through the use of a national destination code (NDC) incorporated in the ISDN number.

CC   Country code as defined by Recommendation E.163
NDC   National destination code
SN   Subscriber number

Note – National and international prefixes are excluded as they are not considered to be part of the international ISDN number.

FIGURE 1/E.164

Number structure

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[3]   Country or geographical area.

[4]   See definitions in Recommendation E.160.

3.3   *Number length*

The international number may be of variable length. The maximum number length shall be 15 digits. However, some Administrations may wish to increase their register capacity to 16 or 17 digits. The decision on register capacity is left as a matter to be taken by individual Administrations.

The length does not include prefixes, language digit, address delimiters (e.g., end of pulsing signals, etc.) since these items are not considered as part of the international ISDN number.

3.4   *Number analysis*

In order to determine:

– the country[5] of destination,

– the most appropriate network routing,

– the proper charging,

the originating country[5] must analyse a number of digits of the international number. The national destination code (NDC) increases the potential requirement for number analysis because it provides for a combination of either a trunk code (TC) and/or a network identification function. Careful consideration should be given to the preparation of the national destination code (NDC) assignments.

On international calls the number analysis performed at the originating country[5] need not be more than the country code and:

– three digits of the NSN in the case of a country with a three digit country code,

– four digits of the NSN in the case of a country with a two digit country code,

– five digits of the NSN in the case of a country with a one digit country code.

(Translation beyond this requirement could be arranged by bilateral agreement if required, e.g., countries assigned a 1 digit country code may require analysis of up to 6 digits beyond the country code.)

4   Number allocation principles

The assignment of country codes is administered by the CCITT, while NSN (NDC plus SN) code assignments are a national responsibility.

ISDN subscriber numbers may be allocated from the range of subscriber numbers available in the local ISDN exchange. These will be assigned to customers who subscribe only to the telephone service, customers with one or more data services and customers with a mixture of telephony and data services.

Subscribers equipped with basic access (the definition of ISDN basic access is given in the Series I Recommendations) should normally be allocated one unique number.

5   Network identification

In countries[5] served by more than one ISDN and/or Public Switched Telephone Network (PSTN) the network identification of each is a national matter.

Network identification within the national (significant) number shall be such that:

– in a country[5] all destination ISDN and PSTN networks shall operate under a single Recommendation E.163 country code,

– the international number maximum length of 15 digits shall not be exceeded, nor shall it be necessary for the number of digits for number analysis to exceed that specified in § 3.4,

– provision of network identification is not mandatory for countries using a single integrated numbering plan arrangement for their ISDNs and PSTNs.

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[5] Country or geographical area.

6 Service identification

The ISDN number by itself will not identify the particular nature of the service, type of connection or quality of service required. An indication of parameters describing the service required by the calling terminal will be included in a service identifier in the signalling information. This service identifier is not considered to be part of the numbering plan.

7 Calling/called line identity[6]

Calling/called line identity (CLI/CDLI) is address information which is passed across the network to provide supplementary services such as calling (or called) line identification presentation. The format of the CLI and CDLI for international calls should be the full international number, i.e., Country Code (CC), National Destination Code (NDC) and Subscriber Number (SN). No other information, such as prefixes or symbols (e.g. "+"), should be included, although a subaddress may be associated with the CLI/CDLI.

8 Dialling procedures

The subscriber dialling procedures for local, national and international calls shall be in accordance with Recommendation E.163. However, subscribers' control procedures for supplementary services will be as defined in Recommendation E.131 or in separate Recommendations for each service.

ISDN subscribers will always be called by the same subscriber number irrespective of where in the network the call originates. For calls in the same numbering area or local network the subscriber number alone is dialled. For national calls between numbering areas or local networks the subscriber number may be preceded by the national prefix and the national destination code.

The addressing procedures for calls using sub-addressing are described in § 11.

9 Prefixes

The use of prefixes shall be in accordance with Recommendations E.160, E.163 and E.166. Where necessary, prefixes can also be used for network and service selection.

10 Escape code

The use of the digit "0" as an escape code for numbering plan interworking is described in Recommendation E.166.

11 Address information

Identification within a subscriber's installation of a point beyond that defined by the ISDN number requires the transfer of address information from the public network to the subscriber's equipment. The following methods apply:

11.1 *Direct dialling-in*

With direct-dialling-in (DDI) the last few digits forming the end of the ISDN subscriber number are transferred to the called subscriber's installation (see Figure 2/E.164). The number of digits used varies and depends upon the requirements of the called subscriber's equipment and the capacity of the numbering plan used.

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[6] This termiminology needs further study.

ISDN subscriber numbers used for DDI may be those published in the public directory.

NDC National destination code
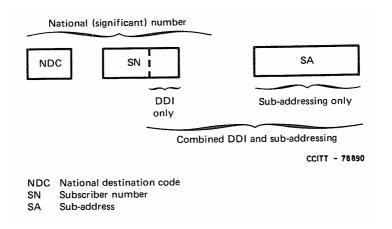SN   Subscriber number
SA   Sub-address

FIGURE 2/E.164

11.2 *Sub-addressing (network address extension)*

Sub-addressing provides a separate additional addressing capacity outside the ISDN numbering plan but constitutes an intrinsic part of the ISDN addressing capabilities. As shown in Figure 2/E.164, up to 20 octets (or 40 digits) may follow the ISDN number and form the ISDN sub-address, which is transferred to the equipment at the subscriber's premises.

When required, the sub-address is sent by the calling party within the call set-up procedure and is passed transparently through the network as a separate entity from both the ISDN number and user-to-user information. Sub-address information is not required to be processed within the public network.

Sub-addressing procedures are the subject of a separate Recommendation.

11.3 *Combination of sub-addressing and direct dialling-in*

Sub-addressing may be used separately or in combination with DDI (see Figure 2/E.164).

11.4 *Address delimiters*

DDI address information may contain an "end of address" (e.g., ST) delimiter. In the case of sub-addressing, an "end of subscriber number/beginning of sub-address" delimiter and the "end of address" delimiter are required.

(The use of an address delimiter at the end of an ISDN address is for further study.)

ITU-T E-SERIES RECOMMENDATIONS

**OVERALL NETWORK OPERATION, TELEPHONE SERVICE,
SERVICE OPERATION AND HUMAN FACTORS**

For further details, please refer to ITU-T List of Recommendations.

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