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Public data networks – Network aspects

International numbering plan for public data networks

ITU-T Recommendation X.121

(Formerly CCITT Recommendation)

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ITU-T Recommendation X.121

International numbering plan for public data networks

Summary

This Recommendation defines the design, characteristics and application of the Numbering Plan for Public Data Networks. The International Numbering Plan for Public Data Networks has been developed in order to facilitate the operation of public data networks and provide for their interworking on a worldwide basis. The numbering plan allows for the identification of a country as well as a specific public data network in that country by means of Data Country Codes and Data Network Identification Codes. Additionally the numbering plan also allows for the identification of Global public data networks by means of a Global Data Network Identification Code. Interworking with other numbering plans can be achieved by use of an escape code mechanism.

In order to conserve the valuable numbering resource, guidance is provided on the efficient use of Data Country codes for the creation of Data Network Identification Codes, and on the use of variable length Private Network Identification Codes for the numbering of private data networks in harmony with the Public Network Numbering Plan. Procedures for the allocation of Data Country Codes are defined. The eligibility criteria and procedures for the allocation of Data Network Identification Codes to Global public data networks are also defined. Guidance is also provided on the numbering of global networks.

Source

ITU-T Recommendation X.121 was revised by ITU-T Study Group 7 (1997-2000) and approved by the World Telecommunication Standardization Assembly (Montreal, 27 September – 6 October 2000).

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation X.121

International numbering plan for public data networks

1 Introduction

This Recommendation defines the design, characteristics and application of the Numbering Plan for Public Data Networks. The International Numbering Plan has been developed in order to facilitate the operation of public data networks and provide for their interworking on a worldwide basis. The numbering plan allows for a number of public data networks in a country; the identification of a country as well as a specific public data network in that country; and a mechanism (use of escape codes) for interworking with other numbering plans.

2 Scope

The scope of this Recommendation is to describe the form and function of the International Numbering Plan for Public Data Networks. In order to conserve the valuable numbering resource, guidance is also given on methods for the efficient use of Data Country Codes to create Data Network Identification Codes, the numbering of private data networks and the use of variable length Private Network Identification Codes. Procedures for the allocation of Data Country codes are defined. Eligibility criteria and procedures for the allocation of Data Network Identification Codes to Global public data networks are provided.

3 References

The following ITU-T Recommendations and other references contain provisions, which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

– ITU-T E.164 (1997), *The international public telecommunication numbering plan.*

– ITU-T E.165 (1988), *Timetable for coordinated implementation of the full capability of the numbering plan for the ISDN era (Recommendation E.164).*

– ITU-T E.165.1 (1996), *Use of escape code "0" within the E.164 numbering plan during the transition period to implementation of NPI mechanism.*

– ITU-T E.166/X.122 (1998), *Numbering plan interworking for the E.164 and X.121 numbering plans.*

– ITU-T E.215 (1997), *Telephone/ISDN numbering plan for the mobile-satellite services of Inmarsat.*

– ITU-T F.69 (1994), *The international telex service – Service and operational provisions of telex destination codes and telex network identification codes.*

– ITU-T F.125 (1993), *Numbering plan for access to the mobile-satellite services of INMARSAT from the international telex service.*

– ITU-T I.330 (1988), *ISDN numbering and addressing principles.*

– ITU-T X.25 (1996), *Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in packet mode and connected to public data networks by dedicated circuit.*

– ITU-T X.28 (1997), *DTE/DCE interface for a start-stop mode Data Terminal Equipment accessing the Packet Assembly/Disassembly facility (PAD) in a public data network situated in the same country.*

– ITU-T X.32 (1996), *Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and accessing a Packet-Switched Public Data Network through a public switched telephone network or an Integrated Services Digital Network or a Circuit Switched Public Data Network.*

– ITU-T X.36 (2000), *Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for public data networks providing frame relay data transmission service by dedicated circuit.*

– ITU-T X.75 (1996), *Packet-switched signalling system between public networks providing data transmission services.*

– ITU-T X.76 (2000), *Network-to-network interface between public networks providing PVC and/or SVC frame relay data transmission service.*

– ITU-T X.123 (1996), *Mapping between escape codes and TOA/NPI for E.164/X.121 numbering plan interworking during the transition period.*

– ITU-T X.124 (1999), *Arrangements for the interworking of the E.164 and X.121 numbering plans for frame relay and ATM Networks.*

4 Definitions

Within the public switched telephone and public data network environment, the terms used for all networks and services must be compatible and consistent. Therefore this Recommendation, in addition to the terms defined herein, relies on a list of terms and definitions contained in E.164. Additionally, the terms and their applicability to number plan interworking can be found in E.166/X.122. A list of definitions is given in Annex K.

5 Abbreviations

This Recommendation uses the following abbreviations.

ATM Asynchronous Transfer Mode

CC Country Code

DCC Data Country Code

DCE Data Circuit-terminating Equipment

DNIC Data Network Identification Code

DTE Data Terminal Equipment

FR Frame Relay

ISDN Integrated Services Digital Network

ITU-T International Telecommunication Union – Telecommunication Standardization Sector

NN National Number

NPI Numbering Plan Identifier

NTN Network Terminal Number

PDN Public Data Network

PNIC Private data Network Identification Code

PSPDN Packet Switched Public Data Network

PSTN Public Switched Telephone Network

ROA Recognized Operating Agency

TDC Telex Destination Code

TOA Type Of Address

TON Type Of Number

TSB Telecommunication Standardization Bureau

6 Design considerations

The general design considerations that form the basis of this Numbering Plan are as follows:

a) The international data number is used to identify a country, a particular network, if several data networks exist in the same country, and a specific data terminal equipment/data circuit-terminating equipment (DTE/DCE) interface on that network.

b) Where a number of public data networks are to be established in a country, it should not be mandatory to integrate the numbering plans of the various networks.

c) The number of digits comprising the code used to identify a country and a specific public data network in that country should be a fixed number of digits and should be the same for all countries.

d) A national data number assigned to a DTE/DCE interface should be unique within a particular national network. This national data number should form part of the international data number which should also be unique on a worldwide basis.

e) The number of digits to be used in an international data number should be governed by national and international requirements and a reasonable limit on the overall number of digits should be imposed.

f) The Numbering Plan should make provision for the interworking of data terminals on public data networks (e.g. X.25) with data terminals on public telephone and telex networks and on Integrated Services Digital Networks (ISDNs).

g) The Numbering Plan should not preclude the possibility of a single national network providing an integrated telecommunications system for services of all kinds.

7 Characteristics and application of the Numbering Plan

7.1 Number system

The 10-digit numeric character set 0-9 should be used for numbers (or addresses) assigned to DTE/DCE interfaces on public data networks. This principle should apply to both national and international data numbers.

Use of the above number system will make it possible for data terminals on public data networks to interwork with data terminals on public telephone and telex networks and on Integrated Services Digital Networks (ISDNs).

7.2 Data network identification codes and data country codes

7.2.1 A Data Network Identification Code (DNIC) could be assigned as follows:

a) to each Public Data Network (PDN) within a country;

b) to a global service, such as the public mobile satellite system and to global public data networks (see 7.4 and 7.5);

c) to a Public Switched Telephone Network (PSTN) or to an ISDN for the purpose of making calls from DTEs connected to a PDN to DTEs connected to that PSTN or ISDN;

NOTE 1– In order to facilitate the interworking of telex networks with data networks, some countries have allocated DNIC to telex networks.

d) to a group of PDNs within a country, when permitted by national regulations;

e) to a group of private data networks connected to PDNs within a country, where permitted by national regulations.

NOTE 2 – For administrative purposes, including charging, a group of networks which have been assigned a single DNIC will, in the international context, be considered as a single entity.

7.2.2 The first digit of the data network identification codes should be in accordance with Table 1.

NOTE 1 – The digit 1 is reserved for the creation of DNICs for allocation to the public mobile satellite systems (e.g. Inmarsat) and global public data networks having special numbering requirements (see also 7.4 and 7.5).

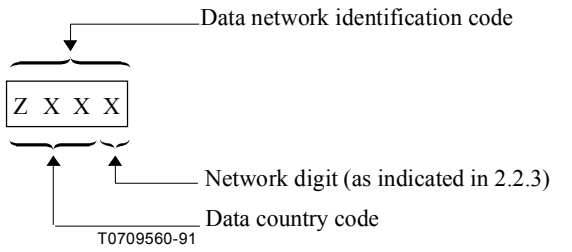
NOTE 2 – Digits 8, 9 and 0 are used as escape codes, not being part of the DNIC. They are defined in 7.9.

Table 1/X.121 – First digit of data network identification code

1	For public mobile satellite systems and global public data networks (see also 7.4 and 7.5)
2 3 4 5 6 7	For country or geographic specific Data Network Identification Codes (DNICs) (see also 7.2.3)

7.2.3 All Data Network Identification Codes (DNICs) shall consist of four digits. There are two categories of DNICs. If the first digit of the DNIC is the digit 1, the DNIC identifies a public mobile satellite system or a global public data network. (see 7.4, 7.5, 7.6). If the first digit of the DNIC is any digit 2 through 7 (as per Table 1), the DNIC identifies a public data network in a specific country or geographic region. In this case the first three digits will always identify a country and are to be regarded as a Data Country Code (DCC). The fourth, or network digit, should identify a specific data network in the country. The format of the country specific Data Network Identification Code is shown in Figure 1.

7.2.4 Each country should be assigned at least one 3-digit Data Country Code (DCC). The Data Country Code (DCC) in conjunction with the fourth digit can identify up to 10 public data networks.



X denotes any digit from 0 through 9
Z denotes any digit from 2 through 7 as indicated in 2.2.2

Figure 1/X.121 – Format of country specific Data Network Identification Codes (DNICs)

7.2.5 The system of Data Network Identification Codes (DNICs) indicated in 7.2.3 and 7.2.4 will provide for 600 Data Country Codes (DCCs) with a theoretical maximum of 6000 DNICs plus 1000 Global DNICs.

7.2.6 In the case where a country requires more than 10 DNICs, multiple Data Country Codes (DCCs) could be assigned to the country if spare DCC codes (within the geographic zone) exist. Procedures for the allocation of DCCs and the assignment of network digits are specified in 7.3. If spare DCC codes do not exist consideration should be given to a number of data networks sharing a common DNIC (see Annex C).

7.2.7 A list of Data Country Codes (DCCs) to be used in the development of Data Network Identification Codes (DNICs) is given in Annex J. This list was prepared in accordance with the requirement that the first digit of a DNIC, which is also the first digit of the embedded Data Country Code (DCC), should be restricted to the digits 2-7 inclusive (see 7.2.2). As first digits of Data Country Codes (DCCs), the digits 2-7 are arranged to represent geographic zones.

7.2.8 Examples indicating how Data Network Identification Codes (DNICs) could be developed, are given in Annex B.

7.3 Procedures for the allocation of Data Country Codes and assignment of Network Digits

7.3.1 Procedures for the allocation of Data Country Codes

The assignment of Data Country Codes (DCCs) is administered by the ITU. A list of allocated and spare DCCs (at the time of publication) is given in Annex J. Additions (new allocations that are accepted) changes and deletions will be published in the ITU Operational Bulletin. A consolidated list of allocated and spare DCCs will be published annually in the ITU Operational Bulletin. A consolidated list of allocated and spare DCCs is also published on the ITU Website.

Since DCCs are a limited resource, the efficient utilization of previously allocated codes may be taken into account when considering applications for further codes. In order to ensure the conservation of this limited resource, Administrations are requested to carefully consider the manner in which the generated Data Network Identification Codes (DNICs) are used. Recommendations on the efficient use of DCCs for the creation of DNICs is given in Annex C. It is suggested that sixty or seventy per cent of the available code space should be efficiently utilized before further applications are made for additional DCCs.

Detailed procedures for the allocation of Data Country Codes and the notification of the assignment of Network Digits are given in Annex A.

7.3.2 Assignment of Network Digits

Although the assignment of network digits to create Data Network Identification Codes (DNICs) is a national matter (and will be in accordance with national laws and regulations), the ITU TSB is to be notified of any new assignments, re-allocations or removals of network digits by completing the notification form shown in Annex L.

7.4 Data Network Identification Codes for public mobile satellite systems

The DNICs currently allocated to public mobile satellite systems are 111S where the digit S indicates the ocean area. The digit S has the values as shown in Annex I. The international data number format for mobile earth stations is specified in 7.6.3.

7.5 Data Network Identification Codes for Global Public Data Networks

DNICs 1000 through to 1109 are reserved and codes 1120 through to 1999 are available for allocation to Global Public Data Networks (see Annex I). As this is a limited resource (only 990 code points available), eligibility criteria and procedures for the allocation (by the TSB) of such DNICs have been developed and are described in Annex G. These DNICs are a common asset and not the property of any individual network operator or ITU member country. Accordingly these DNICs cannot be resold, traded or transferred and shall only be used for the purpose of identifying Global Public Data Networks. These DNICs will be recovered if not used, or no longer required by the assignee, or not used in accordance with the guidelines given in Annex G.

Network operators should recognise that a number of technical alternatives are available for the numbering of Global Public Data Networks. Guidelines for the numbering of Global Public Data Networks are given in Annex H.

7.6 International data number

7.6.1 The international data number assigned to a DTE/DCE interface consists of the Data Network Identification Code (DNIC) of the public data network, followed by the Network Terminal Number (NTN) or, where an integrated numbering scheme exists within a country, the Data Country Code (DCC) followed by the national number (NN) i.e.:

International data number = DNIC + NTN, or DCC + NN

7.6.2 The Network Terminal Number (NTN) should consist of the full address that is used when calling the data terminal from within its serving public data network. The National Number (NN) should consist of the full address used when calling the data terminal from another terminal within the national integrated numbering scheme. These numbers should consist of all the digits necessary to uniquely identify the corresponding DTE/DCE interface within the serving network and should not include any prefix (or access code) that might be employed for such calling. A data terminal on a public data network when called from another country (or where an integrated numbering scheme does not exist, from another network in the same country) should be addressed by the international data number assigned to its DTE/DCE interface.

NOTE 1 – Network Terminal Numbers (NTNs) or National Numbers (NNs) may be assigned by a PDN to DTEs connected to other public networks, when interworking capabilities are provided with that PDN.

NOTE 2 – In the case where a DNIC is assigned to identify a group of public data networks or a group of private data networks, a Private Network Identification Code (PNIC) mechanism may be used. See 7.11 and Annex D.

7.6.3 The complete international data number for an Inmarsat mobile earth station is composed as follows:

111S + mobile earth station number + X

where X is an optional digit which, if present, designates a particular DTE associated with the mobile earth station.

The mobile station is identified by a unique mobile earth station number (Inmarsat mobile number) which depending upon the service offerings of the Inmarsat system required is common for telephony, telex, data transmission and other services as defined in ITU-T E.215 and F.125.

NOTE 1 – In the Inmarsat mobile satellite systems, the use of the S digit for indicating the ocean area in which the mobile earth station is located at the time of the call is considered a temporary arrangement. It is recognized that such an arrangement should be avoided in the future, if possible, since it requires the calling user to know the exact area of a destination mobile earth station at the time of the call, and such an area may change from time to time for the mobile earth station.

NOTE 2 – Digit "X" requires further studies regarding aeronautical and land mobile earth stations.

NOTE 3 – The information contained in this clause relating to Inmarsat was correct at the time of publication, but may change with technical development.

7.7 Number of digits

International data numbers have a maximum length of 14 digits and a minimum length of 5 digits. The length chosen will be dependent on network requirements.

Since the length of the Data Network Identification Code (DNIC) is fixed at 4 digits and the length of the Data Country Code (DCC) is fixed at 3 digits, it would, therefore, be possible to have a Network Terminal Number (NTN) of 10 digits maximum, or a National Number (NN) of 11 digits maximum.

NOTE – The limit of 14 digits specified above applies exclusively to the number of digits used to specify the international data number information. Adequate register capacity should be made available at data switching exchanges to accommodate the above number of digits (14) plus any additional digits that might be introduced for signalling, or other purposes.

7.8 Prefixes

7.8.1 A prefix is an indicator consisting of one or more digits, allowing the selection of different types of address formats (e.g. national data number or international data number formats). Prefixes are not part of the international X.121 format and are not signalled across internetwork or international boundaries.

7.8.2 To distinguish between different address formats within a public data network (e.g. national data number and international data number formats), a prefix would generally be required. Any such prefix does not form a part of the data number. The use and composition of such a prefix is a national matter. However, the possible need to accommodate such a prefix with regard to digit register capacity should be noted. It is also a national matter to decide on evaluation of prefixes, escape codes, parts of the international data number of incoming path of entry for routing or other purposes.

With regard to the prefix shown in Figure 2, it should be noted that the same prefix (designated P) could be used for all four types of calls. The choice of prefix is, however, a national matter.

NOTE – In the case of X.25 access, if the Non TOA/NPI address format is used, a prefix indicating international data number format can only be one digit, due to a limit of 15 digits for the X.25 calling/called address field.

7.9 Escape codes for number plan interworking

To facilitate number plan interworking, with either the E.164 or F.69 Numbering Plans, the X.121 numbering plan provides for the use of an escape code. An X.121 escape code is an indicator consisting of one digit. It indicates that the following digits represent a number from a different numbering plan.

An escape code, when required, has to be carried forward through the originating network and can be carried across internetwork and international boundaries.

Digits used for escape codes are the digits 8, 9 and 0. The allocation and their purpose are shown in Table 2. The escape codes are not part of the international data number but are part of the "international X.121 format" (see Figure 2).

The escape codes are provided to enable DTEs and networks, (numbered under the X.121 numbering plan), which do not have the capability to support a signalling mechanism such as the TOA/NPI address format as defined in the X.25 signalling protocol, to interwork with terminals numbered under the E.164 or F.69 numbering plans (see Figure 2).

The maximum length of an E.164 number is 15 digits. Support of the TOA/NPI address format is required in the case of terminals on Packet Switched Public Data Networks (X.25) interworking with terminals identified by a 15 digit E.164 number.

Networks and terminals should where possible, evolve towards supporting the TOA/NPI address format/signalling protocol mechanisms in order to avoid the use of escape codes. It is recommended that the development of any new signalling protocols for Public Data Networks should not use the escape code mechanism as a means of number plan interworking.

NOTE – ITU-T E.164 formally discontinued the use of escape codes within the E.164 numbering plan as of 31 December 2000.

7.10 Numbering plan interworking

Specific details and procedures on numbering plan interworking between PSPDNs and ISDNs for the E.164 and X.121 numbering plans are outlined in ITU-T E.166/X.122 (see also ITU-T E.165, E.165.1. X.123, X.301 and I.330). Transit cases are considered in these Recommendations. For routing aspects, see also ITU-T X.110.

Specific details and procedures on numbering plan interworking between Public Frame Relay Data Networks and ATM networks for the E.164 and X.121 numbering plans are outlined in ITU-T X.124. Escape codes are not used within the Frame Relay (ITU-T X.36, X.76) and ATM signalling protocols (ITU-T Q.2931) for the purposes of number plan interworking as these protocols utilize a TON/NPI mechanism for number plan interworking.

7.11 Private data Network Identification Codes (PNICs)

In order that private networks (which are connected to the public data network) can be numbered in accordance with the X.121 Numbering Plan, a Private data Network Identification Code (PNIC) can be utilized to identify a specific private network connected to the public data network.

A PNIC code consists of up to 6 digits. The International Data Number of a terminal on a private network is as shown:

International Data Number = DNIC + PNIC + Private Network Terminal Number

The use of PNICs for the development of network terminal numbers on either a group of public data networks or a group of private data networks is described in Annex D. Guidelines for the structure of variable length PNICs are given in Annex E. Guidelines for the numbering of private networks which may have a future requirement for attachment to the public data network are given in Annex F.

Table 2/X.121 – Allocation of X.121 escape codes

8	Indicates that the digits which follow are from the F.69 Numbering Plan (Note 4).
9	Indicates that the digits which follow are from the E.164 Numbering Plan (Notes 2 and 3).
0	Indicates that the digits which follow are from the E.164 Numbering Plan (Notes 1 and 3).

NOTE 1 – In this case, 0 is to indicate that a digital interface on the destination network (ISDN or integrated ISDN/PSTN) is requested.

NOTE 2 – In this case, 9 is to indicate that an analogue interface on the destination network (PSTN or integrated ISDN/PSTN) is requested.

NOTE 3 – In the case of calls from a Packet Switched Public Data Network (PSPDN) to an integrated ISDN/PSTN which does not require a distinction between digital and analogue interfaces, only a single escape code (e.g. 9 or 0) may be required. However, all PSPDNs interworking with ISDNs, PSTNs and integrated ISDN/PSTNs should also support both 9 and 0 escape codes when acting as an originating, transit or destination network.

NOTE 4 – The continued use of and need for Escape code 8 is for further study.

7.12 Number analysis – International calls between public data networks

7.12.1 In the case of international calls between public data networks, provision should be made in originating countries to interpret the first three digits of the international data number. These digits constitute the Data Country Code (DCC) component of the Data Network Identification Code (DNIC) and identify the terminal terminating country. This information is required in the originating country for routing purposes.

7.12.2 In originating countries, it might also be necessary to interpret the fourth, or network digit of a DNIC and, if the originating network requires it, the first digit after the DNIC. Such interpretation would provide the identity of a specific network in a country where several public data networks are in service. This information might be required for billing purposes or for the selection of specific routes to called networks. Interpretation of the fifth digit may also be required in the case where a DNIC is shared amongst a number of networks. Another example of the requirement for interpretation of the fifth digit is the use of this digit in mobile satellite systems for selection of a particular mobile system (see 7.6.3). For information on number analysis and routing in the case of interworking with PSTN and ISDN, see ITU-T X.110 and X.122.

7.12.3 Countries receiving international calls for public data networks should receive the complete international data number. However, where a country of destination indicates that it does not wish to receive the Data Country Code (DCC) component of the DNIC, arrangements should be made to suppress the DCC.

7.12.4 For destination countries with more than ten public data networks, interpretation of the first three digits of the DNIC (i.e. the Data Country Code (DCC)) would identify the group of networks within which the called network is included. Interpretation of the fourth, or network, digit of the DNIC would identify the called network in that group. Interpretation of the first three digits would also make it possible to verify that an incoming call has in fact reached the correct country.

7.12.5 In the case of destination countries where there are fewer than ten public data networks, the first three digits of the DNIC could provide the verification indicated in 7.12.4. Interpretation of the fourth, or network, digit of the DNIC would identify the specific network being called.

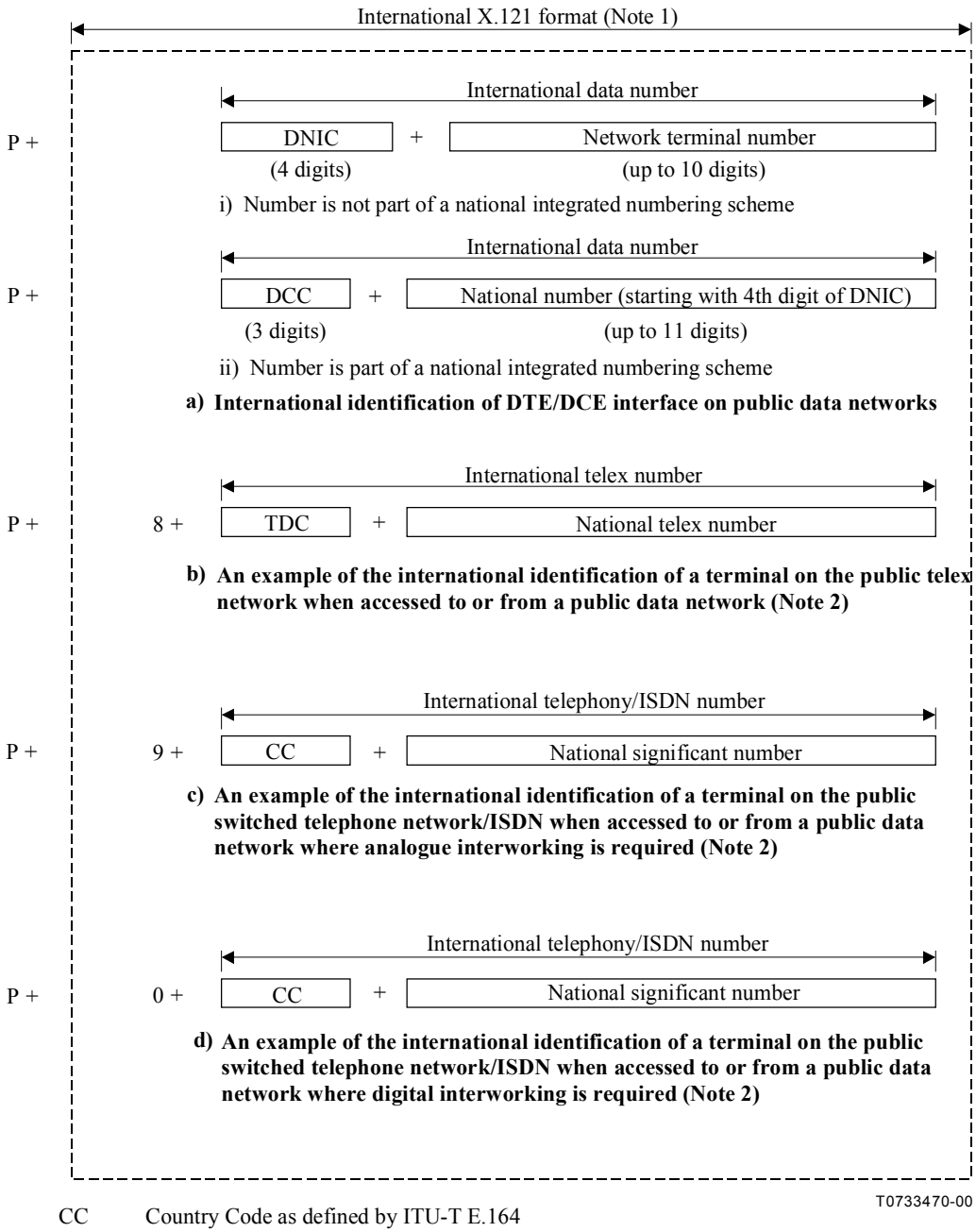
7.12.6 In transit countries the complete international data number must be received. Interpretation of the first three digits would identify the called country. Interpretation of the fourth or network digit would identify a specific data network in the called country. Interpretation of the fourth digit might be required for billing purposes or for route selection beyond the transit country. It might also be necessary in the transit network to analyse the fifth digit to allow selection of a particular public mobile system (see 7.6.3).

7.12.7 Where a data call is to be routed beyond a transit country through a second transit country, the complete international data number should always be sent to the second transit country. Where the data call is to be routed by a transit country to the country of destination, the arrangements indicated in 7.12.3 should apply.

7.13 Directories and letterheads

Directories for public data networks should include information on the procedures to be followed for making international data calls. A diagram, such as that of Figure 2, could assist the customer in these procedures.

With regard to the publication of international data numbers on letterheads or other written material, it is recommended that the Network Terminal Number (NTN) or National Number (NN) should be easily distinguished within the international number, i.e. that there be a space between the 4-digit DNIC and the Network Terminal Number (NTN), or between the 3-digit Data Country Code (DCC) and the National Number (NN), where the fourth digit of the DNIC is included in the National Number (NN).



CC Country Code as defined by ITU-T E.164
DCC Data Country Code
DNIC Data Network Identification Code
P Prefix
TDC Telex Destination Code

NOTE 1 –The term "International X.121 format" refers to the formats included within the dotted lines and excludes prefixes.

NOTE 2 – This illustrates the case where use is made of an X.121 escape code to identify a data terminal on either the public telephone network or ISDN (identified by an E.164 number) or on a telex network (identified by an F.69 number). The various interworking scenarios are described in separate Recommendations. It should also be noted that in the case of calls from a PSPDN to an integrated ISDN/PSTN which does not require a distinction between digital and analogue interfaces, only a single escape code (e.g. 9 or 0) may be required. However, all PSPDNs interworking with ISDNs, PSTNs and integrated ISDN/PSTNs should also support both 9 and 0 escape codes when acting as an originating, transit or destination network.

Figure 2/X.121 – International X.121 format

ANNEX A

Procedures for the allocation of data country codes and assignment of network digits

This annex details procedures for the allocation of Data Country Codes and the assignment of Network Digits.

A.1 Procedures for the allocation of Data Country Codes

The assignment of Data Country Codes (DCCs) is administered by the ITU. A list of allocated and spare DCCs (at the time of publication) is given in Annex J. Additions (new allocations) and changes that are accepted will be published in the ITU Operational Bulletin. A consolidated list of allocated and spare DCCs will be published annually in the ITU Operational Bulletin. A consolidated list of Data Country Codes (DCCs) is also published on the ITU Website.

Since DCCs are a limited resource, the efficient utilization of previously allocated codes may be taken into account when considering applications for further codes. In order to ensure the conservation of this limited resource, Administrations are requested to carefully consider the manner in which the generated Data Network Identification Codes (DNICs) are used. Recommendations on the efficient use of DCCs for the creation of DNICs is given in Annex C. It is suggested that sixty or seventy per cent of the available code space should be efficiently utilized before further applications are made for additional DCCs.

The DCC allocation process is initiated by a written request to the Director of the TSB from the Administration of an ITU member country. Administrations requiring a new or additional DCC(s) may indicate a preference from the available codes. The Study Group responsible for maintaining this Recommendation will appoint a delegated representative from within the TSB for the administration and the processing of applications for the allocation of Data Country Codes.

If the responsible Study Group's delegated representative determines that the request for the DCC allocation does not raise any substantive technical issues and a ready allocation can be made from the spare codes (this is expected to be the normal case), the delegated representative will advise the Director of the TSB to approve the allocation.

In exceptional cases (e.g. where a straightforward allocation cannot be made from the appropriate region or where there is a perceived technical or operational difficulty), the TSB will ensure that appropriate discussion takes place between the TSB, the Administration requesting the allocation and Study Group experts, to ensure that any technical and operational requirements have been taken into consideration before the final allocation of the code is made.

A.2 Assignment of Network Digits

The assignment of network digits to create Data Network Identification Codes (DNICs) is a national matter and will be in accordance with national laws and regulations. The TSB is to be notified of any such assignments. Assignments by Administrations of network digits will be published in the ITU Operational Bulletin. A Recapitulatory list of DNICs is published annually in the Operational Bulletin. A consolidated list of Data Network Identification Codes (DNICs) is also published on the ITU Website.

In order to keep this list up to date, Administrations are requested to check the accuracy of the published information and to inform the TSB of any changes that should be made. Administrations are to notify the TSB of any new assignments, re-allocations or removals of network digits by completing the notification form (published with the Recapitulatory list) and also shown in Annex L.

In the case where a number of networks share a common DNIC, Administrations are requested to supply the names of the networks and the number range allocated to each network. For illustrative purposes assume a country has been allocated a Data Country Code 750. The administration decides to share DNIC 7501 amongst a number of networks. The ITU is informed that DNIC = 7501 is a shared DNIC, and sub-allocations 75011 have been made to "Network-A" and 75012 and 75013 made to "Network-B".

ANNEX B

Development of data network identification codes

The Data Country Codes (DCCs) listed in Annex J are used as the basis to create DNICs in the following examples.

Example 1

In this example, it is assumed for illustrative purposes only that the Netherlands has established its first public data network. To develop the Data Network Identification Code (DNIC) for this network, it would be necessary for the Netherlands to assign to it a network digit to follow the listed Data Country Code (DCC) 204. Assuming that the Netherlands selected the digit 0 as the network digit, the Data Network Identification Code (DNIC) for this initial network would be: 2040.

Example 2

In this example, it is assumed for illustrative purposes only that five public data networks have been established in Canada. To develop the data network identification codes for these networks, it would be necessary for Canada to assign to each of these networks a network digit to follow the listed Data Country Code (DCC) 302. Assuming that Canada assigned the network digits 0-4 to the five networks, the resulting Data Network Identification Codes (DNICs) would be: 3020, 3021, 3022, 3023 and 3024.

Example 3

In this example, it is assumed for illustrative purposes only that eight public data networks have been established in the United States of America. It is also assumed that network digits 0-7 would be assigned by the United States of America to follow the listed Data Country Code (DCC) 310. The Data Network Identification Codes (DNICs) thus formed for these eight networks would be: 3100, 3101, 3102, 3103, 3104, 3105, 3106 and 3107.

If, some time later, four additional public data networks were to be introduced in the United States of America, two of the four new networks could be assigned network digits 8 and 9 in association with Data Country Code (DCC) 310, to produce the Data Network Identification Codes (DNICs) 3108 and 3109.

For the remaining two public data networks, the United States of America would have to ask the TSB for an additional Data Country Code (DCC). A request for a code next in sequence, i.e. 311, could be made if this code appeared to be spare. If code 311 could be made available, it would be assigned to the United States of America. If it was not available, a spare code in the "300" series of Data Country Codes (DCCs) would be assigned. Assuming Data Country Code (DCC) 311 was available and issued to the United States of America, the two remaining public data networks could be assigned network digits 0 and 1 in association with Data Country Code (DCC) 311, to produce the Data Network Identification Codes (DNICs) 3110 and 3111.

The Data Network Identification Codes (DNICs) for the 12 public data networks would then be: 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110 and 3111.

Example 4

In this example, it is assumed, for illustrative purposes only, that a public data network is to be established in each of two Caribbean islands that are part of the group of islands known as the French Antilles. The islands concerned are Guadeloupe and Martinique.

To develop the Data Network Identification Codes (DNICs) for these public data networks, it is assumed that the French Administration would assign network digit 0 to the network in Guadeloupe and network digit 1 to the network in Martinique and associate these network digits with the listed Data Country Code (DCC) 340 for the French Antilles. The Data Network Identification Codes (DNICs) thus formed would be 3400 for Guadeloupe and 3401 for Martinique.

This example indicates that the system of Data Network Identification Codes (DNICs) is appropriate for application to groups of islands or regions of a country since one Data Country Code (DCC) could provide for up to ten public data networks dispersed over several islands or regions. At the same time, such island or regional networks would be distinguishable from each other.

Example 5

In this example, it is assumed for illustrative purposes only that a country has been allocated a Data Country Code 750. The Administration assesses that there is a need for more than 10 DNICs and, in order to meet the demand, decides that some networks will share a common DNIC. Assuming DNICs 7501 and 7502 are to be shared between several networks, sub-allocations 75011 are made to "Network-A", sub-allocations 75012 are made to "Network-B" and 75022 and 75023 are made to "Network-C".

ANNEX C

Recommendations for the efficient use of DCCs to create DNICs

The allocation of DNICs is a national matter. The eligibility for the issue of a DNIC is also a national matter and is beyond the scope of ITU-T Recommendations. However, the TSB does have the responsibility for the issue of Data Country Codes. It should be clearly recognised that the number of available DCCs from which DNICs are created is a limited and finite resource. This is particularly true in the case where Administrations require additional DCCs and have a preference for the next sequential code. Accordingly the TSB could reserve the right not to issue further DCCs if it considered that efficient and effective use had not been made of the previously issued codes. For example, the requirement for a specific DNIC in order to specify or select a higher layer service, a service speed or a security mechanism is not considered efficient or appropriate use of DNICs. The use of DNICs for such purposes is strongly discouraged and such allocations are strongly discouraged. Hence it is considered appropriate that the ITU should provide guidance on the efficient use of DCCs and DNIC code space.

In the context of this Recommendation, it is assumed that networks allocated DNICs are public data networks. The definition of a public data network and eligibility for a DNIC will be interpreted in accordance with national laws and regulations. However, networks allocated DNICs are likely to be required to fulfil certain obligations under national laws and regulations.

Some countries have a requirement for a large number of DNICs in order to identify public data networks. In such cases, consideration should be given to a number of networks sharing the available number space. For example, in order to conserve the limited number of available DNICs, a number of public data networks (e.g. packet switching services) could share a common DNIC but utilize a PNIC type capability to subdivide the available number space.

For example, the simplest mechanism is to use the first digit of the Network Terminal Number to specify a particular public network that has been assigned to the shared DNIC. This in effect is a 1-digit PNIC code mechanism and could provide unique number space for up to 9 or 10 networks depending on national use of prefix codes. Alternatively the available number space (10 digits for Network Terminal Numbers) could be subdivided into distinct blocks each of which are identified by a particular range of PNIC digits. For example an Administration could decide to share DNIC 7501 amongst a number of networks and could allocate the number range defined by 75011 to "Network-A" and the range defined by 75012 to 75014 to "Network-B".

Administrations (and network operators) should carefully note that operationally one of the networks sharing a common DNIC may need to be appointed as the gateway network to facilitate interworking. It should also be noted that the 4 digit DNIC is the primary basis on which routing is undertaken. DNICs are also used within the X.25/X.75 and X.36/X.76 signalling protocols as a network identifier for transit network selection, and to identify the network clearing a call. This is a protocol issue and only 4 digits have been allocated within the protocols for this purpose and this can not be expanded. Hence in those cases where a DNIC is shared it may not be possible to identify the actual network operator.

ANNEX D

Use of Private data Network Identification Codes (PNICs) for the development of network terminal numbers for a group of public data networks or for a group of private data networks connected to public data networks

This annex provides guidelines for allocating (within a country) data numbers for DTE/DCE interfaces on private data networks which are in turn connected to public data networks where permitted by national regulations.

NOTE 1 – In the context of this annex, a Private data Network Identification Code (PNIC) may also be used to identify a specific public data network in a group of public data networks that share a common DNIC.

Private networks are generally connected to public data networks via a DTE/DCE interface connection which is identified by the X.121 number of a particular port on the public data network. For private networks connected to the public network, the use of PNICs provides the capability for readily addressing end systems within such networks. The PNIC capability allows private networks to be logically numbered in accordance with this Recommendation. Hence private network terminals may be readily addressed by other calling DTEs which are outside the private network.

NOTE 2 – Some Packet Switched Public Data Networks do not use 10 digits to identify the Network Terminal Number. This allows a number of digits to be used as a sub-addressing mechanism. For example a PSPDN which uses 8 digits to identify a Network Terminal Number may use 2 digits for sub-addressing. Two digit sub-addressing provides identification of 100 end-system processes or terminals. However, as most private networks require an ability to address individual terminals, host-computers or particular processes, the limited addressing capability of the sub-addressing mechanism is generally not sufficient for private networks.

D.1 A Private data Network Identification Code (PNIC) may be assigned to each private data network which is connected to the public data network. Because of the possible overlap of numbers allocated from existing DNICs, some Administrations may deem it appropriate that a separate DNIC is allocated specifically for PNIC usage. The Private data Network Identification Code (PNIC) digits are the first digits of the Network Terminal Number (NTN).

D.2 A Private data Network Identification Code (PNIC) may be up to 6 digits in length. In order to cater for the numbering requirements of different sized private data networks, some public data networks may wish to offer a variable length PNIC capability. Guidance for structuring variable length PNICs is provided in Annex E. The format for the Private data Network Identification Code (PNIC) is as follows:

ZXXXXX Private data Network Identification Code (PNIC).

Z denotes any digit from 2 through 9 as indicated in D.3 (see Note in Table D.1).

X denotes any digit 0 through 9.

D.3 The first digit of a Private data Network Identification Code (PNIC) is in accordance with Table D.1.

Table D.1/X.121 – First digit of private data network identification code

0 1	(Note)
2 3 4 5 6 7 8 9	For Private data Network Identification Codes (PNICs)
NOTE – The use of 0 or 1 depends on the national use of 0 or 1.	

D.4 If a country has more private data networks than can be grouped under one DNIC or, if the public data networks within a country are not all interconnected, another DNIC may be allocated for each new group of private data networks.

D.5 If a private data network requires more numbers for DTE/DCE interfaces than can be grouped under one PNIC, multiple PNICs may be allocated to a single private data network. Variable length PNIC structures generally provide a flexible structure that allows a mix of various sized networks to be efficiently identified. Guidelines for the structure of variable length PNICs is given in Annex E.

D.6 The assignment/allocation of Private data Network Identification Codes (PNICs) is administered nationally. However, because PNIC codes are a limited and finite resource, allocations of PNIC codes should generally not be made to private networks that are not connected to the public data network. The allocation of a PNIC code is likely to be made when the private network connects (or makes arrangements for connection) to the public network.

D.7 Guidelines on the numbering of private networks, which are not connected to the public data network, but wish to harmonize with the public network numbering plan are given in Annex F.

ANNEX E

Guidelines for the structure of variable length PNICs

E.1 Introduction

This annex provides guidelines for the structure of variable length Private data Network Identification Codes (PNICs). One approach for PNIC addressing has been to use a (single) standard (say 4-digit or 6-digit) PNIC structure, with allocation of multiple PNICs to any customers who have a greater, or more complex addressing requirement. To cater for the addressing requirements of a wide range of private networks, and to ensure efficient use of number space, some networks/Administrations may wish to provide a variable length (for example 2-, 3- or 4-digit) PNIC capability.

The number range of the DNIC which has been allocated for PNICs must be structured into zones from which 2-, 3- and 4-digit PNICs will be allocated. An unstructured mix of 2-, 3- and 4-digit PNICs would impose unnecessary systems overheads (complexity in the routing tables) on most public data network providers. The variable length PNIC capability will enhance customer flexibility and make PNIC use more attractive. Through the use of a structured number space (but with flexible boundaries) following the DNIC, there will be minimal impact on numbering efficiency.

E.2 Structure of the "PNIC specific" DNIC number space

To ensure uniqueness of the number space, a specific DNIC may be allocated for PNIC use if sufficient number capacity is not available from existing DNICs. PNICs can either be fixed length (up to 6 digits) or variable length (1, 2, 3, 4, 5 or 6 digits).

As public data network providers would be subject to significant routing analysis and systems overheads if an unstructured allocation of 2-, 3-, 4-, 5- and 6-digit PNICs was adopted, it is suggested that in implementing variable length PNICs, the allocation of PNICs should be restricted to specific ranges from the available number space. The use of 0 or 1 as the first digit of the PNIC will depend on the national use of 0 or 1. For example, some networks use 0 or 1 as a prefix and do not use these digits as the first digit of a PNIC in order to avoid ambiguity.

For example, a network may wish to implement a variable length (e.g. 2-, 3- and 4-digit) PNIC capability. A specific DNIC is assigned for the numbering of private data networks using PNICs. It is suggested that 4-digit PNICs could be allocated commencing from the lowest to the highest value within a range 1000 to 3999 and 3-digit PNICs could be allocated commencing from the highest to the lowest value within a range 699 to 400. With practical experience it will be possible to modify the position of the range boundaries shown in Table E.1 to adjust for customer take-up of the three PNIC length options. The need for 2-digit PNICs (allowing a private network terminal number of 8 digits) is likely to be quite small.

Table E.1/X.121 – Possible Number Ranges Structure for Variable Length PNICs

DNIC	Possibles ranges	PNIC Length
For example 5057	00000 to 09999	Reserved due to use of 0
	1000 to 3999 (provides 3000 PNICs)	4 digits
	400 to 699 (provides 300 PNICs)	3 digits
	70 to 99 (provides 30 PNICs)	2 digits

E.3 PNIC eligibility criteria

The allocation and administration of PNICs is a national matter. Because PNIC codes are a limited and finite resource, it is recommended that some criteria should be adopted in order to conserve the number space. Allocations of PNIC codes should generally not be made to private networks that are not connected to the public data network. The allocation of PNIC codes is likely to be made when the private network connects (or makes arrangements for connection) to the public network.

Criteria for the allocation of a PNIC code could be based on the size or the numbering requirements of the private network. For example:

- A minimum criteria for the allocation of a 4-digit PNIC may be "a projected take-up of 100 DCE/DTE interfaces, etc."

- If variable length (for example 2-, 3- and 4-digit) PNICs are adopted, then the criteria may be based on the needs of the private network to address large numbers of terminals, for example:

Length of PNIC	Projected number of DTE/DCE Interfaces on Private Network
4	< 100
3	100 – 1000
2	> 1000

E.4 Variable length PNIC structures

Table E.2 shows the number format for data networks identified by a Private Network Identification Code. In this example the PNIC is either 2, 3, or 4 digits in length.

Table E.2/X.121 – Number format for data networks identified by Private Network Identification Code

<table>
<tr><th colspan="2">Data Network Identification Code</th><th colspan="3">Network Terminal Number (Max. 10 digits)</th></tr>
<tr><td colspan="5">a – Without area routing code</td></tr>
<tr><th>Data Country Code</th><th>Network Digit</th><th>Private Network Identification code</th><th colspan="2">Private Network Terminal Number</th></tr>
<tr><td>3 digits</td><td>1 digit</td><td>4 digits
3 digits
2 digits</td><td colspan="2">max. 6 digits
max. 7 digits
max. 8 digits</td></tr>
<tr><td>Examples
505
505
505</td><td>
7
7
7</td><td>
2500
564
88</td><td colspan="2">
321654
3217654
32187654</td></tr>
<tr><td colspan="5">b – With area routing code (Note 2)</td></tr>
<tr><th rowspan="2">Data Country Code</th><th rowspan="2">Network Digit</th><th rowspan="2">Private Network Identification code</th><th colspan="2">Private Network Terminal Number</th></tr>
<tr><th>[optional] area routing code</th><th>Terminal Number</th></tr>
<tr><td>3 digits</td><td>1 digit</td><td>4 digits
3 digits
2 digits</td><td>max. 1 digit</td><td>max. 5 digits
max. 6 digits
max. 7 digits</td></tr>
<tr><td>Example
505
(Note 1)</td><td>
7</td><td>
2500
564
88</td><td>
3
4
7</td><td>
32165
321654
3217654</td></tr>
<tr><td colspan="5">NOTE 1 – In this example, the DNIC 5057 has been specifically allocated for the connection of private networks.
NOTE 2 – Some public data networks may be required to undertake routing on the basis of the geographic location of the private network identified by a particular PNIC. To cater for such arrangements (and in particular where there are multiple points of attachment between the public and private network, or where a hierarchical routing system is used in the private network), it may be convenient that the first digit of the private network terminal number designate the geographic area for a particular point of attachment.</td></tr>
</table>

ANNEX F

Guidelines on Numbering of Private Data Networks: Use of PNIC structure for private X.25 networks not attached to the PSPDN

Private packet switched data networks will generally employ a numbering scheme appropriate to the technology used to implement that particular private network. The numbering of private networks will also be influenced by the manner in which they are or may be connected to the public network and the need for individual end systems and terminals to be directly addressed by outside DTEs. The use of PNICs is the recommended method for addressing a large number of terminals on a private X.25 network. (See also Annex C.)

Private data Network Identification Codes (PNICs) may be up to six digits in length. The private network terminal number (Pvt. NTN) may have a length as specified in the following table:

PNIC field length	2	3	4	5	6
Pvt. NTN field length	8	7	6	5	4

Operators of private data networks which are wholly self-contained, but wish to make provision for future connection with a public data network, may establish a numbering scheme for their network which harmonizes with the public data network numbering plan as specified in this Recommendation.

This is achieved by inserting a convenient (dummy) value in the DNIC and PNIC fields of the data terminal number such that these fields have no real significance in identifying terminals on that private network. If the private network numbering plan is structured such that of the available 14-digit address space, only the digits of the Private Network Terminal Number field have any actual significance, (i.e. the DNIC and PNIC fields have no real significance as far as identifying individual DTEs, and can be set to any convenient value) it is a relatively simple operation to map that numbering plan to a fully compatible X.121 plan.

In order that a data terminal number used in a self-contained private network can achieve compatibility with the X.121 number plan, it is required to have the following structure:

Field	**Number of digits**	**Significance within private network**
DNIC Field	4 digits	Of no significance in identifying a network terminal
PNIC Field	2 to 6 digits	Of no significance in identifying a network terminal
Pvt NTN Field	4 to 8 digits	Real and unique significance in identifying a network terminal

For example, based on network architecture, size and scalability considerations, a private network operator determines that 6 digits are required to uniquely identify all the terminals on that particular private network. In order that the private network number has the format of an X.121 number it is structured as XXXXYYYY123456. When the private network is connected to the public network, this number can then be readily mapped to a valid X.121 data terminal number DDDDPPPP123456 where DDDD is the appropriate DNIC and PPPP is the allocated (4 digit) PNIC code. The choice of the PNIC length should be made in accordance with the national arrangements for PNIC allocation.

The allocation of PNICs is a national matter. However, because PNIC codes are a limited and finite resource, allocations of PNIC codes should generally not be made to private networks that are not connected to the public data network. The allocation of a PNIC code is likely to be made when the private network connects (or makes arrangements for connection) to the public network.

ANNEX G

Eligibility criteria and procedures for the allocation of DNICs to global public data networks

G.1 General guidelines

This annex defines eligibility criteria and procedures for the allocation of DNICs (from the 1XXX series) to Global Public Data Networks in order that the ITU can efficiently and objectively handle requests for the allocation of such DNICs in a timely manner, bearing in mind that these codes are a common asset and not the property of any individual network operator or ITU Member country. Accordingly these DNICs cannot be resold, traded or transferred and shall only be used for the purpose of identifying Global Public Data Networks. These DNICs will be recovered if not used, or no longer required by the assignee, or not used in accordance with these guidelines.

The ITU is responsible for the allocation of Data Country Codes using the procedures detailed in 7.3. Administrations within particular countries are then responsible for the allocation of DNICs, generated from their allocated DCC(s), to networks in accordance with their own national laws and regulations.

As far as global DNICs are concerned, the ITU is responsible for their allocation. The ITU determines the eligibility criteria for the allocation of such DNICs. The eligibility criteria may be modified, withdrawn, added to or further modified at any time, as needed, in accordance with the changing telecommunications environment.

A data network identification code for a global public data network is one which does not have a specific geographic, regional or country significance. A DNIC for a global network is allocated to a public data network which provides access in several geographic regions or countries. Such networks are termed "global networks" for the purposes of this Recommendation and will generally have access or switching nodes in a number of geographic areas or countries. Accordingly it may not be possible to determine an appropriate Data Country Code from which a DNIC could or should be allocated.

Although the allocation of DNICs generated from a Data Country Code is a national matter, in order to conserve the available number space, it should be noted that , (National Laws permitting), network operators allocated a Global DNIC would not necessarily need a country specific DNIC to identify the same network.

NOTE 1 – Prior to 1993, the allocation of a DNIC for a non-zoned system was granted to Inmarsat to accommodate the need for a non-zoned public mobile maritime data service, operated by multiple Administrations.

NOTE 2 – The principles of efficiently routing data between networks identified by a zoned-DNIC and networks identified by a global DNIC are subject to further study and the development of appropriate Recommendations.

G.2 Eligibility criteria

Organizations requiring a DNIC for a global data network are required to demonstrate that they meet the eligibility criteria. No precedent should be attributed to any particular assignment for the purpose of supporting new assignments. As the number of available DNICs is quite limited, it is important that all technical alternatives to the assignment of such a DNIC be ascertained. Guidelines (which describe a number of technical alternatives) for the numbering of global data networks are given in Annex H. Organizations which meet – the following criteria are eligible for consideration for the allocation of a global DNIC.

a) *The status of the organization operating the network*

There are two distinct categories of public networks which may be eligible for allocation of a Global DNIC:

- The first category are networks which are operated by International Treaty Organizations (for example: Inmarsat, or the United Nations and its various charter organs).
- The second category are networks which provide a public data transmission service. Such a public data network may be operated by either an Administration or group of Administrations, or an ROA or group of ROAs from several different countries. The network provides open and non-discriminatory access to all users who may wish to subscribe to the service. The network is not closed or "private in nature". The network provides a basic service (for example, access to an X.25, Frame Relay or other data service) and is operated by the holder(s) of a carrier or service licence to provide public data communications in those countries where such regulations are in force.

b) *Geographic characteristics*

The network has an international nature; that is, it spans several countries or geographic regions. The applicant should provide evidence that the network will provide global but not necessarily ubiquitous coverage.

c) *Nature of the service provided and the relation to public data networks*

The service provided is essentially the carriage of public data traffic. The network provides open and non-discriminatory access to all users who may wish to subscribe to the service.

d) *Ability to efficiently interwork with existing public data networks*

The network has the capability to efficiently interwork with existing public data networks and provides a capability for routing transit traffic.

e) *Compliance with national regulations*

Operators of such networks are required to comply with national laws and regulations. The possession of a global DNIC does not necessarily imply a right to operate a data network or service in a particular country or geographic region. Network operators must demonstrate they hold a carrier or service provider’s licence in the countries where the network may operate, if such licences are needed. A global network operator who either holds a global network DNIC or wishes to obtain a Global DNIC should approach the regulatory authorities of the countries in which the network may operate to confirm that the operation of such a network complies with national laws and regulations.

f) *Network size*

The network is likely to have a significant number of points of attachment for interfacing to customer terminal equipment. For subsequent global DNIC code allocation (notwithstanding technical considerations) the applicant must demonstrate that the existing Global DNICs have been utilized in an efficient manner and the existing number plan is approaching maximum utilization.

g) *Technical and operational considerations*

There is a – technical and operational benefit in using a single DNIC from the global network series to identify the network and that the other – technical alternatives available (for example Scenarios 1 and 2 of Annex H) are seen as imposing limitations on the future technical and commercial development of the network. It should be demonstrated that the allocation of the code is the most efficient and effective method for identifying the global network.

G.3 Procedures for the allocation of DNICs to global networks

The assignment of a DNIC to a global network is administered by the ITU. A list of allocated and spare DNICs (at the time of publication) is given in Annex I. Assignments of DNICs to global networks will be published in the ITU Operational Bulletin. A Recapitulatory list of DNICs is published annually in the Operational Bulletin and is also published on the ITU Website.

Since DNICs for global networks are a very limited resource, the need for such an assignment will be assessed in line with the eligibility criteria in force at the time. In order to ensure the conservation of this limited resource, network operators/Administrations are requested to carefully consider their need for such a DNIC and the manner in which the allocated code is to be used.

The process for the allocation of a global DNIC is initiated by a written request to the Director of the TSB from the network operator and must be supported by at least two Administrations (that are Members of the ITU) of the countries in which the network operator intends to operate a public data transmission service. Network operators requiring new or additional DNICs may indicate a preference from the available codes.

The Study Group responsible for the maintenance of this Recommendation will appoint a delegated representative from within the TSB to be responsible for the initial processing of applications for the allocation of global DNICs. All applications for the assignment of a global DNIC will be considered by the above-mentioned Study Group before an allocation is made.

The allocation of a global DNIC is not considered to be a straightforward or simple matter. It is likely to raise substantial technical issues. Accordingly, when the TSB receives an application from a network operator, the TSB will ensure that appropriate discussion takes place between the TSB, the network operator requesting the allocation, the Telecommunication Administrations of the countries in which the network will operate and Study Group experts, to ensure that any technical and operational requirements (such as interconnection with existing public data networks) have been taken into consideration before the final allocation of the code is made.

The onus is placed on the network operator applying for a global DNIC to demonstrate that there is a technical and operational benefit in using a single DNIC from the global network series to identify the network and that the other technical alternatives available (for example Scenarios 1 and 2 of Annex H) are seen as imposing limitations on the technical development or the commercial relationships that the network may wish to establish. It should be demonstrated that the allocation of the code is the most efficient and effective method for identifying the global network. In particular, issues such as the long-term stability of the network's numbering structure should be considered.

If the responsible Study Group determines that the request for the allocation of a global DNIC meets the eligibility criteria defined in G.2, the Study Group will advise the Director of the TSB to approve the allocation.

G.4 Reclamation of Global DNICS

Global DNICs will be recovered if not used, or are no longer required by the network to which they had been allocated or not used in accordance with these guidelines.

ANNEX H

Guidelines for the numbering of global networks

This annex provides guidelines for the numbering of Global data networks. The Global network (which may be operated by a single Administration or group of Administrations or an ROA or group of ROAs from several different countries) provides a public data network transmission service. Figures H.1, H.2 and H.3 describe possible scenarios for the numbering of such networks. Of the three scenarios described, only the third scenario requires the allocation of a specific DNIC from the Global Network series. Procedures and eligibility criteria for the allocation of such DNICs are described in Annex G. It is envisaged that the majority of networks will be accommodated by the arrangements described in scenarios 1 and 2.

Scenario 1

The global network consists of a number of subnetworks each identified by a DNIC appropriate to the country or geographic region in which the subnetwork operates. Figure H.1 shows a global network consisting of three subnetworks. Network 1 is located in the region allocated the DCC = wxy and identified by DNIC = wxyz. Network 2 is located in the region allocated the DCC = abc and identified by DNIC = abcd. Network 3 is located in the region allocated the DCC = klm and identified by DNIC = klmn. The DNICs are allocated according to the national laws of the countries or geographic regions in which the networks operate. Scenario 1 is a special case of the more general arrangement of a number of quite separate public data networks operated by a number of various Administrations/ROAs.

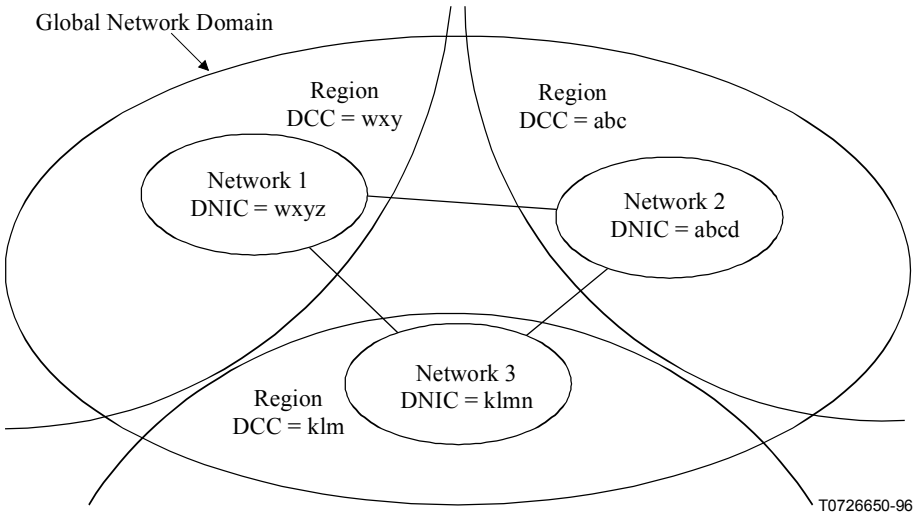


Figure H.1/X.121 – Global network composed of subnetworks identified by a DNIC appropriate to the region in which the subnetwork operates

Scenario 2

The global network consists of a number of subnetworks spanning a number of countries or geographic regions. A single DNIC is used to identify the network. The DNIC used is allocated from one of the countries/geographic regions in which the network operates. Figure H.2 shows a global network consisting of three subnetworks. Each network, although in different regions, uses a common DNIC. For example, Network 1 is located in the region allocated the DCC = wxy and identified by DNIC = wxyz and is the principle or parent network. Networks 2 and 3, although located in other regions, utilize the same DNIC.

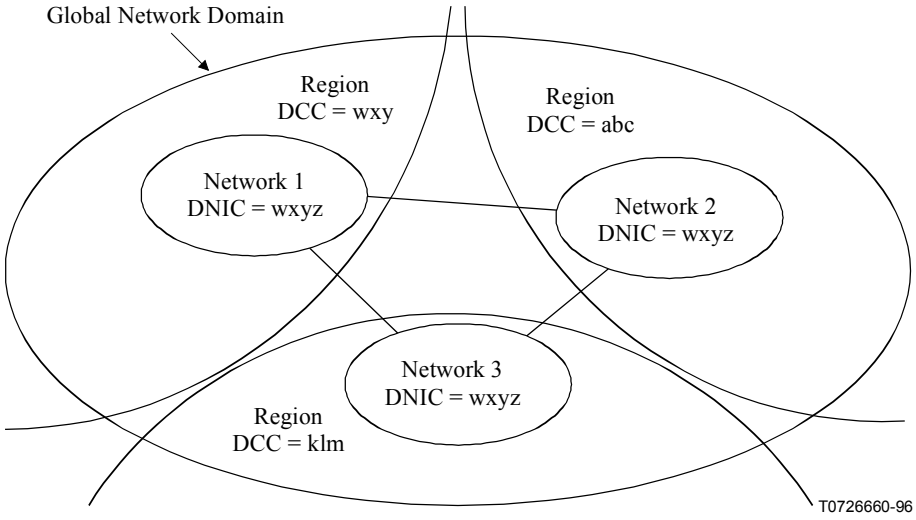


Figure H.2/X.121 – Global network composed of subnetworks identified by a common DNIC allocated to the parent network

Scenario 3

The global network consists of a number of subnetworks spanning a large number of countries or geographic regions. A single DNIC is used to identify the network. The DNIC used is from the series specifically allocated to Global Networks according to the eligibility criteria and allocation procedures detailed in Annex G. For example, Figure H.3 shows a global network consisting of three subnetworks. Although each subnetwork is located in a different geographic region, they are identified by a common DNIC = 1pqr. It is also envisaged that a global network could be designed such that the subnetworks could span several countries or geographic regions. For example, a subnetwork could span geographic regions identified by DCC = prh, DCC = jlp, DCC = hvb, DCC = uks, etc. The interconnection of the subnetworks is considered to be a network implementation issue.

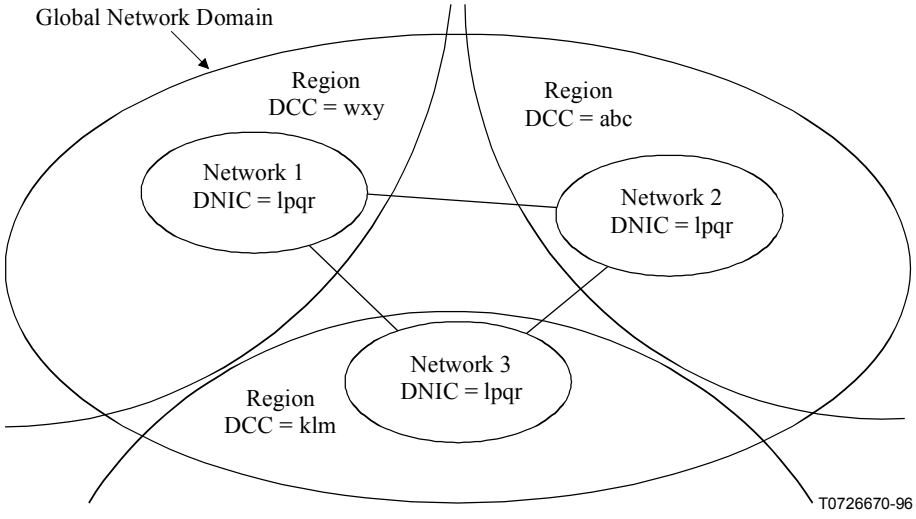


Figure H.3/X.121 – Global network composed of subnetwork identified by a common DNIC = 1pqr allocated from the global series

ANNEX I

List of DNICs allocated to public mobile satellite systems and global public data networks

Code	Public mobile satellite system /global public data network
1110	Spare
1111	Inmarsat mobile satellite data transmission system – Atlantic Ocean-East
1112	Inmarsat mobile satellite data transmission system – Pacific Ocean
1113	Inmarsat mobile satellite data transmission system – Indian Ocean
1114	Inmarsat mobile satellite data transmission system – Atlantic Ocean-West
1115	Spare
1116	Spare
1117	Spare
1118	Spare
1119	Spare

NOTE 1 – Codes 1110 to 1119 are reserved for allocation to the Inmarsat public mobile satellite systems.

NOTE 2 – Codes 1000 to 1109 are reserved for future allocation by the TSB.

NOTE 3 – Codes 1120 to 1999 are available for future allocation by the TSB.

ANNEX J

List of data country or geographical area codes

NOTE – The countries or geographical areas shown in this annex include those that already have code assignments in the case of other public telecommunication networks. The information contained in this annex was correct at the time of publication. Changes are published in the ITU Operational Bulletin. Up to date information is also available via the ITU Website.

Zone 2

Code	Country or geographical area
202	Greece
204	Netherlands (Kingdom of the)
205	Netherlands (Kingdom of the)
206	Belgium
208	France
209	France
210	France
211	France
212	Monaco (Principality of)
213	Andorra (Principality of)
214	Spain
215	Spain

Zone 2

Code	Country or geographical area
216	Hungary (Republic of)
218	Bosnia and Herzegovina
219	Croatia (Republic of)
220	Yugoslavia (Federal Republic of)
222	Italy
223	Italy
224	Italy
225	Vatican City State
226	Romania
228	Switzerland (Confederation of)
229	Switzerland (Confederation of)
230	Czech Republic
231	Slovak Republic
232	Austria
233	Austria
234	United Kingdom of Great Britain and Northern Ireland
235	United Kingdom of Great Britain and Northern Ireland
236	United Kingdom of Great Britain and Northern Ireland
237	United Kingdom of Great Britain and Northern Ireland
238	Denmark
239	Denmark
240	Sweden
242	Norway
243	Norway
244	Finland
246	Lithuania (Republic of)
247	Latvia (Republic of)
248	Estonia (Republic of)
250	Russian Federation
251	Russian Federation
255	Ukraine
257	Belarus (Republic of)
259	Moldova (Republic of)
260	Poland (Republic of)
261	Poland (Republic of)
262	Germany (Federal Republic of)
263	Germany (Federal Republic of)
264	Germany (Federal Republic of)

Zone 2

Code	Country or geographical area
265	Germany (Federal Republic of)
266	Gibraltar
268	Portugal
269	Portugal
270	Luxembourg
272	Ireland
274	Iceland
276	Albania (Republic of)
278	Malta
280	Cyprus (Republic of)
282	Georgia
283	Armenia (Republic of)
284	Bulgaria (Republic of)
286	Turkey
288	Faroe Islands
290	Greenland
292	San Marino (Republic of)
293	Slovenia (Republic of)
294	The Former Yugoslav Republic of Macedonia
295	Liechtenstein (Principality of)

Zone 2: Spare Codes **30**

Zone 3

Code	Country or geographical area
302	Canada
303	Canada
308	Saint Pierre and Miquelon (Collectivité territoriale de la République française)
310	United States of America
311	United States of America
312	United States of America
313	United States of America
314	United States of America
315	United States of America
316	United States of America
330	Puerto Rico
332	United States Virgin Islands
334	Mexico

Zone 3

Code	Country or geographical area
335	Mexico
338	Jamaica
340	Guadeloupe (French Department of) and Martinique (French Department of)
342	Barbados
344	Antigua and Barbuda
346	Cayman Islands
348	British Virgin Islands
350	Bermuda
352	Grenada
354	Montserrat
356	Saint Kitts and Nevis
358	Saint Lucia
360	Saint Vincent and the Grenadines
362	Netherlands Antilles
363	Aruba
364	Bahamas (Commonwealth of the)
365	Anguilla
366	Dominica (Commonwealth of)
368	Cuba
370	Dominican Republic
372	Haiti (Republic of)
374	Trinidad and Tobago
376	Turks and Caicos Islands

Zone 3: Spare Codes **64**

Zone 4

Code	Country or geographical area
400	Azerbaijani Republic
401	Kazakstan (Republic of)
404	India (Republic of)
410	Pakistan (Islamic Republic of)
411	Pakistan (Islamic Republic of)
412	Afghanistan (Islamic State of)
413	Sri Lanka (Democratic Socialist Republic of)
414	Myanmar (Union of)
415	Lebanon
416	Jordan (Hashemite Kingdom of)
417	Syrian Arab Republic

Zone 4

Code	Country or geographical area
418	Iraq (Republic of)
419	Kuwait (State of)
420	Saudi Arabia (Kingdom of)
421	Yemen (Republic of)
422	Oman (Sultanate of)
424	United Arab Emirates
425	Israel (State of)
426	Bahrain (State of)
427	Qatar (State of)
428	Mongolia
429	Nepal
430	United Arab Emirates (Abu Dhabi)
431	United Arab Emirates (Dubai)
432	Iran (Islamic Republic of)
434	Uzbekistan (Republic of)
436	Tajikistan (Republic of)
437	Kyrgyz Republic
438	Turkmenistan
440	Japan
441	Japan
442	Japan
443	Japan
450	Korea (Republic of)
452	Viet Nam (Socialist Republic of)
453	Hongkong
454	Hongkong
455	Macau
456	Cambodia (Kingdom of)
457	Lao People's Democratic Republic
460	China (People's Republic of)
466	Taiwan, China
467	Democratic People's Republic of Korea
470	Bangladesh (People's Republic of)
472	Maldives (Republic of)
480	Korea (Republic of)
481	Korea (Republic of)

Zone 4: Spare Codes **53**

Zone 5

Code	Country or geographical area
502	Malaysia
505	Australia
510	Indonesia (Republic of)
515	Philippines (Republic of the)
520	Thailand
525	Singapore (Republic of)
528	Brunei Darussalam
530	New Zealand
534	Northern Mariana Islands (Commonwealth of the)
535	Guam
536	Nauru (Republic of)
537	Papua New Guinea
539	Tonga (Kingdom of)
540	Solomon Islands
541	Vanuatu (Republic of)
542	Fiji (Republic of)
543	Wallis and Futuna (French Overseas Territory)
544	American Samoa
545	Kiribati (Republic of)
546	New Caledonia (French Overseas Territory)
547	French Polynesia (French Overseas Territory)
548	Cook Islands
549	Samoa (Independent State of)
550	Micronesia (Federated States of)

Zone 5: Spare Codes **76**

Zone 6

Code	Country or geographical area
602	Egypt (Arab Republic of)
603	Algeria (People's Democratic Republic of)
604	Morocco (Kingdom of)
605	Tunisia
606	Libya (Socialist People's Libyan Arab Jamahiriya)
607	Gambia (Republic of the)
608	Senegal (Republic of)
609	Mauritania (Islamic Republic of)
610	Mali (Republic of)
611	Guinea (Republic of)

Zone 6

Code	Country or geographical area
612	Côte d'Ivoire (Republic of)
613	Burkina Faso
614	Niger (Republic of the)
615	Togolese Republic
616	Benin (Republic of)
617	Mauritius (Republic of)
618	Liberia (Republic of)
619	Sierra Leone
620	Ghana
621	Nigeria (Federal Republic of)
622	Chad (Republic of)
623	Central African Republic
624	Cameroon (Republic of)
625	Cape Verde (Republic of)
626	Sao Tome and Principe (Democratic Republic of)
627	Equatorial Guinea (Republic of)
628	Gabonese Republic
629	Congo (Republic of the)
630	Democratic Republic of the Congo
631	Angola (Republic of)
632	Guinea-Bissau (Republic of)
633	Seychelles (Republic of)
634	Sudan (Republic of the)
635	Rwandese Republic
636	Ethiopia (Federal Democratic Republic of)
637	Somali Democratic Republic
638	Djibouti (Republic of)
639	Kenya (Republic of)
640	Tanzania (United Republic of)
641	Uganda (Republic of)
642	Burundi (Republic of)
643	Mozambique (Republic of)
645	Zambia (Republic of)
646	Madagascar (Republic of)
647	Reunion (French Department of)
648	Zimbabwe (Republic of)
649	Namibia (Republic of)
650	Malawi

Zone 6

Code	Country or geographical area
651	Lesotho (Kingdom of)
652	Botswana (Republic of)
653	Swaziland (Kingdom of)
654	Comoros (Islamic Federal Republic of the)
655	South Africa (Republic of)
658	Eritrea

Zone 6: Spare Codes **46**

Zone 7

Code	Country or geographical area
702	Belize
704	Guatemala (Republic of)
706	El Salvador (Republic of)
708	Honduras (Republic of)
710	Nicaragua
712	Costa Rica
714	Panama (Republic of)
716	Peru
722	Argentine Republic
724	Brazil (Federative Republic of)
725	Brazil (Federative Republic of)
730	Chile
732	Colombia (Republic of)
734	Venezuela (Bolivarian Republic of)
736	Bolivia (Republic of)
738	Guyana
740	Ecuador
742	Guiana (French Department of)
744	Paraguay (Republic of)
746	Suriname (Republic of)
748	Uruguay (Eastern Republic of)

Zone 7: Spare Codes **79**

ANNEX K

Definitions regarding the international numbering plan for public data networks

K.1 data country code: In the context of the international numbering plan for public data networks, a component of the international X.121 format consisting of three digits allocated by the ITU-T and published in this Recommendation.

K.2 data network identification code: In the context of the international numbering plan for public data networks, a component of the international X.121 format consisting of four digits. The first three digits are regarded as the data country code, the fourth digit identifies a network in that country according to this Recommendation.

NOTE 1 – The digit allocated by countries to establish, together with the data country code, the data network identification code should be notified to the TSB.

NOTE 2 – The TSB publishes a list of data network identification codes in the Operational Bulletin.

K.3 escape code: In the context of the international numbering plan for public data networks, an indicator consisting of one digit which indicates that the following digits are a number from a different numbering plan.

NOTE – An escape code is part of the international X.121 format.

K.4 international data number: In the context of the international numbering plan for public data networks, the address information comprising the data country code and the national number, or the data network identification code and the (national) network terminal number, according to this Recommendation.

K.5 international data number format: In the context of the international numbering plan for public data networks, a numbering plan format comprising the digits of the international data number, according to this Recommendation.

K.6 international X.121 format: In the context of the international numbering plan for public data networks, a format consisting of digits which are to be transferred across international boundaries, according to this Recommendation.

NOTE 1 – See also "international data number format".

NOTE 2 – Escape codes, if required, are part of the international X.121 format and are followed by digits of another international numbering plan.

NOTE 3 – Prefixes do not belong to the international X.121 format.

K.7 numbering plan: In the context of the international numbering plan for public data networks, the specification given in this Recommendation.

NOTE – Other international numbering plans are contained in ITU-T E.164 and F.69.

K.8 numbering plan interworking: In the context of the international numbering plan for public data networks, the methods to establish interworking between networks applying different international numbering plans.

NOTE – Examples of numbering plan interworking are given in ITU-T E.166/X.122 and I.332.

K.9 prefix: In the context of the international numbering plan for public data networks, an indicator consisting of one or more digits, allowing the selection of different numbering formats. Prefixes are not part of the international X.121 format.

NOTE – Prefixes are a national matter.

K.10 public data network: A network with the following properties is generally regarded as public:

- a network that is openly accessible to the general public and allows non-discriminatory access;
- a network which provides a basic carriage service;
- a network operated by the holder of a carrier or service licence (where such requirements exist);
- a network that has the capability to support connectivity (via a standard network to network interface protocol, e.g. X.75) to other networks for the purpose of routing of traffic between networks.

NOTE – The definition of a public data network is open to interpretation and is dependent on national laws and regulations. However, networks allocated DNICs are likely to be required to fulfil certain obligations (according to the National Laws under which they operate). Traditional approaches have assumed that only public data networks are allocated DNICs.

K.11 private data network: A network which is operationally private by nature and not universally available to the general public. Where such networks have a significant requirement to utilize the public network numbering plan, this can be achieved by use of a PNIC.

K.12 global public data network: A data network which has the attributes of a public network and provides access in several geographic regions or countries.

ANNEX L

Notification of the assignment of Data Network Identification Codes

Assignments by Administrations of network digits will be published in the ITU Operational Bulletin. A Recapitulatory list of DNICs is published annually in the Operational Bulletin. A consolidated list of Data Network Identification Codes (DNICs) is also published on the ITU Website. In order to keep this list up to date, Administrations are requested to check the accuracy of the published information and to inform the TSB of any changes that should be made. Administrations should notify the TSB of any new assignments, re-allocations or removals of network digits by completing the notification form shown in this Annex (and which is also published with the Recapitulatory list). A separate form should be used for each DNIC.

Network operators/service providers should inform the TSB of any changes related to the company or organization operating the network such as the company name or contact information.

This Notification form should be returned to:

International Telecommunication Union

Telecommunication Standardization Bureau (TSB)

Place des Nations
CH – 1211 Genève 20
Suisse
Tel. : +41 22 730 5222
Fax : +41 22 730 5853
Email : tsbedh@itu.int

Notification for the assignment of Data Network Identification Codes* (DNIC) by the Administrations	
Name and address of Administration:	
** DNIC No.:	
# Name of network to which a DNIC is allocated:	
Locality of the Network (Country or Geographical Area):	
Date of notification:	
Postal address of the service provider and from which additional information may be requested: Tel: Telex: Fax: email	_____ _____ _____ _____ _____ _____
Your reference:	
Date:	
Signature:	

* Further details, if any, concerning the network for which this DNIC has been assigned may be attached to this form.

\# If the DNIC is shared amongst a number of networks show number range allocations. For example DNIC 7501 is shared amongst a number of networks – 75011 allocated to "Network-A" and 75012 to 75014 allocated to "Network-B".

** A separate form should be used for each DNIC.

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Geneva, 2001