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Overall network aspects and functions, ISDN user-network interfaces

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NUMBERING PRINCIPLES FOR INTERWORKING BETWEEN ISDNs AND DEDICATED NETWORKS WITH DIFFERENT NUMBERING PLANS

Reedition of CCITT Recommendation I.332 published in the Blue Book, Fascicle III.8 (1988)

NOTES

1 CCITT Recommendation I.332 was published in Fascicle III.8 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 I.332

NUMBERING PRINCIPLES FOR INTERWORKING BETWEEN ISDNs AND DEDICATED NETWORKS WITH DIFFERENT NUMBERING PLANS

(Melbourne, 1988)

1 Introduction

Different public networks currently make use of different numbering plans. Single-stage interworking between ISDNs and dedicated networks as recommended in Recommendation I.330 requires adoption of solutions which make it possible to convey the addressing needs from one network to another.

This Recommendation represents a framework by which progress on numbering plan interworking within the various CCITT Study Groups may be coordinated. Detailed recommendations for numbering plan inter-working are contained in Recommendations E.166 and X.122.

The ISDN international number exceeds the addressing capability of present dedicated public networks. Therefore, these networks may not be able to reach subscribers' terminals connected to an ISDN if these terminals make use of the 15 digits allowed in ISDN.

In order to support numbering plan interworking between ISDNs and present dedicated networks, procedures have to be identified which offer single-stage interworking solutions for the near term, while recognizing that other solutions supporting the 15 digits capability of the ISDN number will have to be supported in the future.

One of the major objectives of introducing the concept of Time *T* (given in Recommendation E.165), is to provide a target date by which the long-term numbering plan interworking solutions will be in place.

2 Principles for Time T

ISDNs are expected to interwork with dedicated networks. However, due to the different addressing capabilities between the ISDN and existing numbering plans some temporary constraints need to be imposed on the number length and digit analysis required to access the user network interfaces of the ISDNs, before Time *T*.

2.1 *Numbering constraints before Time T*

2.1.1 *ISDNs interworking with dedicated networks*

To allow numbering plan interworking with dedicated networks before Time *T*, an ISDN will not assign international E.164 (I.331) numbers longer than 12 digits to its user network interfaces capable of receiving calls from dedicated networks.

2.1.2 *ISDNs which do not interwork with dedicated networks*

These ISDNs are allowed to assign numbers to user network interfaces according to the full capability of the numbering plan for the ISDN era.

2.2 *Evolution after Time T*

After Time *T*, ISDNs and PSTNs can make use of the full capability of E.164 numbers to identify their user network interfaces and terminals respectively.

2.3 *Evolution up to Time T*

Between now and Time T, any new network or user equipment, in ISDNs, or networks intending to interwork with ISDNs, should be installed with the identified relevant post- *T* capability(ies).

3 Single-stage interworking between ISDNs and dedicated networks

3.1 Numbering plan interworking procedures for short-term and for long-term will be required between:

i) ISDN (E.164) to/from PSPDN (X.121)

ii) ISDN (E.164) to/from CSPDN (X.121)

Note – Requirements for Telex (F.69) are included in Recommendation U.202.

3.2 The recommended long-term numbering plan interworking solution is based on the NPI/TON field in the ISDN call set-up message.[1)] The NPI elements is the numbering plan identifier (e.g. Recommendations E.164/E.163, X.121, F.69), whereas the TON indicates the type of number (e.g. local, national, international). This NPI/TON field will be carried as part of the call set-up message to the originating exchange, which will use this information to route the call. The NPI element will also be available within the network as part of the Initial Address Message in Recommendation Q.763.

An equivalent NPI/TON feature in Recommendations X.25/X.75 will also be available to support long-term numbering plan interworking between ISDNs and PSPDNs, employing X.31 procedures.

3.3 The short-term, single-stage interworking arrangements will use prefixes and escape codes to indicate the type of number and the numbering plan of the destination network, respectively. Definitions of prefixes and escape codes are provided in Annex A. As indicated in Annex A, prefixes are not part of the number and are not signalled over internetwork or international boundaries to that they are not subject to international standards. Escape codes however, may be carried forward through the originating network and across internetwork and international boundaries Therefore, the values of escape codes need to be standardized.

Note – The details on short-term interworking using escape codes are included in Recommendations E.166 and X.122.

3.4 Table 1/I.332 illustrates numbering considerations for single-stage interworking using the example of interworking between an ISDN and PDN.

3.5 *Principles for consistent interworking*

When considering Table 1/I.332, the following points should be taken into account:

1) It should be noted that X.25 procedures (containing E.164 numbers) may be used on ISDN subscriber-to-ISDN subscriber calls where no PDN is used. The choice of method for X.25/X.75 should allow this application.

2) During the interim period (pre- *T*), ISDN interfaces not interworking with any existing dedicated networks may be assigned E.164 numbers up to 15 digits in length. (Other ISDN subscribers would be assigned E.164 numbers according to Table 1/I.332).

3) The treatment of various addresses during call interworking, as outlined in Table 1/I.332, should apply to all kinds of addresses, e.g. calling party, redirecting, etc.

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1) As defined in Recommendation I.451 (Q.931).

TABLE 1/I.332

Accommodation of numbers during ISDN/PDN interworking

Call type	Man machine selection	User-network interface	Gateway between networks
ISDN to PDN	Terminal specific	*Interim* Recs. E.166 and X.122 or long-term solution *By time T* Numbering plan = Rec. X.121 Number = DNIC (DCC + NN) + NTN Type of number: international (DNIC present), national (DNIC omitted), or network specific	*Interim* Recs. E.166 and X.122 or long-term solution *By time T* Numbering plan = Rec. X.121 Number = DNIC (DCC + NN) + NTN Type of number: international (DNIC present), national (DNIC omitted), or network specific
PDN to ISDN	e.g. Request for PAD PAD/DTE implementation specific for support of user-network interface	e.g. Recs. X.25/X.31, X.21/X.30 *Interim* Modified X-Series to support Rec. I.330 principles Numbering plan = Rec. E.164 (CC + NDC + SN) ≤ 12 digits *By time T* Modified Recs. X.25 and 1.451 to support long-term interworking solution Numbering plan = Rec. E.164 (CC + NDC + SN) ≤ 15 digits	e.g. Recs. X.75, X.71 *Interim* Modified X-Series to support Rec. I.330 principles Numbering plan = Rec. E.164 (CC + NDC + SN) ≤ 12 digits *By time T* Modified Recs. X.25, X.75 and Q.763 to support long-term interworking solution Numbering plan = Rec. E.164 (CC + NDC + SN) ≤ 15 digits

CC	Country code	NDC	National destination code
SN	Subscriber number	DNIC	Data network identification code
DCC	Data country code	NN	National number
NTN	Network terminal number		

Note 1 – Numbering plan interworking between ISDNs and between ISDN and PSTN is not required since a common numbering plan is used.

Note 2 – Other solutions at particular interfaces may *also* be supported by some networks. Such solutions should not conflict with the use of the indicated method. The method indicated should be supported by all networks.

4 Requirements by Time *T*

4.1 By Time *T* the numbering plan identifier and type of number (NPI/TON)[2] capability should be exploited for calls within the ISDN and between ISDN and a dedicated network (e.g. PSPDN[3]) in the following cases:

i) NPI/TON must be used across internetwork and international boundaries where Signalling System No. 7 ISUP is used;

ii) the NPI/TON equivalent feature in the X.25 packet layer must be used when interworking from ISDN to a PSPDN employing X.31 procedures. (Reference Table 1/I.332)

4.2 Where ISDN is provided such that there is a mixture of PSTN and ISDN customers and traffic on a local exchange, the manner in which NPI/TON is used in the network is at the discretion of the Administration, taking due account of prevailing commercial, technical and regulatory considerations. Although Time *T* is not directly relevant to this decision, networks not fully exploiting the NPI/TON capability after *T* shall place no burden on those that do.

4.3 In those parts of a PSTN where inter-exchange signalling is other than Signalling System No. 7 ISUP, prefixes/escape digits may have to continue to be used.

ANNEX A

(to Recommendation I.332)

Prefixes and escape codes for numbering plan interworking

A.1 *Prefix*

The prefix is an indicator consisting of one or more digits, allowing the selection of different types of address formats (e.g. local, national, or international address formats), transit network and/or service selection. Prefixes are not part of the number and are not signalled over internetwork or international boundaries.

Note – When prefixes are used, they are always entered by the user or automatic calling equipment.

A.2 *Escape code*

An escape code is an indicator consisting of one or more digits. The indicator is defined in a given numbering plan, and is used to indicate that the following digits are a number from a different numbering plan. Escape codes are currently established within the X.121 and E.164 numbering plans.

An escape code may be carried forward through the originating network and can be carried across internetwork and international boundaries. Therefore, the digits for escape codes should be standardized.

Note – There may be cases when a standardized escape code may be numerically equal to a prefix already in use in the network. In this case a different digit (special prefix) other than the standardized escape code may be used, and the translation from the "special prefix" to the standardized escape code is performed by the network.

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[2] As defined in Recommendation I.451 (Q.931).

[3] Introduction of NPI may take place prior to Time *T*, provided that no burden is placed on networks not supporting the NPI when interworking unless bilaterally agreed.

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