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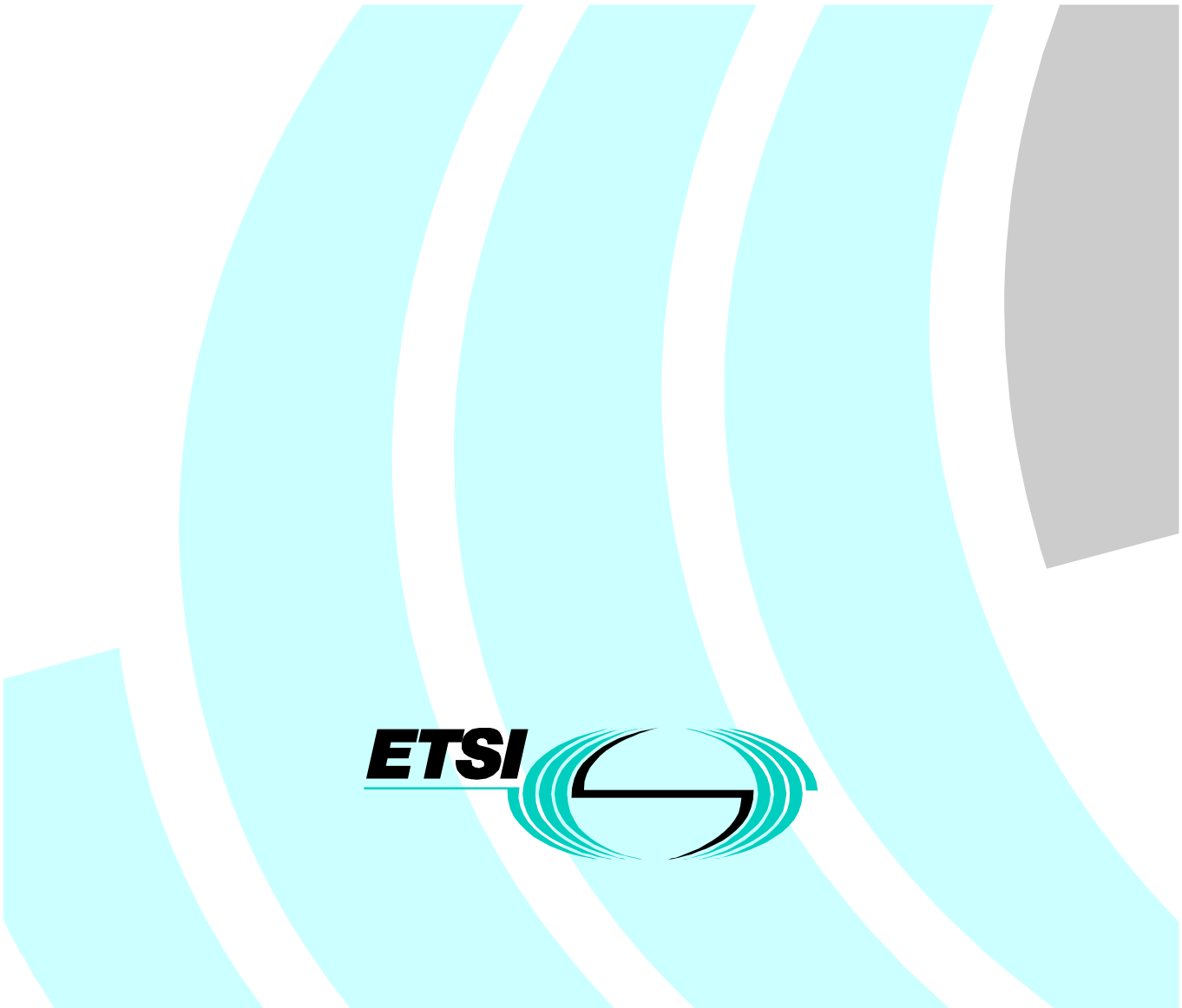
Technical Report

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); Guide to numbering options for public networks based on VoIP technology



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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Project Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON).

1 Scope

The present document provides basic guidance on the range of different numbering options within E.164 that may be used for services provided on public networks using TIPHON compliant technology. The present document identifies:

- the various numbering options;
- the main considerations in selecting an option;
- the advantages and disadvantages of each option;
- issues concerning number portability.

The information and advice in the present document applies primarily to TIPHON Scenarios 0 (all IP) and 2 (SCN to IP) but there are additional comments about Scenario 3 (SCN to IP to SCN).

NOTE: The E.164 number will normally be presented as the calling number in the Calling Line Identity which is relevant to Scenario 1 (IP to SCN) but this is not a major influence on the choice of E.164 number.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] EG 201 367 (V1.1): "Intelligent Network (IN); Number Portability Task Force (NPTF); IN and Intelligence Support for Service Provider Number Portability".

[2] ITU-T Recommendation E.105: "International telephone service".

[3] ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".

[4] TR 101 092: "Network Aspects (NA); Report on Carrier Selection".

[5] TR 101 118 (V1.1): "Network Aspects (NA); High level network architecture and solutions to support number portability".

[6] TR 101 119 (V1.1): "Network Aspects (NA); High level description of number portability".

[7] TR 101 122 (V1.1): "Network Aspects (NA); Numbering and addressing for number portability".

[8] TR 101 697 (V1.1): "Number Portability Task Force (NPTF); Guidance on choice of network solutions for service provider portability for geographic and non-geographic numbers".

[9] TR 101 698 (V1.1): "Number Portability Task Force (NPTF); Administrative support of service provider portability for geographic and non-geographic numbers".

3 Abbreviations

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

VoIP	Voice over IP
IP	Internet Protocol
ISDN	Integrated Services Digital Network
SCN	Switched Circuit network
UPT	Universal Personal Telecommunications

4 General considerations

4.1 Introduction to numbering arrangements

The introduction of VoIP technology in "public" networks is likely to be the second phase of the development of VoIP, use in corporate networks being the first phase. Numbering becomes a significant issue when the network termination point is implemented in IP technology and the transition from the traditional Switched Circuit Network technology occurs within or between public networks.

ITU-T Recommendation E.164 describes the "International Public Telecommunications Numbering Plan".

ITU-T allocates codes to:

- countries and geographical regions;
- global services;
- "Networks" that share a global code.

Numbering within countries and geographical regions (e.g. North America) is managed by the national administration or numbering authority. The numbering space after the country code is subdivided into:

- national destination code;
- subscriber number.

In practice, the national destination code may be used for:

- a geographical area (e.g. a city);
- a service type;
- a network (e.g. a particular mobile network).

The lengths of the national numbers and their constituent parts vary from country to country. Not all service types may be callable from outside the country concerned.

4.2 Basic principles

The approach to numbering varies from country to country and is heavily influenced by historical arrangements, but many numbering authorities follow the following principles:

- the caller should be able to discern some tariff information from the early part of the number and should be able easily to identify numbers where the tariff is high;
- numbers should be allocated on the basis of:
  - service type;
  - geographical location; and / or
  - tariff level.

and not on the basis of technology.

Many national regulations are written with reference to services and are designed to be technology independent at least to a first approximation.

With the introduction of competition, many national authorities impose requirements for operator/service provider number portability so that customers' numbers may be transferred between operators and/or service providers when customers change their account. Requirements for number portability between operators are inherently incompatible with identifying a network operator in the initial part of a international or national number. Where numbers ranges have been or are allocated initially to network operators for subsequent sub-allocation of individual numbers to customers and portability is introduced, then the relationship between the number range and the operator is broken and the number range is no longer a precise indicator of the operator.

The need for callers to be able to discern some tariff information from numbers imposes constraints on the use of numbers and reduces the efficiency of the use of numbers. In the longer term it may not be possible to maintain this information, and it may be desirable to remove this constraint, in which case other adequate forms of tariff transparency for callers may be needed.

4.3 Relationship of numbering to VoIP

VoIP is a technology that may be used to provide various different services. These services include:

- the international telephony service such as is also provided by the PSTN and ISDN and conforms to ITU-T Recommendation E.105 [2], where there will normally be some location information within the national number;
- national services that do not indicate location but have special tariff arrangements such as:
  - freephone;
  - local tariff;
  - national tariff;
  - premium rate.
- national services with special features such as Universal Personal Telecommunications (UPT);
- international services such as universal freephone (+800 ….) and UPT.

Since numbering is normally related primarily to services rather than technology, this means that there is no single numbering arrangement for VoIP technology. The numbering options, and the choice from these options, should be determined by the service that is to be provided.

5 Choosing a numbering option

5.1 The steps

There are two steps to choosing a numbering option:

Step 1: Find out what numbering options are available for the service that you plan to provide. This involves contacting your national numbering authority to find out their policies for allocating number ranges to services. For international services it may involve discussions with the ITU-T secretariat.

Step 2: Evaluate the options and select the most suitable one.

5.2 Factors in evaluating options

5.2.1 The customer's and caller's perspectives

Options should be evaluated from the perspective of customers who will be identified by a number from the range allocated. These customers will be concerned with the perception that potential callers will obtain from the number. Care should be taken to evaluate likely misconceptions as well as correct deductions.

For example:

- callers could be deterred from calling a number that has always to be dialled in the national or international format even if there is a special tariff that is low, because the callers mistakenly believe the tariff to be higher than it is;
- callers may be confused about the tariffs in some areas of the numbering plan and so may avoid calling all numbers in that range (This may be either a result of the historical development of the numbering plan or an oversight by the regulator. The situation should not arise in theory but may do in practice).

5.2.2 Service or tariff recognition

If the customer who is allocated the number wants the caller to recognize a particular existing service or tariff range, then preference should be given to the well established and most widely recognized ranges. New ranges are less likely to be recognized until there has been sufficient advertising and branding.

5.2.3 Call barring

Some companies and some residential users bar calls to national or international format numbers. Customers may wish to have numbers that can be dialled in the most local format available because otherwise some potential callers will be barred from calling them.

5.2.4 Accessibility

Although the ITU-T and most countries provide rules for opening access to new codes, in practice not all operators follow these rules and there may be delays before all the potential callers who should be able to gain connection to a given number are able to do so. Operators should ensure that adequate advance notification is given of new number ranges and allocations.

6 Other issues

6.1 Number portability

Number portability between operators is relevant to geographic, non-geographic and mobile services.

Many regulators require operator portability to be provided for some services or number ranges. Market entrants who use VoIP may be very concerned to obtain number allocations that look as similar as possible those used by SCN networks and to obtain the number portability from existing operators. This may be essential in order to compete for customers from the existing networks. The market entrants may, in turn, have to offer portability from their network to other operators.

The main ETSI documents on number portability are:

- TR 101 119 (V1.1): High level description of number portability [6];
- TR 101 118 (V1.1): High level network architecture and solutions to support number portability [5];
- TR 101 122 (V1.1): Numbering and addressing for number portability [7];
- EG 201 367: IN and intelligence support for service provider number portability [1];
- TR 101 697 (V1.1): Guidance on choice of network solutions for service provider portability for geographic and non-geographic numbers [8];
- TR 101 698 (V1.1): Administrative support of service provider number portability [9].

6.2 Number availability

The availability of numbers in some countries may be scarce and the introduction of VoIP technology may lead to many new applications for number blocks, especially for geographic numbers. National numbering authorities need to plan for this potential increase in demand in order to avoid shortages.

6.3 Carrier selection

Although not a pure numbering issue, operators who wish to provide services to customers who are connected to other access networks (TIPHON Scenario 3) need to obtain a carrier selection code from the national authority so that callers can select their network. In some countries, it may be possible for callers to have carrier pre-selection where the access provider registers their choice of long distance or international carrier and routes all calls that do not have call-by-call selection in accordance with this choice.

Further information is given in TR 101 092: Report on carrier selection [4].

History

Document history		
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