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OF ITU

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

International operation – Numbering plan of the international telephone service

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The international public telecommunication numbering plan

ITU-T Recommendation E.164

ITU-T

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ITU-T Recommendation E.164

The international public telecommunication numbering plan

Summary

This Recommendation provides the number structure and functionality for the four categories of numbers used for international public telecommunication: geographic areas, global services, Networks and Groups of Countries (GoC). For each of the categories, it details the components of the numbering structure and the digit analysis required to successfully route the calls. Annex A provides additional information on the structure and function of international public telecommunication numbers (hereafter referred to as "international E.164-numbers"). Annex B provides information on network identification, service parameters, calling/connected line identity, dialling procedures and addressing for geographic-based ISDN calls. Specific E.164-based applications, which differ in usage, are defined in separate Recommendations.

Source

ITU-T Recommendation E.164 was approved on 24 February 2005 by ITU-T Study Group 2 (2005-2008) under the WTSA Resolution 1 procedure.

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.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

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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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1 Introduction

The rapid advances in telecommunication technology coupled with increased diversification of customer demands served by a number of different types of dedicated public switched networks (fixed and mobile telephone, data, etc.) have created a need to provide a uniform customer access to the multitude of network structures (i.e., circuit, packet, IP-based, etc.). Implementation of these network architectures is ongoing in a number of countries and eventually these will be able to carry the full range of existing and new services.

To provide a broad base for these new arrangements, numbering has been kept compatible with that originally established for international telephone service.

2 Scope

This Recommendation provides the number structure and functionality for the four categories of numbers used for international public telecommunication: geographic areas, global services, Networks and Groups of Countries (GoC). For each of the categories, it details the components of the numbering structure and the digit analysis required to successfully route the calls. Annex A provides additional information on the structure and function of international public telecommunication numbers (hereafter referred to as "international E.164-numbers"). Annex B provides information on network identification, service parameters, calling/connected line identity, dialling procedures and addressing for geographic-based ISDN calls. In addition, this Recommendation describes a resource that enables the conduct of trials of potential new international public correspondence services. Specific E.164-based applications, which differ in usage, are defined in separate Recommendations, e.g., ITU-T Rec. E.168 – Application of E.164 numbering plan for UPT.

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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

– ITU-T Recommendation E.123 (2001), *Notation for national and international telephone numbers, e-mail addresses and Web addresses*.

– ITU-T Recommendation E.129 (2002), *Presentation of national numbering plans*.

– ITU-T Recommendation E.131 (1988), *Subscriber control procedures for supplementary telephone services*.

– ITU-T Recommendation E.164.1 (2005), *Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated identification codes (ICs)*.

– ITU-T Recommendation E.164.2 (2001), *E.164 numbering resources for trials*.

– ITU-T Recommendation E.164.3 (2001), *Principles, criteria and procedures for the assignment and reclamation of E.164 country codes and associated identification codes for groups of countries*.

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

– ITU-T Recommendation E.168 (2002), *Application of E.164 numbering plan for UPT*.

– ITU-T Recommendation E.169 (1998), *Application of Recommendation E.164 numbering plan for universal international freephone numbers for international freephone service*.

– ITU-T Recommendation E.169.2 (2000), *Application of Recommendation E.164 numbering plan for universal international numbers for international telecommunications services using country codes for global services*.

– ITU-T Recommendation E.169.3 (2000), *Application of Recommendation E.164 numbering plan for universal international shared cost numbers for international shared cost service*.

– ITU-T Recommendation E.190 (1997), *Principles and responsibilities for the management, assignment and reclamation of E-series international numbering resources*.

– ITU-T Recommendation E.191 (2000), *B-ISDN addressing*.

– ITU-T Recommendation E.213 (1988), *Telephone and ISDN numbering plan for land mobile stations in public land mobile networks (PLMN)*.

– ITU-T Recommendation E.214 (2005), *Structure of the land mobile global title for the signalling connection control part (SCCP)*.

– ITU-T Recommendation E.331 (1991), *Minimum user-terminal interface for a human user entering address information into an ISDN terminal*.

– ITU WTSA (Florianopolis 2004) Resolution 20, *Procedures for allocation and management of international telecommunication numbering, naming, addressing and identification resources*.

– ETS 300 738 ed.1 (1997-06), *Human Factors (HF); Minimum Man-Machine Interface (MMI) to public network based supplementary services*.

– TS 100 907 V7.1.0 (1999-08), *Digital cellular telecommunications system (Phase 2+) (GSM); Man-Machine Interface (MMI) of the Mobile Station (MS) (GSM 02.30 version 7.1.0 Release 1998)*.

4 Definitions

Within the integrated service environment, the terms used for all networks and services must be compatible and consistent. This Recommendation defines the following terms.

4.1 address

F: *adresse*

S: *dirección*

A string or combination of decimal digits, symbols, and additional information which identifies the specific termination point(s) of a connection in a public network(s) or, where applicable, in interconnected private network(s).

4.2 country code (CC) for geographic areas

F: *indicatif de pays pour zones géographiques*

S: *indicativo de país para áreas geográficas*

The combination of one, two or three digits identifying a specific country, countries in an integrated numbering plan, or a specific geographic area.

4.3 country code (CC) for global services

F: *indicatif de pays pour les services mondiaux*

S: *indicativo de país para servicios mundiales*

A 3-digit country code used to identify the global service.

4.4 country code (CC) for groups of countries

F: *indicatif de pays pour les groupes de pays*

S: *indicativo de país (cc) para grupos de países*

A shared 3-digit country code used in combination with a Group Identification Code to identify a group of countries.

4.5 country code (CC) for networks

F: *indicatif de pays pour les Réseaux*

S: *indicativo de país para Redes*

A shared 3-digit Country Code used in combination with an identification code to identify an international Network.

4.6 country code (CC) for trials

F: *indicatif de pays pour les essais*

S: *indicativo de país para (cc) para ensayos*

A shared 3-digit Country Code used in combination with a 3-digit Trial Identification Code to identify a Trial.

4.7 destination network (DN) code

F: *indicatif de réseau de destination (DN)*

S: *indicativo de red de destino (DN)*

An optional code field within the international E.164-numbering plan which identifies the destination network serving the destination subscriber. It performs the destination network selection function of the NDC. In some instances it can be combined with a trunk code to form the NDC. The DN code can be a decimal digit or a combination of decimal digits (not including any prefix).

4.8 dialling plan

F: *plan de numérotation*

S: *plan de marcación*

A string or combination of decimal digits, symbols, and additional information that defines the method by which the numbering plan is used. A dialling plan includes the use of prefixes, suffixes, and additional information, supplemental to the numbering plan, required to complete the call.

4.9 global service

F: *service mondial*

S: *servicio mundial*

A service defined by the ITU-T, provisioned on the public switched network, to which the ITU-T has assigned a specific Country Code to enable the provision of that international service between two or more countries and/or integrated numbering plans.

4.10 global subscriber number (GSN)

F: *numéro d'abonné mondial (GSN)*

S: *número de abonado mundial (GSN)*

The portion of the international E.164-number that identifies a subscriber for a particular global service.

4.11 group identification code (GIC)

F: *code d'identification de groupe (CIG)*

S: *código de identificación de grupo (CIG)*

A one-digit identification code assigned to a Group of Countries.

4.12 group identification code administrator (GICA)

F: *administrateur de code d'identification de groupe (GICA)*

S: *administrador de códigos de identificación de grupo (GICA)*

The organization entrusted by the assignee with the administration and management of the numbering resources behind a specific CC+GIC.

4.13 groups of countries (GoC)

F: *groupe de pays (GoC)*

S: *grupo de países (GoC)*

Several ITU- or UN-recognized countries sharing the same CC+GIC.

4.14 identification code (IC)

F: *code d'identification (IC)*

S: *indicativo de identificación (SC)*

The code subsequent to a country code for Networks that uniquely identifies an international Network.

4.15 international prefix

F: *préfixe international*

S: *prefijo internacional*

A digit or combination of digits used to indicate that the number following is an international E.164-number.

4.16 international public telecommunication number

F: *numéro de télécommunications publiques internationales*

S: *número de telecomunicaciones públicas internacionales*

A string of decimal digits that, for a geographic country code, uniquely identifies a subscriber or a point where a service is provided. For the case of a global service code, it identifies the subscriber of the service. For Networks, it identifies a subscriber of the Network.

An international public telecommunication number (*hereafter referred to as "international E.164-numbers"*) can act in the "role" of both a name and an address. Portability is reducing a number's role as an address. Numbers are increasingly acting in the role of a name only.

The number, which includes the country code and subsequent digits, but not the international prefix, contains the information necessary to route the call to this termination point on a public network (it may also contain the supplementary information necessary to forward it on a private network). It is sometimes referred to as an "E.164 number" or "international number".

4.17 name

F: *nom*

S: *nombre*

A name is a combination of characters and is used to identify subscribers. Characters may include numbers, letters and symbols.

4.18 national (significant) number [N(S)N]

F: *numéro (significatif) national [N(S)N]*

S: *número (significativo) nacional [N(S)N]*

That portion of the international E.164-number that follows the country code for geographic areas. The national (significant) number consists of the National Destination Code (NDC) followed by the Subscriber Number (SN). The function and format of the N(S)N is nationally determined.

4.19 national (trunk) prefix

F: *préfixe (interurbain) national*

S: *prefijo (interurbano) nacional*

A digit or combination of digits used by a calling subscriber, making a call to a subscriber in his own country but outside his own numbering area. It provides access to the automatic outgoing trunk equipment.

4.20 national destination code (NDC)

F: *indicatif national de destination (NDC)*

S: *indicativo nacional de destino (NDC)*

A nationally optional code field, within the international public telecommunication numbering plan (hereafter referred to as the "international E.164-numbering plan"), which – combined with the Subscriber's Number (SN) – will constitute the national (significant) number of the international E.164-number for geographic areas. The NDC will have a network and/or trunk code selection function.

The NDC can be a decimal digit or a combination of decimal digits (not including any prefix) identifying a numbering area within a country (or group of countries included in one integrated numbering plan or a specific geographic area) and/or network/services.

4.21 Network

F: *Réseau*

S: *Red*

Internationally interconnected physical nodes and operational systems operated and maintained by one or more ROAs to provide public telecommunications services. Private networks are not included in this definition. Note that the use of capital "N" in Networks indicates that this definition applies.

4.22 numbering plan

F: *plan de numérotage*

S: *plan de numeración*

A numbering plan specifies the format and structure of the numbers used within that plan. It typically consists of decimal digits segmented into groups in order to identify specific elements used for identification, routing and charging capabilities, e.g., to identify countries, national destinations and subscribers.

A numbering plan does not include prefixes, suffixes, and additional information required to complete a call.

The national[1] numbering plan is the national implementation of the international E.164-numbering plan.

4.23 prefix

F: *préfixe*

S: *prefijo*

A prefix is an indicator consisting of one or more digits, that allows the selection of different types of number formats, networks and/or service.

4.24 subscriber number (SN)

F: *numéro d'abonné (SN)*

S: *número de abonado (SN)*

The portion of the international E.164-number that identifies a subscriber in a network or numbering area.

4.25 trial identification codes

F: *codes d'identification d'essai*

S: *código de identificación de ensayo*

Three-digit identification codes that uniquely identify international public correspondence service trial participants.

4.26 trials

F: *essais*

S: *ensayos*

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[1] For the purposes of this Recommendation, "national" is defined as a country, group of countries, global service or Network.

The temporary implementation of a proposed new international public correspondence service for the purpose of determining its technical, operational, and business viability.

4.27 trunk code (TC)

F: *indicatif interurbain (TC)*

S: *indicativo interurbano (TC)*

A digit or combination of digits, not including the national (trunk) prefix, identifying the numbering area within a country (or group of countries included in one integrated numbering plan or a specific geographic area).

The trunk code has to be used before the called subscriber's number when the calling and called subscribers are in different numbering areas. The trunk code is a particular application of NDC.

5 Abbreviations

This Recommendation uses the following abbreviations.

CC	Country Code
CCITT	International Telegraph and Telephone Consultative Committee
CDLI	Called Line Identity
CLI	Calling Line Identity
COLI	Connected Line Identity
DN	Destination Network
GoC	Groups of Countries
GIC	Group Identification Code
GICA	Group Identification Code Administrator
GSN	Global Subscriber Number
IC	Identification Code
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
NDC	National Destination Code
NPI	Numbering Plan Identifier
N(S)N	National (Significant) Number
NT2	Network Termination 2
PSTN	Public Switched Telephone Network
ROA	Recognized Operating Agency
SA	Sub-Address
SN	Subscriber Number
TIC	Trial Identification Code
TC	Trunk Code
TON	Type of Number

TSB Telecommunication Standardization Bureau

UIFN Universal International Freephone Number

6 International E.164-number structure

This clause identifies four different structures for the international E.164-number:

- International E.164-number for geographic areas.
- International E.164-number for global services.
- International E.164-number for Networks.
- International E.164-number for Groups of Countries.

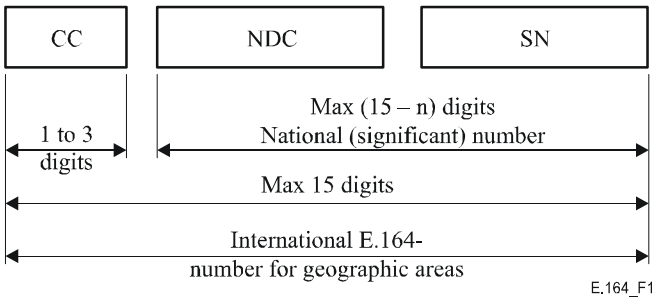
6.1 International E.164-number length

The ITU-T recommends that the maximum number of digits for the international geographic, global services, Network and Groups of Countries applications should be 15 (excluding the international prefix). Administrations are invited to do their utmost to limit the digits to be dialled to the degree possible consistent with the service needs.

6.2 Structure of the international E.164-number

6.2.1 The international E.164-number for geographic areas (Figure 1) is composed of a variable number of decimal digits arranged in specific code fields. The international E.164-number code fields are the Country Code (CC) and the National (Significant) Number N(S)N.

Figure 1 shows the international E.164-number structure for geographic areas.



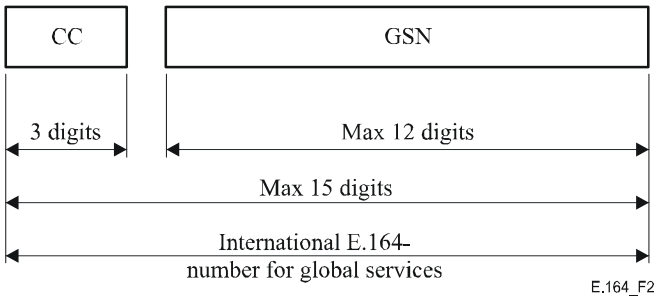
CC Country Code for geographic area
NDC National Destination Code
SN Subscriber Number
n Number of digits in the country code

NOTE – National and international prefixes are not part of the international E.164-number for geographic areas.

Figure 1/E.164 – International E.164-number structure for geographic areas

6.2.2 The international E.164-number for global services (Figure 2) is composed of decimal digits that vary depending on the specific service. The international service number code fields are the 3-digit country code for global services and the Global Subscriber Number (GSN).

Figure 2 shows the international E.164-number structure for global services. The use of this format is service specific and is dependent on the numbering requirements as detailed in the appropriate Recommendation, e.g., ITU-T Rec. E.169 – Application of Recommendation E.164 numbering plan for universal international freephone numbers for international freephone service.



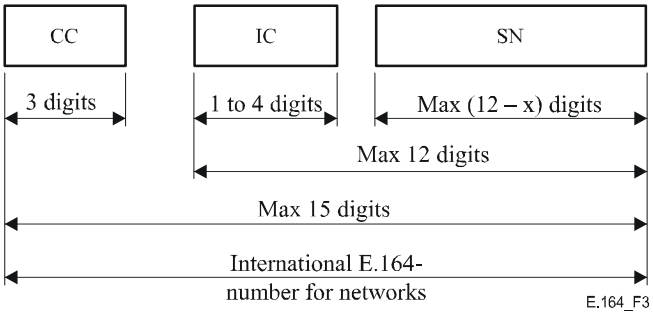
CC Country Code for global services
GSN Global Subscriber Number

NOTE – National and international prefixes are not part of the international E.164-number for global services.

Figure 2/E.164 – International E.164-number structure for global services

6.2.3 The international E.164-number for Networks (Figure 3) is composed of decimal digits arranged in three code fields. The code fields are the three-digit Country Code (CC) for Networks field, the IC field, which varies in length from one to four digits, and the Subscriber Number (SN), which can be up to 15 minus the number of digits in the CC and IC fields.

Figure 3 shows the international E.164-number for Networks.



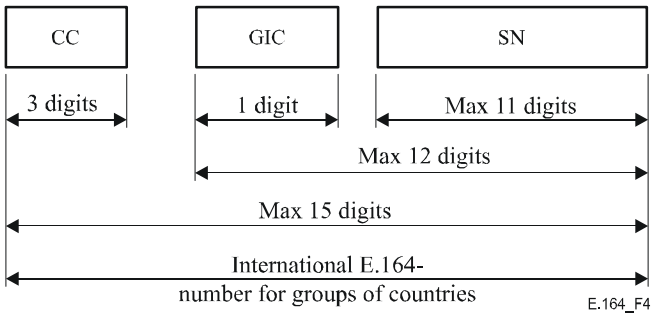
CC Country Code for Networks
IC Identification Code
SN Subscriber Number
x Number of digits in Identification Code

NOTE – National and international prefixes are not part of the international E.164-number for Networks.

Figure 3/E.164 – International E.164-number structure for Networks

6.2.4 The international E.164-number for Groups of Countries (Figure 4) is composed of decimal digits arranged in three code fields. The code fields are the three-digit Country Code (CC) for Groups of Countries field, the Group Identification Code (GIC) field, which is fixed at one digit, and the Subscriber Number (SN) field which can be a maximum of 11 digits.

Figure 4 shows the international E.164-number for Groups of Countries.



CC Country Code for Groups of Countries
GIC Group Identification Code
SN Subscriber Number

NOTE – National prefixes are not part of the international E.164-number for Groups of Countries.

Figure 4/E.164 – International E.164-number structure for Groups of Countries

6.3 Assignment of Country Codes (CCs)

6.3.1 Country codes may be assigned to either geographic areas, global services, Networks or Groups of Countries.

6.3.2 The status of country codes for geographic areas, global services, Networks and Groups of Countries is published periodically by the TSB.

6.3.3 All spare country codes will be assigned on a three-digit basis.

6.3.4 The assignment and reservation of country codes shall follow the criteria and procedures as defined in ITU-T Rec. E.164.1, for geographic areas, global services and Networks; in ITU-T Rec. E.164.3 for Groups of Countries and in ITU-T Rec. E.164.2 for Trials.

6.4 Assignment of Identification Codes, Group Identification Codes and Trial Identification Codes

6.4.1 The list of assigned and reserved identification codes with their associated country codes is published periodically by the TSB.

6.4.2 The assignment and reservation of identification codes shall follow the criteria and procedures as defined in ITU-T Rec. E.164.1 or E.164.2 or E.164.3 as appropriate.

7 International E.164-number for geographic areas

Principles, criteria and procedures for the assignment of international E.164-numbers for geographic areas may be found in ITU-T Recs E.190 and E.164.1.

7.1 Country Code for geographic areas

The Country Code is used to select the destination country[2] (i.e., the country where the identified subscriber is registered or the country containing a point where the service is provided) and varies in length from 1 to 3 digits.

[2] Whenever the term "country", "destination country" or "originating country" is used in this clause, it identifies a specific country, a group of countries in an integrated numbering plan or a specific geographical area.

7.2 National (significant) number

7.2.1 The ITU-T recommends that the maximum number of digits of the National (Significant) Number, N(S)N, should be equal to 15 – *n*, where *n* is the number of digits of the country code.

7.2.2 The N(S)N is used to select the destination subscriber (in clause 7, the term "subscriber" means a human subscriber or a point where a service is provided). In selecting the destination subscriber, however, it may be necessary to select a destination network. To accomplish this selection, the N(S)N code field comprises a National Destination Code (NDC) followed by the Subscriber's Number (SN). The NDC and SN may be inseparably connected in some national applications to form a single composite dialling sequence.

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

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

b) a Trunk Code (TC);

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

The NDCs of an Administration may consist of one of the above structures or others as defined by national numbering plan administrators.

NOTE – The sequences DN-TC and TC-DN are a national matter. The various NDC options (TC/DN) are reflected in Figure 5.

7.2.4 The SN varies in length depending on the requirements of the destination country.

7.2.5 Where appropriate, identification of a specific network within the destination country shall be through the use of a NDC incorporated into the international E.164-number.

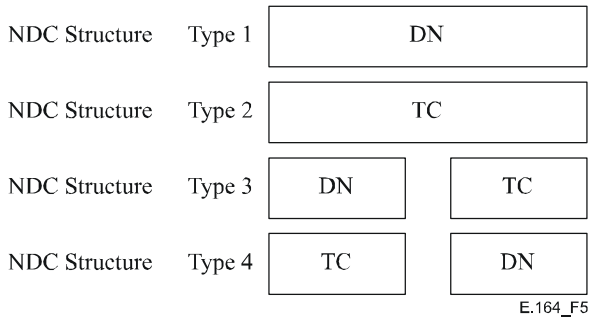


Figure 5/E.164 – Options for NDC structure

7.3 Prefixes

7.3.1 Applications

A prefix is an indicator consisting of one or more digits that allows the selection of different types of number formats, networks and/or service. Prefixes are not part of the international E.164-number and are not signalled over international boundaries. It is a national matter to decide whether prefixes can be signalled between domestic networks.

Prefixes can also be used for carrier network and service selection nationally.

7.3.2 National (trunk) prefix

The national (trunk) prefix is not included in N(S)N. Accordingly, in the international service, the national (trunk) prefix of the country of destination must not be dialled.

It should be noted that, in some countries, it is customary to consider for national purposes that the national (trunk) prefix is included in the national dialling plan, which is then not the N(S)N. A careful distinction must therefore be made between such national definition or practice and the ITU-T definition, which is internationally valid. In order to avoid misunderstanding, the ITU-T definition includes the word "significant" between brackets, reading as follows: "national (significant) number".

It is recommended by the ITU-T that the national numbering plan administrator of countries that have not yet adopted a trunk prefix for access to their national automatic trunk network adopt a prefix composed of a single digit, preferably 0. Irrespective of what digit is adopted as a trunk prefix, this digit should be precluded from being used also as a first digit of the N(S)N.

The reasons for this recommendation are:

– to provide the maximum degree of standardization of the national (trunk) prefixes used in different countries, so that dialling is made as easy as possible for a person travelling from one country to another;
– to minimize the number of digits to be dialled;
– to reduce user problems which arise because of the requirement, in automatic international operation, that the trunk prefix of the country of destination must not be dialled.

In the automatic international service, following the international prefix and country code of the called country, the caller should dial the N(S)N of the called subscriber (i.e., without dialling the national (trunk) prefix).

The use and printing of symbols and separators in national and international E.164-numbers are detailed in ITU-T Rec. E.123.

7.4 National numbering plan

7.4.1 Characteristics of a national numbering plan

Each national numbering plan administrator should give the most careful consideration to the preparation of a national numbering plan for its own network. This plan should be designed:

a) to allow generous provision for future growth in the number of subscribers and services to the national system;
b) with the consideration that the national network will ultimately be accessible to subscribers in other countries by means of international dialling procedures;
c) so that subscribers would always be called by either the same N(S)N or SN, a national matter, regardless of where the call originated from within the national numbering plan.

The numbering plan will be based on and evolve from the existing numbering plans applicable to national and international public telephone networks.

Where multiple destinations (e.g., ROAs or network operators) serve the called party's geographical area, the national numbering plan in the country of destination shall provide for discrimination between these ROAs or network operators.

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

Prefixes and other information concerned with identifying selection procedures or Network Service parameters (such as Quality of Service or transit delay) do not form part of the number.

An integrated numbering plan shall include an unambiguous identification of a particular country. In addition, the number will identify networks within these countries, if required.

7.4.2 Notification of national numbering changes

National numbering plan administrators should advise the ITU-T, on a non-binding informational basis, of significant national numbering plan changes well in advance of the event, so that this information can be published by the TSB. It is recommended that this notification be submitted at least 2 years in advance to ensure formal and timely information to the widest possible distribution.

National numbering plan administrators are encouraged to inform other national numbering plan administrators of significant national numbering plan changes well in advance of its implementation. ITU-T Rec. E.129 provides a standardized method for presenting the national numbering plans of all countries (i.e., each country's national implementation of the international E.164-numbering plan) as well as a method by which this information (and changes to this information) is made available to all interested parties.

7.5 Digit analysis

7.5.1 In order to determine:

– the country of destination;

– the most appropriate network routing;

– the proper charging,

the originating country must analyse a number of digits of the international E.164-number. The length of the National Destination Code (NDC) increases the potential requirement for number analysis because it provides for a combination of either a Trunk Code (TC) and/or a network identification function. Careful consideration should be given to the preparation of the National Destination Code (NDC) assignments.

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

– four digits of the N(S)N in the case of a country with a three-digit country code;

– five digits of the N(S)N in the case of a country with a two-digit country code;

– six digits of the N(S)N in the case of a country with a one-digit country code.

7.5.3 The national numbering plan of a country should be such that digit analysis for incoming international calls need not exceed established limits applicable to the N(S)N but allows:

a) determination of routing that reflects economic and other appropriate network factors;

b) distinctions for charging in those countries where distinctions are applicable.

8 International E.164-number for global services

The numbering plan for global services is service specific. Each use of an E.164 country code for a global service needs to comply with numbering assignment principles, as specified in ITU-T Rec. E.190, as identified for the specific service, and the criteria and procedures as specified in ITU-T Rec. E.164.1. Refer to the appropriate numbering Recommendation for documentation regarding the numbering scheme and any service specific principles, e.g., ITU-T Rec. E.168 – Application of E.164 numbering plan for UPT.

The international E.164-number for global services is composed of the 3-digit country code applied for the global service and the Global Subscriber Number (GSN). The maximum length is 15 digits (see Figure 2).

8.1 Country Code for global services

The country code for a global service is used to identify the global service and is three digits in length.

8.2 Global Subscriber Number

The Global Subscriber Number (GSN) consists of the digits following the country code for the global service. The structure and functionality of these digits is application dependent and will be addressed in the appropriate global service numbering Recommendations, e.g., ITU-T Rec. E.169 – Application of E.164 numbering plan for universal international freephone numbers for international freephone service.

8.3 Digit analysis

Digit analysis for global services is service specific. In order to determine the specific global service, and the call routing and charging, the digit analysis should not exceed seven digits, e.g., three-digit CC + 4 digits of N(S)N. Refer to the appropriate ITU-T numbering Recommendation for documentation regarding the number analysis requirements for the specific global service.

8.4 Evolution path to an international E.164-number for global services

The development of a numbering plan for a global service should consider the possibility for the subscribers, who already have a number for the same comparable domestic service, to evolve their domestic Subscriber Number (SN) to the Global Subscriber Number (GSN).

It is assumed that ITU-T recognized global services would be location independent.

If in the implementation of the global service there are duplicate numbering requests and there are no service specific resolution procedures, then the duplicate request procedures should be invoked as defined in ITU-T Rec. E.169 – Application of E.164 numbering plan for universal international freephone numbers for international freephone service.

9 International E.164-number for Networks

Principles, criteria and procedures for the assignment of international E.164-numbers for international Networks may be found in ITU-T Recs E.164.1 and E.190.

International E.164-numbers used by Networks consist of three parts: a shared three-digit E.164 country code for Networks, an identification code, and a subscriber number (see Figure 3). The maximum length of international E.164-numbers used by Networks is fifteen (15) digits.

9.1 Country Code for Networks

These digits are the first three digits of international E.164-numbers for Networks. A country code for networks is a shared combination of three digits and is used in combination with the Identification Code to identify Networks.

9.2 Identification Code

An Identification Code (IC) is a combination of one to four digits used for identification of Networks. These digits follow the shared country code field within international E.164-numbers for Networks.

9.3 Subscriber Numbers

Subscriber Numbers are the remaining digits that follow the shared country code and the IC. The structure and functionality is determined by the network operator. The maximum length of the subscriber number is 15 minus the total of the CC and IC digits. The minimum length of the subscriber number is:

– nine digits with a one-digit IC;

– eight digits with a two-digit IC;

– seven digits with a three-digit IC;
– six digits with a four-digit IC.

Additionally, resources shorter in length than the required minimum number of digits are authorized following the CC + IC, on condition that the quantity of these resources is limited to 10% of the total capacity of the numbering resources for Networks determined by the network operator.

9.4 Digit analysis

For calls utilizing the international E.164-number for Networks, the maximum number of digits to be analysed is seven, which includes the three digits of the E.164 country code, the identification code, and the initial significant digits (if any) of the subscriber number. A minimum of the 3-digit country code and IC must always be analysed to determine the appropriate routing and charging.

10 International E.164-Number for Groups of Countries

Principles, criteria and procedures for the assignment of international E.164-numbers for Groups of Countries may be found in ITU-T Recs E.164.3 and E.190.

International E.164-numbers used by Groups of Countries consist of three fields: a shared three-digit E.164 Country Code for Groups of Countries; a one-digit Group Identification Code; and a Subscriber Number to a maximum length of eleven digits (see Figure 4). The maximum length of international E.164-number used by Groups of Countries is 15 digits.

10.1 Country Code for Groups of Countries

These are the first three digits of international E.164-number for Groups of Countries. A country code for Groups of Countries is a shared (i.e., shared between GoC's) three-digit CC used in combination with a single-digit GIC to uniquely identify a Group of Countries.

10.2 Group Identification Code

A Group Identification Code (GIC) is a single-digit code used to uniquely identify a Group of Countries. The GIC immediately follows the shared country code field within the international E.164-number for Groups of Countries.

10.3 Subscriber Numbers

Subscriber Numbers (SN) are the digits (to a maximum of eleven) which follow the CC + GIC fields and are used to identify individual subscribers or terminals with the GoC. The minimum length of the subscriber number is nine digits, although a maximum of 10% of the total capacity of the numbering resources following the CC + GIC determined by the GoC is authorized to be shorter than nine digits in length. The structure and functionality of subscriber numbers is determined by the GoC and are administered and managed by the Group Identification Code Administrator (GICA).

10.4 Digit analysis

The maximum number of digits to be analysed for the processing of calls to international E.164-numbers for Groups of Countries is seven. This includes the CC field (three-digit) plus the GIC field (one-digit) plus the first three digits of the Subscriber Number (SN). A minimum of four digits (i.e., CC + GIC) must always be analysed to determine the appropriate routing and charging.

11 International E.164-numbering resources for Trials

An E.164 Country Code (i.e., 991) has been allocated to enable the conduct of trials of new international public correspondence services. Additionally, a three-digit Trial Identification Code (TIC) field will be used in conjunction with the shared country code to uniquely designate trial numbers and participants. Details pertaining to the use of and the restrictions associated with this resource are contained in ITU-T Rec. E.164.2.

12 International prefix

It is recommended by the ITU-T that national numbering plan administrators that have not yet introduced automatic international operation, or national numbering plan administrators and international network operators that are, for various reasons, defining or revising their numbering plans, adopt an international prefix (a code for access to the international automatic network) composed of the two digits 00[3].

In accordance with ITU-T Rec. E.123, the symbol "+" is recommended to indicate that an international prefix is required.

13 Recommendation history

ITU-T Rec. E.29, first issued in 1960 and subsequently revised. The first version was a renumbering of CCIF no. 26.

ITU-T Rec. E.161, first issued in 1964, was a renumbering of E.29. It was subsequently revised several times.

ITU-T Rec. E.163, first published in 1980, was the result of removing the number-related content from the 1976 version of ITU-T Rec. E.161 and moving it to the new ITU-T Rec. E.163.

ITU-T Rec. E.163 was withdrawn and its content merged with ITU-T Rec. E.164 in 1991(see below).

ITU-T Rec. E.164, first issued 1984.

ITU-T Rec. E.164, second issue 1988.

ITU-T Rec. E.164, third issue 1991 – merged with ITU-T Rec. E.163.

ITU-T Rec. E.164, fourth issue 1997 – incorporates ITU-T Recs E.160 and E.162.

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[3] Where there is a requirement for further discrimination between international network operators and/or the different network services they provide, the method for accommodating this need is a national matter.

Annex A

Clarification and explanation of the structure and function of international E.164-numbers

A.1 Scope

A.1.1 International E.164-numbers are the basis for global addressing in fixed and mobile terminal networks. These numbering resources uniquely identify user-network interfaces, e.g., PSTN/ISDN, mobile terminals, and individuals utilizing specific global services, e.g., Universal International Freephone Numbers (UIFNs). Most of the services/subscribers can be addressed directly, but in cases where indirect addressing is used, number translation is required, e.g., for UIFNs.

A.1.2 This annex provides clarification and explanation to the structure and functionality of international E.164-numbers. These structures/functions are independent of the technical arrangement to record, charge or route the calls.

A.2 Structure

A.2.1 The international E.164-number, which is the foundation of the hierarchy, consists of the country code plus the necessary additional elements (NDC + SN, GSN, IC + SN, or GIC+SN). The international E.164-number exists only at the international level, i.e., the CC and GSN are combined to form a single dialling sequence.

A.2.2 In countries where NDC and SN are combined to form a single dialling sequence or where the NDC does not exist, the local and national levels are integrated and there is no difference between the subscriber number and the national (significant) number.

A.2.3 International E.164-numbers have hierarchical structures as shown in Figure A.1.

A.2.4 When in the local level, typically the use of a national (trunk) prefix provides access to the national level, and the use of an international prefix provides access to the international level.

A.2.5 Numbers that only exist in the local, intraNetwork and/or national level are not considered international E.164-numbers.

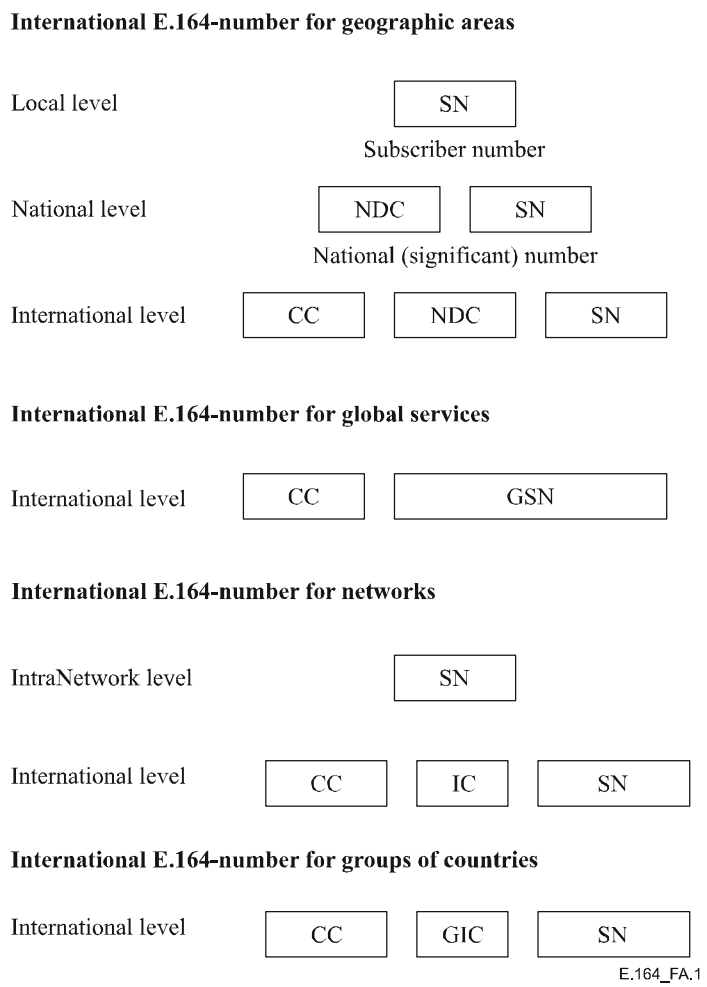
A.3 Number length

A.3.1 International E.164-number for geographic areas

A.3.1.1 International E.164-numbers for geographic areas have a maximum length of 15 digits.

A.3.1.2 The maximum length of national (significant) numbers is 15 digits minus the length of the country code.

A.3.1.3 The maximum length of subscriber numbers is 15 digits minus the length of the country code and the national destination code.



NDC National Destination Code
CC Country Code
IC Identification Code
SN Subscriber Number
GSN Global Subscriber Number
GIC Group Identification Code

NOTE – IntraNetwork level is used when calling and called parties are within the same network.

Figure A.1/E.164 – Hierarchical structures of International E.164-numbers

A.3.2 International E.164-number for global services

The maximum length of a global subscriber number is 12 digits, since the country code assigned to global services is always three digits in length.

A.3.3 International E.164-number for Networks

The maximum length of the combined identification code and subscriber number is 12 digits, since the country code for networks is always three digits in length.

A.3.4 International E.164-number for Groups of Countries

The maximum length of a subscriber number is 11 digits since the country code for Groups of countries is always three digits in length and the Group Identification Code is fixed at one digit.

A.3.5 Summary of number length

Table A.1 summarizes the maximum number length on each level for the four categories of international E.164-numbers.

Table A.1/E.164 – Maximum number length

Level	Geographic areas	Global services	Networks	Groups of Countries
Local	15 minus (number of digits in CC + NDC)	NA	NA	NA
National	15 minus (number of digits in CC)	NA	NA	NA
IntraNetwork	NA	NA	15 minus (number of digits in CC + IC)	NA
International	15	15	15	15
NA Not Applicable				

A.4 Unique identification of international E.164-number for geographic areas

A.4.1 An international E.164-number for geographic areas uniquely identifies a subscriber within a geographical area locally, nationally and internationally, i.e., dialling the subscriber number locally, the national (significant) number nationally and the international E.164-number internationally always provides identification of the same subscriber.

A.4.2 The national (significant) number provides unique identification of one subscriber irrespective of where the call is generated from within the country or geographical area characterized by CC.

A.4.3 The subscriber number provides unique identification of one subscriber irrespective of where the call is generated from within a local area identified by NDC, where applicable. The subscriber number is a complete number and, therefore, cannot be separated.

A.4.4 Use of prefixes to distinguish the national (significant) number and the international number from the subscriber number does not alter the uniqueness of international E.164-numbers.

A.5 Unique identification of international E.164-number for global services

The international E.164-number for global services uniquely identifies subscribers only at the international level. The international E.164-number for global services is a complete number, and, therefore, cannot be separated.

A.6 Unique identification of international E.164-number for Networks

For illustrative purposes only, it is assumed that intraNetwork dialling is by subscriber number.

A.6.1 An international E.164-number for Networks uniquely identifies a subscriber within a Network, and internationally, i.e., dialling the subscriber number and the international E.164-number, always provides identification of the same subscriber.

A.6.2 The subscriber number provides unique identification of one subscriber irrespective of where the call is generated from within the Network identified by CC + IC. The subscriber number is a complete number and, therefore, cannot be separated.

A.6.3 Use of an international prefix to distinguish the subscriber number and the international E.164-number for Networks does not alter the uniqueness of international E.164-numbers.

A.7 Unique identification of international E.164-number for Groups of Countries

The international E.164-number for Groups of Countries uniquely identifies subscribers only at the international level. The international number for Groups of Countries is a complete number, and, therefore, cannot be separated.

A.8 Non-E.164 numbers

A.8.1 Any number for geographical areas, global services, Networks or Groups of Countries which does not conform to the structure, length and uniqueness as defined in this annex or in the main body of this Recommendation is not an international E.164-number.

A.8.2 Non-E.164 numbers may not be passed across any network boundaries without a specific bilateral agreement.

A.8.3 Listed below are some examples of non-E.164 numbers from the first category of numbers. These examples are not exhaustive.

A.8.3.1 Local Special Purpose Numbers

For example, Local Special Purpose Numbers (LSPNs) are numbers with significantly fewer digits than subscriber numbers, and which are valid for a specific purpose only, within a limited part of the same NDC area.

The LSPNs are part of a hierarchical structure with three levels as follows:

– Local level: LSPN.

– IntraNetwork level: NDC + LSPN.

– International level: CC + NDC + LSPN.

Since LSPNs are significantly shorter than the subscriber numbers, they are within the limits of Table A.1.

If LSPNs and NDC + LSPN terminate at the same service, then LSPN would be an international E.164-number, but this is not the case in this example. In our example the LSPN terminates at, for instance, two different services within the NDC area, depending upon from where the calling user is located. LSPN and NDC + LSPN are ambiguous and therefore not international E.164-numbers.

A.8.3.2 International Special Purpose Numbers used nationally

In this example, the International Special Purpose Numbers (ISPNs) are numbers with significantly fewer digits than ordinary subscriber numbers, and which only exist in an international format within the country which provides it. The digits of ISPN are identical to the leading digits of one or more subscriber numbers.

Nationally, the ISPNs exist only at the international level as follows:

– International level: CC + NDC + ISPN.

Since ISPNs are significantly shorter than the subscriber numbers, they are within the limits of Table A.1.

Nationally the CC + NDC + ISPN could terminate at a service center. As the digits of ISPN are identical to the leading digits of a subscriber number, all incoming international calls to the service center will fail because the CC + NDC + ISPN and the leading digits of CC + NDC + SN are ambiguous, and therefore not international E.164-numbers.

A.8.3.3 Network-specific numbers

In this example, network-specific numbers are numbers that belong to subscribers connected to one network operator in a country with more than one operator, but where the network operator demands that the calling user dials some additional digits.

The network-specific numbers have a hierarchical structure with 3 levels as follows:

– Local level: SN.

– National level: NDC + SN.

– International level: CC + AD + NDC + SN (see Note.)

NOTE – ADs (Additional Digits) are the network operator identification digits that would have to be added by the calling users abroad to remove ambiguity and reach a particular subscriber in specific national network.

The network-specific number does not fit in the hierarchical structure because it consists of more than the country code plus the national (significant) number. AD is not part of the national (significant) number, but may be part of a national prefix used to distinguish the national (significant) numbers from the subscriber numbers.

The numbers are not unique because NDC + SN and CC + NDC + SN lead to two different subscribers.

Network-specific numbers that are manipulated in this way are not international E.164-numbers.

A.8.3.4 National (significant) numbers with excessive length

In this example, the national (significant) numbers (NDC + SN) as used nationally have differing lengths, and the longest national (significant) numbers violate the maximum given in Table A.1.

The numbers have a hierarchical structure as follows. The structure is independent of the number length.

– Local level: SN.

– National level: NDC + SN.

– International level: CC + NDC + SN.

Some of the national (significant) numbers (NDC + SN) and international numbers (CC + NDC + SN) are longer than the maximum given in Table A.1. These numbers are not international E.164-numbers. The most significant part of the national (significant) numbers, truncated to the limits given in Table A.1, are international E.164-numbers provided that they are unique.

Annex B

Application of international E.164-numbers for ISDN

(Annex B needs further consideration to better reflect more recent developments.
This is for further study in the 2005-2008 Study Period)

B.1 Scope

This annex describes the application of international E.164-numbers to ISDN numbering and addressing. Additional numbering and addressing requirements are covered in separate Recommendations, e.g., B-ISDN is contained in ITU-T Rec. E.191.

B.2 ISDN numbers

Numbering for ISDN is an integral part of the international E.164-numbering plan.

The ISDN number is an application of international E.164-numbering for geographic areas and for international networks, to the ISDN user-network interface/network termination.

B.3 Addressing

B.3.1 Identification

Identification within a subscriber's installation of a point beyond the ISDN boundary requires the transfer of address information from the public network to the subscriber's equipment. Two cases can apply:

– identification by an ISDN number;

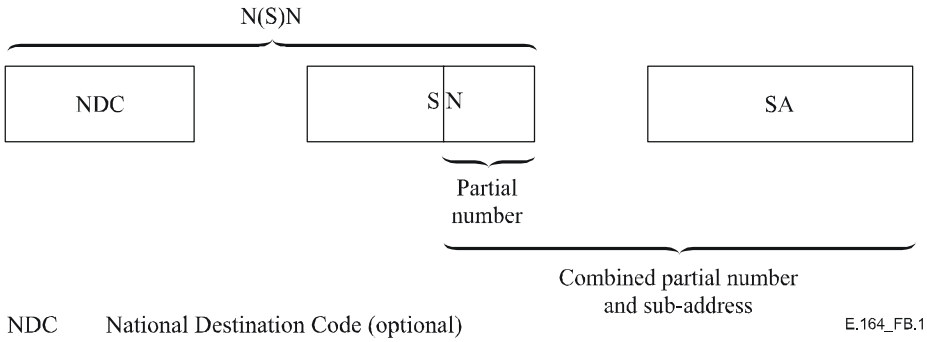
– identification by an ISDN number plus additional address information.

B.3.2 Addressing by an ISDN number

When selecting a destination in the subscriber installation, digits forming the end of the ISDN subscriber number are transferred to the called subscriber's installation as a partial number (see Figure B.1). The number of digits used depends upon the requirements of the called subscriber's equipment and the capacity of the numbering plan used.

In instances where a partial number is utilized, e.g., Network Termination 2 (NT2), the number will be used in the context of the direct-dialling-in supplementary service.

If the subscriber's installation consists of terminal equipment only, the transferred digits will be used in the context of the multiple-subscriber-number supplementary service.



NDC National Destination Code (optional)
N(S)N National (Significant) Number
SA Sub-Address
SN Subscriber Number

NOTE – The multiple-subscriber-number is not covered in the diagram.

Figure B.1/E.164 – Addressing by an ISDN number

B.3.3 Sub-addressing (network address extension)

Sub-addressing provides an additional addressing capacity outside the ISDN numbering plan but constitutes an intrinsic part of the ISDN addressing capabilities. The sub-address is a sequence of digits, following the ISDN number. The maximum length should be 20 octets (40 digits). As shown in Figure B.1, the sub-address may follow the ISDN number and form the ISDN address, which is transferred to the equipment at the subscriber's premises.

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

B.3.4 Combination of addressing and sub-addressing

Sub-addressing may be used separately or in combination with a partial number (see Figure B.1).

B.4 Dialling procedures

B.4.1 The subscriber dialling procedures for local, national and international calls shall be in accordance with clause 7. However, subscriber's control procedures for supplementary services is defined in ITU-T Rec. E.131 (for Europe, also see ETSI ETS 300 738 and TS 001 907) or in separate Recommendations for each service.

B.4.2 ISDN subscribers will always be called by the same subscriber number, irrespective of where in the public network the call originates. For calls in the same numbering area or local network, the subscriber number alone is dialled. For national calls between numbering areas or local networks, the subscriber number may be preceded by the national prefix and the national destination code.

B.4.3 The addressing procedures for calls using sub-addressing are described in B.3.

B.5 Network identification

B.5.1 Geographic areas

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

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

– in a country all destination ISDN and PSTN networks shall operate under a single country code;

– the international E.164-number maximum length of 15 digits shall not be exceeded, nor shall it be necessary for the number of digits for number analysis to exceed that specified in 7.5;

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

B.5.2 Networks

In all cases when Network codes are assigned, they are supplemented with Identification Codes (ICs) which uniquely identify each international Network.

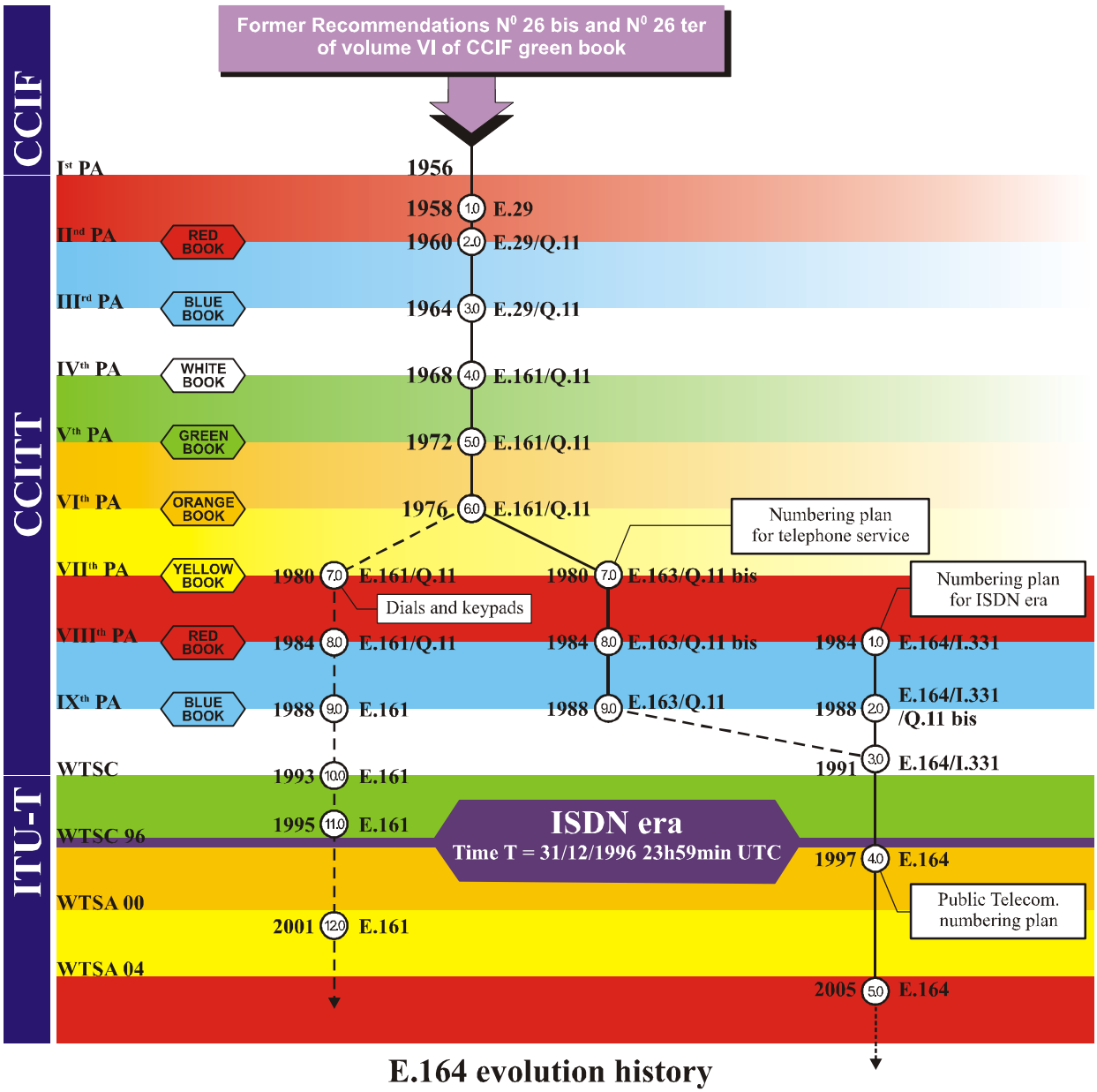
Digit analysis of the CC + IC provides the required network identification.

B.6 Service parameters

The ISDN number by itself will not identify the particular nature of the service, which is derived from particular signalling parameters that are not part of the numbering plan. For example, for ISDN calls, in addition to a number and possible prefix, there is a requirement to provide a choice of bearer capability in the signalling protocol. One number can therefore facilitate access to more than one service.

B.7 Calling/connected line identity

Calling/Connected Line Identity (CLI/COLI) is address information that is passed across the network to provide supplementary services such as calling (or connected) line identification presentation. The format of the CLI and COLI for international calls should be the full international E.164-number, i.e., Country Code (CC), National Destination Code (NDC) and Subscriber Number (SN). No other information, such as prefixes or symbols (e.g., "+"), should be included, although a sub-address may be associated with the CLI/COLI. However, in a country where network-specific numbers are utilized for identifying customers or network services, it remains a national matter. When implemented, the NPI (Numbering Plan Identifier) TON (Type of Number) mechanism should define the numbering status of the calling/connected line. The authorization to pass CLI/COLI across an international boundary is a national matter.



E.164 evolution history

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	**Overall network operation, telephone service, service operation and human factors**
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects and next-generation networks
Series Z	Languages and general software aspects for telecommunication systems

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