FINAL REPORT
ON THE EFFECT OF
NUMBER PORTABILITY
ON NATIONAL NUMBER
ADMINISTRATION & MANAGEMENT

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This study has been prepared by ETO for ECTRA.

Author: *Marco Bernardi*
Jack Nuijten

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Executive summary

The objective of the study is to make proposals to the National Regulatory Authorities (NRAs) of CEPT countries regarding the effects of number portability (NP) on the establishment of national ITU-T Recommendation E.164 numbering and dialling plans (administration) and on the assignment of numbers from the plans (management). It should be realised that the impact of NP is part of a complex process in which many other factors play roles which support or counteract the effects of NP or which promote or hinder the introduction of certain types of NP. Some of these effects on NP may even be more important than the effects caused by NP. It should also be realised that the impact of NP may differ per case (e.g. per country, per service, per type of customer). NP certainly makes NRAs more aware of numbering issues. NRAs need to develop a view on the effects of NP, in particular on its more fundamental impact in the longer term.

Three different types of NP are distinguished:

- service provider portability: the facility for a user to take his E.164 number with him when changing service provider (including network operator)

- service portability: the facility for a user to take his E.164 number with him when changing service; differences in services could be caused by differences in technology, e.g. the difference between PSTN and ISDN, or by differences in the commercial character, e.g. the difference between shared cost service and premium rate service

- location portability: the facility for a user to take his E.164 number with him when changing location.

ETO collected material for this study by means of a questionnaire to ECTRA representatives and others. After the first interim report, a workshop was held to collect and discuss relevant examples and opinions on the impact of NP. The workshop provided input which was one element used to assess the responses to the questionnaire.

From the assessment of the responses to the questionnaire the following picture has taken shape regarding the long-term impact of NP. The longer-term effects may already have some initial signs visible at present but some may not become apparent until after five years or more.

A   The long-term impact on national numbering plans

1. The main effect, if any, of NP on the national numbering plan would be the loss of structure in the plan. Less structure might mean that the usable number capacity would increase significantly.

2. Service portability requires removal of any service information, including any tariff information, from the number. Service portability is in particular foreseen between fixed and mobile services. Service portability is certainly not foreseen for special-tariff services as long as there remain a need for users to have tariff information in the number.

3. Nation-wide location portability requires removal of any geographic information from the numbering plan and, therefore, closing of the numbering plan. Closing of the numbering plan also provides extra number capacity. But the need for nation-wide location portability is unclear while in some countries local dialling is valued by users.

B   The long-term impact on number assignment

1. The main effect of NP on number assignment is that it opens the door to individual assignment by the NPM (Numbering Plan Manager) directly to the users. After all, NP between network operators and service providers ultimately implies that numbers cannot contain any operator or service provider identity.

2. Individual assignment directly to users is feasible in particular for special-tariff services and also for personal numbers. Assignment directly to users does not seem feasible in the case of geographic numbers in particular nor - to a lesser degree - for mobile numbers.

3. An effect of all types of NP is that the user may be able to retain his number longer and therefore may value his number more. Individual assignment provides better possibilities to deal with valuable numbers than block assignment.

4. A change from block assignment to individual assignment implies a shift of the assignment workload from network operators and service providers to the NPM. Such a change may be an opportunity for the NRA to delegate assignment, if the functions delegated are entrusted to an independent body and the NRA remains in control.

On the basis of the considerations detailed above under items A and B, ETO proposes that NRAs should take account of the following points for both the short term and the long term:

a) In a long term perspective ETO foresees service portability between fixed and mobile services. The advantages and disadvantages of service portability for these and other services should be weighed against maintaining information in numbers regarding tariff or service.

b) The advantages and disadvantages of nation-wide location portability and a closed numbering plan should be weighed against maintaining information in numbers regarding geography and, where applicable, tariff.

c) The beneficial effect of all types of NP on usable numbering capacity should be considered when planning future number needs.

d) The implication of NP that more routing numbers are needed should be taken into account when planning future number needs.

e) ETO foresees individual assignment directly to users for numbers used for services such as special-tariff services. Consideration should be given to the advantages and disadvantages of individual assignment, and, in addition, to auctioning and number trading for those numbers.

f) The advantages and disadvantages of delegation of assignment should be weighed against each other.

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1   Presentation of the study

The objective of the study is to make proposals to the National Regulatory Authorities (NRAs) of ECTRA countries regarding the effects of number portability (NP) on the establishment of national ITU-T Recommendation E.164 numbering and dialling plans (administration) and on the assignment of numbers from the plans (management). NP certainly makes NRAs more aware of numbers. It should be realised that the impact of NP is part of a complex process in which many other factors play roles which support or counteract the effects of NP or which promote or hinder the introduction of certain types of NP. Some of these effects on NP may even be more important than the effects caused by NP. It should also be realised that the impact of NP may differ per case (e.g. per country, per service, per type of customer). Therefore, specific proposals applicable to all countries at the same time are not foreseen. Generic proposals for consideration, leaving room for different applications at different times, seem to be more appropriate.

1.1   Introduction

Three types of NP are distinguished:

-   service provider portability: the customer can retain his E.164 number when changing network operator or service provider (while not changing service or location)

-   service portability: the customer can retain his E.164 number when changing service (while not changing location or network operator or service provider); differences in services could be caused by differences in technology, e.g. the difference between PSTN and ISDN, or by differences in the commercial character, e.g. the difference between shared cost service and premium rate service

-   location portability: the customer can retain his E.164 number when changing location within a geographic numbering area (while not changing service or network operator or service provider).

Some cases of number porting are a combination of two or even three types of NP. For example: porting a number between a fixed network service provider and a mobile network service provider implies both service provider portability and service portability.

Only portability of the complete number has been taken into consideration. Partial portability, in which case only the last part of the number is ported, for example the subscriber number behind a service access code, has not been included.

NP is becoming feasible in step with the erosion of technical restrictions. At the same time, several factors are providing impetus for the introduction of NP, notably the move to more competitive telecommunication markets. An important factor is the requirement for EU countries to have service provider portability introduced for geographic and non-geographic numbers before the year 2000. According to the proposal for the Directive on universal service obligation, the Commission intends to extend the availability of service provider portability to mobile users. ETO shares the view that mobile numbers should be included in the EU requirement.

National number administration and management are under the control of NRAs according to EU regulation. NRAs now need to develop a view on the effects of NP on national number administration and management, in particular the more fundamental effects in the longer term.

1.2   Work Requirement

The work requirement (see Annex A) addressed to ETO by ECTRA is to:

- investigate present and future effects of the different types of NP on number administration and management in European countries, in some relevant non-European countries and on an international level where NP has been implemented

- identify trends that may affect numbering administration and management in a way that reinforces or counteracts the effects of NP

- provide analytical comments on developments in number administration and management as a consequence of the introduction of NP, while taking related trends into account

- propose measures to assist NRAs in preparing for these developments.

1.3   Methodology and work plan

ETO has used a questionnaire to:

- collect examples of direct effects and of first signs of longer-term effects of NP
- collect opinions on the longer-term impact of NP
- to develop a common understanding of the possible longer-term impact of NP: the effects of NP and the limitations on the introduction of NP which will emerge as a consequence of these effects, other implications and synergetic developments.

The response to the questionnaire has been used to select the most relevant cases of consequences of NP, limitations on the introduction of NP and other implications and synergetic developments. The information collected was presented in the first interim report which was sent to ECTRA/PTN and ENF members for comments.

The first interim report was discussed at an ETO workshop, mainly with European NRAs and operators on 26 November 1999. The workshop discussion provided the main input, next to the feedback from questionnaire respondents and others, for the present second interim report. The second interim report also contained general proposals for consideration by NRAs. This report was being sent to ECTRA/PTN and ENF members for comments in February 2000. The draft final report contained the definite proposals. It was distributed for approval by ECTRA in September 2000. It had comments annexed from individual ENF members if required.

The final report is the report approved by ECTRA in October 2000.

1.4   Structure of the report

The body of the report is chapter 2 in which the issues are clarified and the questionnaire responses assessed. Chapter 3 contains the conclusions. Abbreviations and definitions are explained in Annex B and Annex C respectively. Annex D contains the bibliography and Annex E the ETO progress report on number portability. The questionnaire with collected responses is found in Annex F and the workshop report in Annex G.

2   The questionnaire responses and their assessment

This chapter provides an overview of responses to the questionnaire and an assessment of these responses. The assessment builds on the workshop discussion which provided considerable refinement of opinions on the questionnaire statements. The questionnaire with the collection of individual responses can be found in Annex F. The workshop report can be found in Annex G.

The questionnaire was sent to all ECTRA/PTN representatives and five other experts inside and outside Europe. Responses with answers to the questions were received from 16 ECTRA/PTN representatives and 3 other experts.

Additional information was collected from regulator and consultancy reports and from respondents. Documents consulted are listed in Annex D.

The questionnaire consisted of one question about short-term (direct) effects and nine statements about longer-term effects of NP which are addressed in the following sections. The period for longer-term effects has not been defined. The longer-term effects may already have some initial signs visible at present but they may become apparent after five years or more. The intention of the questionnaire was to reach a common understanding, not only of the effects of NP, but also of the limitations on the introduction of NP as a consequence of these effects and of other implications and synergetic developments. Each section is therefore provided with an introduction to clarify these issues.

The workshop was attended by 12 persons, including the ETO numbering team. There were representatives from the NRAs of Austria, Denmark and Sweden and from the North American Numbering Plan administrator. The ENF and the British users were represented. There were two representatives from France Telecom and one from BT.

2.1   Short-term effects of NP

Introduction

NP may have short-term (direct) effects on national administration and management, depending on the type of NP, the type of numbering plan and the way numbers are assigned by the Numbering Plan Manager (NPM, usually an NRA).

At present the introduction of NP in European countries is still limited (see the ETO progress report in Annex E):

- Service provider portability will have been introduced by January 2000:

  - for fixed local loop services in 15 countries
  - for mobile services in at least 4 countries
  - for other non-geographic services in the fixed network in 14 countries.

- Some service portability will have been introduced by January 2000:

  - for fixed local loop services in 4 countries
  - for mobile services in 1 country.

- Some location portability will have been introduced by January 2000:

  - for fixed local loop services in at least 4 countries.

As the introduction of NP has only recently started and is still limited, the short-term effects will also be limited. Short-term effects of the three types of number portability are:

- <u>Service provider portability</u>
  Service provider portability is the most important type of NP when considering the development of competition and consumer protection and is therefore subject to regulation. This type of NP only has consequences for the numbering plan if service provider identifications have been included in the numbering plan. The NPM has to keep track of ported numbers. If network operators or service providers receive numbers from the NPM by block assignment, porting of numbers may affect the number blocks for which the network operators or service providers remain responsible. This responsibility includes payment of number charges and correct usage of numbers. It may even be decided to change from block assignment to individual assignment, which is assignment by the NPM of numbers in units of a single number. Individual assignment may be made to network operators or service providers or directly to users.

- <u>Service portability</u>
  Service portability may or may not be regulated. This type of NP has implications for the numbering plan. If services use distinct numbers from the numbering plan, then portability between these services would require removal of this distinction.

- <u>Location portability</u>
  Location portability may or may not be regulated. This type of NP can be nation-wide for non-geographic numbers. For geographic numbers, location portability is limited to a certain geographic areas within a country. Nation-wide location portability for all numbers would require removal of geographic limitations on numbers in the numbering plan.

Assessment of the responses

The collected responses are presented in Annex F, section B.

The direct effects mentioned mainly concern service provider portability:

- need for the NPM to keep track of ported numbers (mentioned by three countries)
- need for the NRA to define the service provider responsible for ported numbers (mentioned by two countries)
- need for a central reference database (mentioned by one or two countries)
- need to change conditions of assignment (mentioned by one country)
- consideration of central assignment of individual non-geographic numbers (mentioned by one country)
- delegation of assignment tasks for freephone and shared-cost numbers, which requires highly detailed rules (mentioned by one country).

Reduced need for blocks of geographic numbers was mentioned by one country. The need for numbering resources for routing was mentioned by two countries. In one country a new range for numbers with nation-wide location portability has been introduced; those numbers are assigned directly to users.

2.2   Service portability and tariff/service information

Introduction

The statements for discussion are:

> *Service portability will become more available, for example portability between mobile and fixed services. This implies disappearance of information about service and tariff in numbers that users dial.*

> *Alternative means of informing users about tariffs of calls will become more and more available: instead of the number itself, means such as recorded announcements and screen messages will be used.*

It may well be that the cause-and-effect relationship is the other way around: service portability does not cause disappearance of service and tariff information in numbers but removal of information in the number results in service portability becoming available.

The idea behind the statements for discussion is that from a user's point of view portability between most services is desirable. Service portability may have as a consequence that information on services and their tariffs is no longer visible in the number. For some services and tariffs, information may remain useful for users. This implies that where service portability is introduced, alternative means to maintain tariff transparency may be required. A possibility to take account of this is the provision of alternative means of informing users about tariffs or services, for example by recorded announcements at the start of a call. When the calling party has a terminal with a screen, which is expected to be increasingly the case, the tariff or service information could be provided on the screen. As long as no satisfactory alternatives are available, the introduction of service portability may be limited.

It should be noted that any loss of tariff information in numbers may adversely affect the ability of customer equipment and public network switches to implement call barring as a mechanism to restrict certain types of calls.

In addition to tariff transparency, another factor may work against service portability. This factor is the need for service branding that may increase because of competition in telecommunication services.

Users may not desire service portability for certain services like special-tariff services. Freephone is an example of a service for which tariff transparency is essential. The called party would like to clearly indicate that a call to his number is free of charge. On the other hand, from a calling party's point of view a clear indication of the tariff for a call is desirable in particular when the tariff is more than a local tariff. A calling party would also like to know in advance whether the number he wants to reach is used for a type of service, like paging, which requires him to handle the call in a special way.

There are several developments which may diminish the importance of deriving tariff information directly from the number. With the start of competition in telecommunication services, the tariff is more becoming a marketing tool and is used to differentiate between services. Tariff information is becoming less clear-cut for most numbers. The actual tariff also depends on the charges by the originating network, the transit network (which may be selected by the calling party) and the terminating network. So the tariff may differ, depending on the networks used for the call. With tariffs going down and becoming less dependent on distance in the longer term, tariffs for most calls may no longer be sufficiently significant to necessitate being indicated by the number. Tariffs may even be set to zero where only a subscription needs to be paid. More transparency is lost for premium rate services where tariffing by the premium rate service customer is done separately from the telephone bill. The increasing complexity of tariff information and the downward trend of the tariff levels may also make the tariff information in the number less useful.

Ovum states in its recent report on tariff transparency for the European Commission that problems with tariff transparency are increasing. Reasons mentioned are increase of the number of operators, services and tariff options, the take-up of service provider portability, fixed-mobile convergence and more complex pricing. There will also be a growing use of services in which the called party pays for some or all of the call. Tariffs may be simplified for some consumers with the disappearance of tariff differences between local and national calls, the development of simplified tariff packages and the possible introduction in the long term of flat rate charging for VoIP. The take-up of tariff transparency services like advice of charge (AoC) services has been disappointing so far. Apart from AoC services, customers see itemised billing as a useful, if more limited, way of improving tariff transparency. Ovum expects the NRAs to deal with growing tariff transparency problems by restricting the prices which service providers are allowed to charge and by restricting service and location portability.

Assessment of the responses

The collected responses are presented in Annex F, section C, statements 1and 2.

The main effect of service portability on the national numbering plan is the disappearance of tariff information in the number. This effect may limit the introduction of service portability as long as no alternatives for maintaining tariff transparency are available.

The area of agreement between respondents on service portability covers in particular portability between fixed and mobile services. Service portability for special-tariff services is certainly not foreseen by the respondents.

Tariff information in the number is still considered important at present. A continued need for tariff transparency is foreseen. Regarding alternative means for providing tariff information, the belief prevails that these means will become available in the long term but may not replace all tariff information in numbers. Already now, recorded announcements are used for certain services, premium rate services in particular, in a number of countries.

2.3   Simplified dialling, local dialling and location portability

Introduction

The statement discussed is:

> *The use of simplified dialling procedures by consumers (for example by abbreviated dialling, automated dialling and dialling by voice recognition) is increasing. This undermines the benefits of local dialling. At the same time abolition of local dialling is becoming more attractive as it enables development towards nation-wide location portability.*

The idea behind the statement for discussion is that from a user's point of view location portability, preferably nation-wide, is desirable. Nation-wide location portability has as a consequence that geographic information and the associated tariff information is no longer visible in the number. This implies the abolition of geographic numbering areas within a country. As a consequence, local dialling has to be abolished, i.e. the numbering plan has to be closed.

On the other hand, reasons can be mentioned for not introducing location portability. Geographic information may remain important for some users. It provides a means to show the location of the user in the number. It makes it easier for calling parties, for example, to find the local plumber. With call forwarding from the old location to the new location the same can be achieved as with location portability while geographic information in the number is maintained. In addition, users may value local dialling.

Market research by the Australian Communications Authority (ACA) in October 1999 revealed that 68% of Australian users consider that it is important that geographic numbers provide location information. By contrast, only 48% of the users consider that it is important that they have the ability to port numbers outside their local area. Similar research in Australia in 1991 revealed a much lower interest in location portability. So there would appear to be a trend towards greater value being placed on location portability and less value being placed on having location information in numbers.

There is a noticeable current trend from open to closed numbering plans in Europe. There are several reasons for this trend:

- thanks to modern technology, dialled numbers can be used independently of geographic location, and this for example makes location portability feasible on a nation-wide basis instead of only locally
- distinguishing of local areas to support differentiated recognition of charging areas will become increasingly less relevant as the costs for calls become less dependent on distance and the difference between charges for national calls and for local calls loses significance
- the difference in user-friendliness between national dialling and local dialling is losing significance because of the increasing use of simplified techniques such as abbreviated dialling, automatic dialling and speech-initiated dialling.

These are all reasons to move towards a closed numbering plan. Moving from open towards closed numbering yields two main benefits:

- a closed numbering plan is a precondition for location-independent use of numbers and thus for more efficient use of the numbering plan capacity, since the whole range of numbers can be used in any location nation-wide, as necessary
- a closed plan does not require a national prefix, normally '0', to distinguish between local and national dialling; freeing first digit '0' creates an extra capacity potential for numbers.

In Europe, a quite a few countries have already closed their numbering plan or are in the process of doing so. Some of the first countries that closed their numbering plans, in the beginning of the 1990s, were Norway and Denmark. Those countries were followed by France, Spain and Italy. In addition, Luxembourg, Iceland, and Malta have closed their numbering plans. Portugal has done the same in October 1999. Switzerland will follow later in 2001. Belgium has recently decided to change to a closed plan.

Assessment of the responses

The collected responses are presented in Annex F, section C, statement 3.

> The main effect of nation-wide location portability on national numbering plans is the disappearance of geographic information and associated tariff information in the number. This implies closing of the plan.
>
> The respondents see few problems in closing the numbering plan. This not only opens the door to nation-wide location portability but also provides extra number capacity. The extent to which closing of the plan also leads to nation-wide portability remains to be seen. Geographic information, which may include tariff information, is still highly valued.

2.4   Towards less structure in the national numbering plan

Introduction

The statement discussed is:

> *National numbering plans will become less and less structured, both as regards the geographic numbers, if they still exist, and as regards the non-geographic numbers.*

The idea behind the statement for discussion is that from a user's point of view service provider portability, service portability and location portability, preferably nation-wide, are desirable as has already been stated in the previous two sections. These types of portability require deletion of structure in the national numbering plans. An additional reason for minimising structure is that structure also causes loss of usable number capacity. This loss can be considerable and could easily be of the order of 90%!

On the other hand, tariff, service and geographic information in the number is valued, as is explained in the previous two sections. The developments will depend on which of the conflicting assets - number portability or information in the number - is valued most. This may differ per service type, per customer type and per country. The above-mentioned statement implies that number portability is valued most and causes information to disappear from the number. The priorities may, however, be the reverse.

Numbers that only have the function of an address (routing numbers) need to be distinguished from numbers that only have the function of a name or have both functions. Some structure in numbering plans should at least be maintained in order to distinguish numbers with different functions.

Assessment of the responses

The collected responses are presented in Annex F, section C, statement 4.

> The main effect of service provider portability, service portability and nation-wide location portability is the disappearance of structure in national numbering plans, which implies that the usable number capacity may increase significantly.
>
> It is hard to see a common position in the responses. Respondents favouring less structure in the numbering plan focus in particular on the deletion of distinction between fixed and mobile services. Maintaining at least some structure is considered important for having geographic, service and tariff information in the numbers. Two special reasons were mentioned for actually adding more structure to the numbers: one relates to non-geographic numbers for new services and the other relates to protection of remaining resources.

2.5   Increase of commercial and personal value of numbers

Introduction

The statement discussed is:

> *The commercial and personal value of numbers is increasing through developments such as the introduction of NP, because NP provides a better chance for customers to retain numbers for a sustained period of time.*

The idea behind this statement for discussion is that the longer a user can retain his number, the higher the value of the number may be. A customer is more prepared to invest in a number and the marketing of it, when he can rely on retaining the number for a long time. The investments themselves contribute again to the value of the number. NP supports the user in that respect. This effect of NP may consequently affect number administration and management as is shown in the next section.

The statement may also be valid in reverse: it is the value of a number perceived by the customer that creates the demand for NP.

It should be noted that the level of truth in the statement also depends on the type of service, the type of customer and other circumstances such as the expected future stability of the numbering plan. The value of numbers is probably higher where they are used for marketing purposes. Examples of such numbers are those used for special-tariff services. Even within the group of special-tariff services large differences in perceived value of numbers may exist. For example, freephone numbers are often used as long-term tools while premium rate numbers are often used as short-term tools.

Expected developments of names in general may have an effect on number value. In the very long term the use of E.164 numbers may be discontinued and replaced by other types of names. ETO believes that in the next years E.164 numbers will be increasingly used as names in coexistence with other naming systems.

Increase in value of numbers will also imply that numbering plans need to be designed more carefully in order to avoid future changes to valuable numbers. Changes to highly valued numbers may cause requests from users for compensation.

There are other reasons for the value of a numbers to increase. One important reason is that telecommunications increasingly provide the link for contact between the user and his clients, friends or relatives. A number that can easily be remembered and associated with the user is becoming more important for these contacts. Alphanumeric dialling is further adding to the ease of remembering numbers and to the value of numbers. It is expected that alphanumeric dialling, in accordance with the global ITU standard[1], will gradually become more available.

If the value of numbers increases this may stimulate number trading, either legal or illegal, which again may add to the value of numbers. Both horizontal and vertical number trading may be involved here: horizontal trading is trading between equal parties. e.g. between two users, and vertical trading is between parties on different levels, e.g. between operators and users. As was already pointed out in the ETO report on Non-discriminatory Access to Numbering Resources, within the legal context the concept of trading is closely linked to ownership rights. Since in general there are no ownership rights over numbers but only Rights of Use (RoU), numbers cannot, in legal terms, be traded. Trading of numbers, therefore, may simply be interpreted as:

- the transfer of RoU of numbers in the case of horizontal trading

- the granting of RoU of numbers in the case of vertical trading.

For reasons of simplicity the term 'number trading' will be used throughout the report for both cases.

Assessment of the responses

The collected responses are presented in Annex F, section C, statement 5.

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[1] ITU-T Recommendation E.161, option A.

An effect of all types of NP is that the user may be able to retain his number longer and therefore may value his number more. This may have consequences for number administration and management as is shown in the next section. Increase in value of numbers will also imply that numbering plans need to be designed more carefully in order to avoid future changes to valuable numbers.

It seems to be generally assumed by the respondents that the value of numbers is increasing. There are other causes of the value increase that may be more important than NP. Other reasons mentioned are: individual assignment, competition, need for more aggressive marketing of numbers, a future-proof numbering plan. On the other hand, the lifetime of numbers may be limited anyway because of numbering plan changes, lack of location portability and, possibly, gradual replacement of numbers by names containing non-digit characters.

2.6   Individual assignment, distortion of competition, effective use

Introduction

The statements discussed are:

> *Distortion of competition would best be avoided by number assignment by the numbering plan manager (NPM) being made directly to users.*

> *Number assignment by the NPM directly to users adds to effective use of capacity as individual numbers are only assigned when they are actually to be used.*

NP between network operators and service providers ultimately implies that numbers cannot contain any operator or service provider identity. With NP it is therefore not necessary in the long run to assign blocks of numbers to mobile network operators or to service providers. Initially, blocks of numbers identifying network operators may be preferred for some implementations of NP.

Individual assignment implies more complex routing mechanisms. But service provider portability ultimately implies the same. Assuming that service provider portability has been introduced, individual assignment may only accelerate the process of diffusion of individual numbers from service providers holding the originally assigned number block concerned to other service providers. Traditional block routing could still be used if numbers continue to belong to a block held by a network operator. The originating operator should then route a call to a certain number to the network of the operator holding that number. That network provides the information required for routing the call to the terminating network. Once a central database is used to obtain routing information for any call, routing can be done more efficiently.

Number assignment by the NPM to operators in blocks carries a potential distortion of competition, in particular for services using valuable numbers like special-tariff services. Operators or service providers assigned blocks containing significant quantities of commercially valuable numbers are at a competitive advantage over operators or service providers with less valuable numbers.

The competitive advantage may not be offset by service provider portability. First of all, it may be impossible for a user to form an overview of available numbers that are attractive to him if the information concerned is scattered over the different service providers. Secondly, if the user were to find an attractive number with a service provider with whom he does not want a subscription, it may be hard for the user to take the number to another service provider. Both problems may be solvable. A user may have an overview if service providers co-operate using a common central administrative database in which the status of numbers of all number blocks assigned is shown. The last problem regarding choosing a subscription independently from the choice of a number may be solved by so-called pre-allocation porting.

Several reasons can be given why individual assignment, even more so if directly to users, would result in more effective use of number capacity. The reason mentioned in the statement is the most obvious one. Without intermediate stages of block assignment, no capacity is lost in the reserves of unused numbers within the blocks. For the same reason, number pooling is being tried out in concert with the introduction of service provider portability, in particular in North America. Number pooling is a numbering management process by which numbering resources are assigned to a shared reservoir associated with specific designated numbering resources. It provides an easy way of exchanging unused parts of originally assigned number blocks or numbers between operators.

But other reasons for more effective use of number capacity can be mentioned, in particular where numbers which may have a high market value are concerned. In that case, network operators or service providers who are assignees may try to obtain more blocks than they really need in order to have more attractive numbers available for their customers. This problem of 'warehousing' would be tackled with assignment directly to users. However, even with assignment directly to users, storing and trading of numbers by users may be hard to prevent. Users may obtain numbers for other reasons than just to use them, and may create arrangements to make it appear as if the numbers are in use.

Assignment from a central pool of numbers directly to users would certainly enable users to choose the number which has the most value to them from all numbers that are available on a national level. It can be expected that a number with a higher value is more effective in its use. The process of achieving a situation where numbers are used by those who value the numbers most can be further supported by number pricing based on market value and by number trading. It should be realised, however, that users who value a certain number most may not be able to pay accordingly.

The arguments of competition distortion and of effective use of number capacity may have limited value for certain types of number. Competition distortion is in particular applicable to highly valued numbers used for certain non-geographic services like freephone. Effective use of capacity may not be an issue at all for many services in many European countries where lack of capacity is not an issue. There may be other means to increase effective use of existing capacity that are less costly and more beneficial, depending on parameters such as whether the plan is open or closed, the format of the numbers, the quantity of geographic numbering areas, the quality of the assignment process and of supervision.

The Netherlands, Germany and Austria have already introduced individual assignment directly to users for special-tariff numbers in close alignment with the introduction of service provider portability for these numbers.

The above-mentioned arguments for introducing assignment directly to users have also been expressed by Oftel in the UK in the context of a consultation on Developing Number Administration. Oftel intends to move from block assignment to assignment directly to users, in particular for special-tariff numbers and for corporate network numbers. Personal numbers have also been mentioned as a candidate. Different means of number pricing will be used, for example by having auctions for valuable numbers. Oftel is further considering number trading and assumes that if number trading is to be allowed, appropriate measures must be put in place to ensure that numbers are actually used and not just traded. However, number trading still seems to be a taboo in most European countries, even while it is recognised that the value of numbers is increasing (see previous section).

The ACA in Australia has commenced a feasibility study of alternative approaches to assigning numbers that give more explicit recognition to those factors which relate to the attribution of value to numbers. One component of any new approach may be to allocate numbers in smaller units than the current practice. Assigning numbers in units of a single number might address the problems arising from demand for particular numbers. Another component may be to assign numbers directly to the entities that use the numbers. Individual assignment might be the most efficient means by which the demand for particular numbers can be met most directly. ACA has already planned individual assignment for freephone and shared cost numbers.

ACA suggests that individual assignment will be more straightforward where:

- the implementation of service provider portability relies on establishment of a centralised number database
- the quantity of numbers involved is not very large (up to some millions of numbers in Australia)
- value is frequently attributed to the numbers.

ACA has concluded that Australian customers are increasingly attributing value to numbers. ACA is aware that at least some carriage service providers deal with demand from their customers for valued numbers by charging their customers a premium for valuable numbers or by reserving numbers that are considered valuable. The discrepancy between the extent to which certain numbers are valued and the (lower) fee imposed by ACA is a stimulating factor in warehousing, hoarding and trading of valuable numbers. This has already been experienced in the USA with North American freephone numbers. ACA is also concerned about potential conflicts with intellectual property rights caused by number trading while alphanumeric dialling is developing. ACA is considering auctioning numbers in order to achieve the most economically efficient outcome.

Assessment of the responses

The collected responses are presented in Annex F, section C, statements 6 and 7.

> NP between network operators and service providers ultimately implies that numbers cannot contain any operator or service provider identity. With NP it is therefore not necessary in the long run to assign blocks of numbers to mobile network operators or to service providers. Negative effects of block assignment, like competition distortion and inefficiency in use of numbers, may possibly be solved for certain services and in some countries by changing to assignment directly to users. Certain highly valued numbers may be assigned by auctioning.
>
> Assignment directly to users is supported by the respondents in particular for special-tariff services and also for personal numbers. It is under consideration in several countries and is actually already applied to these services in a few countries. The benefits mentioned in addition to those already covered by the two statements are ease of choice for users, an opportunity to allow number trading for some services and simple access for NRAs to number information.
>
> Assignment directly to users is opposed by the respondents where geographic numbers are concerned in particular, and to a lesser degree also where mobile numbers are concerned. For these numbers in particular, competition distortion is not considered to be an issue. The arguments mentioned against assignment directly to users concern management difficulties, routing problems and the extra burden for the NPM. Block assignment would even be more effective in certain cases like prepaid phones. Routing problems, however, should in the long term not be seen as an argument against individual assignment once service provider portability is available.

2.7   Delegation of assignment and self-regulation by industry

Introduction

The statement discussed is:

> *An increased workload in terms of assignment may be a reason for the NRA to delegate assignment and an opportunity to allow more self-regulation by industry.*

Service provider portability may lead to a change from block assignment to individual assignment, in particular for special-tariff and personal numbers (see previous section). Such a change implies a shift of the workload to the NPM. This may be an opportunity for the NRA to delegate assignment and possibly to allow more self-regulation by industry. But in principle individual assignment and delegation of assignment are separate issues.

Delegation of assignment will add to the complexity of existing numbering management. One of the complexities is developing detailed and precise rules for allocation and, in particular for refusal of allocation of numbers. The need for great detail and precision is to ensure that the organisation to which assignment powers has been delegated has rules and procedures to govern every possible scenario that it may encounter in deciding whether to approve or refuse an application for allocation of numbers. Auditing the use of assigned numbers may be more complicated.

Delegation should yield sufficient benefits to compensate for the increased complexity, such as increased efficiency of the assignment process. Self-regulation will have more chance as the telecommunications market develops and establishes self-regulating mechanisms. It should be realised, however, that self-regulation by industry may be an objective in the very long term as part of a general attitude that regulation by independent bodies should only be applied where market mechanisms fail to do the job.

It is not clear whether the overall number assignment process, including all stages, would become more efficient if only one stage were required instead of two or three stages. On first sight going from block assignment to individual assignment seems to imply simplification of the overall assignment process. On the other hand, block assignment has advantages for the service providers. There is today a strong link between administrative and technical data in the service provider's databases, but this would disappear with individual assignment directly to users. This integration of number assignment into service provision optimises the management of individual numbers by the service provider, by allowing swift administrative action in case of modification of the technical situation of the user. It should be noted that this link between administrative and technical data will also disappear with number portability irrespective of individual assignment of numbers to users.

One potential scenario that may be worthy of consideration in the context of delegation of assignment is a competitive model of assignment. This might operate in a similar manner to the model for allocation of Internet domain names where there is a separation between a single "registry" of domain names and multiple competing "registrars" who assign names to users and record their assignments in the registry. This model of delegation of assignment is probably only applicable to E.164 numbers if the numbers are allocated individually to the end users and there is scope for multiple registrars to compete over such characteristics as cost of registration, speed of registration and quality of services.

The ACA in Australia has scheduled to commence delegation of assignment and transfer functions for freephone and shared cost numbers to an independent body called INMS (Industry Number Management Service) in November 2000. The preparations have involved and continue to involve a considerable effort by both the ACA and the INMS. A number of issues have been quite contentious and have required intensive negotiations. The issues are ownership of the intellectual property associated with the design and content of the database to be operated by INMS and indemnification relating to decisions by the independent body. Oversight of the delegation is also expected to involve considerable preparatory and continuing effort.

Assessment of the responses

The collected responses are presented in Annex F, section C, statement 8.

> Service provider portability may lead to a change from block assignment to individual assignment. Such a change may be an opportunity for the NRA to delegate assignment and possibly to allow more self-regulation by industry.
>
> Delegation of assignment tasks is considered possible by the respondents and, in particular for special-tariff numbers, it is actually under consideration in one country and in preparation in another. But there is a common view that delegation should only be possible where the functions delegated are entrusted to an independent body and the NRA remains in control. Self-regulation by industry is not foreseen.

2.8   NP and the need for more routing numbers

Introduction

The statement discussed is:

> *As NP proliferates, more routing numbers, either E.164 numbers or numbers from other resources, need to be assigned.*

NP accelerates the trend of separation of name and address, where the name is the directory number used by the calling party to reach the called party and the address is used for routing. For most non-geographic numbers this separation already exists. When the directory number can only be used as a name, another number is needed as an address to enable routing.

Routing numbers may be numbers from the national telephone numbering plan or numbers from another plan. They may be full numbers or they may be used to prefix a ported directory number.

The increased separation of name and address has consequences for the numbering plan design and the assignment of the resources concerned.

Assessment of the responses

The collected responses are presented in Annex F, section C, statement 9.

NP for geographic numbers creates a need for more routing numbers.

Apparently the views of the respondents on the need for routing numbers differ, possibly because of some misunderstanding of the statement discussed. Whether numbers are used from the national telephone numbering plan or from another plan, whether they are used as full numbers or as prefixes, in all cases, NP for geographic numbers requires more routing numbers.

3   Conclusions and proposals

From the assessment of the responses to the questionnaire the following picture takes shape regarding the impact of NP, both for the short term and the long term. The longer-term effects may already have some initial signs visible at present but they may become apparent after five years or more.

A   The short-term impact

The direct effects mentioned mainly concern service provider portability:

- need for the NPM to keep track of ported numbers (mentioned by three countries)
- need for the NRA to define the service provider responsible for ported numbers (mentioned by two countries)
- need for a central reference database (mentioned by one or two countries)
- need to change conditions of assignment (mentioned by one country)
- consideration of central assignment of individual non-geographic numbers (mentioned by one country)
- delegation of assignment tasks for freephone and shared-cost numbers, which requires highly detailed rules (mentioned by one country).

Less need for blocks of geographic numbers was mentioned by one country. The need for numbering resources for routing was mentioned by two countries. In one country a new range for numbers with nation-wide location portability has been introduced and these numbers are assigned directly to users.

B   The long-term impact on national numbering plans

The structure of the national numbering plan determines which type of NP may be implemented. The main effect, if any, of NP on the national numbering plan would be the loss of structure in the plan. Less structure might mean that the usable number capacity would increase significantly.

Another effect of NP is that the user might be able to retain his number longer and therefore might value his number more. (The inverse effect is certainly also true: retaining a number makes the number valuable for the user and, therefore, NP is desirable.) Increase in value of numbers will imply that numbering plans need to be designed more carefully in order to avoid future changes to valuable numbers

Service portability requires removal of any service information including any tariff information in the number. The need for service and tariff information in the number may limit the introduction of service portability. Regarding alternative means for providing tariff information, the belief prevails that these means will become available in the long term but may not replace all tariff information in numbers. Service portability is in particular foreseen between fixed and mobile services, although users still value geographic information in the number. Service portability is certainly not foreseen for special-tariff services because of the need for users to have tariff information in the number.

Nation-wide location portability requires removal of any geographic information in the numbering plan and, therefore, closing of the numbering plan. Closing the numbering plan not only opens the door to nation-wide location portability but also provides extra number capacity. But the need for nation-wide location portability is unclear while in some countries local dialling is valued by users.

NP for geographic numbers creates more need for more routing numbers.

C   The long-term impact on number assignment

The main effect of NP on number assignment is that it opens the door to individual assignment by the NPM (Numbering Plan Manager) directly to the users. After all, NP between network operators and service providers ultimately implies that numbers cannot contain any operator or service provider identity. With NP it therefore is not necessary in the long run to assign blocks of numbers to mobile network operators or to service providers. Negative effects of block assignment, such as competition distortion and inefficiency in use of numbers, may possibly be solved for certain services and in some countries by changing to assignment directly to users.

Individual assignment directly to users is feasible in particular for special-tariff services and also for personal numbers. It is under consideration in several countries and is actually already applied in a few countries. Assignment directly to users is opposed in the case of geographic numbers in particular and to a lesser degree also for mobile numbers. For these numbers in particular, the issue of competition distortion is not considered to be evident.

It seems to be generally assumed that the value of numbers is increasing. (There may be elements other than NP that are even more important factors in this increase in value.) Individual assignment provides better possibilities to deal with valuable numbers than block assignment. It may also provide an opportunity to allow number trading for some services. Certain highly valued numbers may be assigned by auctioning.

A change from block assignment to individual assignment implies a shift of the assignment workload from network operators and service providers to the NPM. Such a change may be an opportunity for the NRA to delegate assignment and possibly to allow more self-regulation by industry. Delegation of assignment tasks is considered feasible and, in particular for special-tariff numbers, it is actually under consideration in one country and in preparation in another. But there is a common view that assignment should only be delegated where the functions concerned are entrusted to an independent body and the NRA remains in control. Self-regulation by industry is not foreseen.

On the basis of the considerations detailed above under items A, B and C, ETO proposes that NRAs should take account of the following points for both the short term and the long term:

1. In a long term perspective ETO foresees service portability between fixed and mobile services. The advantages and disadvantages of service portability for these and other services should be weighed against maintaining information in numbers regarding tariff or service.

2. The advantages and disadvantages of nation-wide location portability and a closed numbering plan should be weighed against maintaining information in numbers regarding geography and, where applicable, tariff.

3. The beneficial effect of all types of NP on usable numbering capacity should be considered when planning future number needs.

4. The implication of NP that more routing numbers are needed should be taken into account when planning future number needs.

5. ETO foresees individual assignment directly to users for numbers used for services such as special-tariff services. Consideration should be given to the advantages and disadvantages of individual assignment and, in addition, to auctioning and number trading for those numbers.

6. The advantages and disadvantages of delegation of assignment should be weighed against each other.

ANNEXES

Annex A   Work requirement for ETO study

1.   **Subject: The Effect of Number Portability on National Number Administration And Management**

2.   **Purpose**

The objective of the study is to make proposals to CEPT NRAs regarding the effect of number portability on the establishment of national numbering and dialling plans (administration), and on the assignment of numbers from the plans (management).

3.   **Background and Justification**

Number portability is the facility for a user to take his ITU-T Recommendation E.164 number with him when changing service provider, location or service. This study examines the effect of number portability (service provider portability in particular) on national number administration and management. Service provider portability implies local network portability. The other types of number portability are also included.

Number portability is becoming feasible in step with the erosion of technical restrictions. At the same time, several factors are providing impetus for the introduction of number portability, notably the move to more competitive telecommunication markets. An important factor is the proposal for EU countries to have service provider portability introduced for geographic and non-geographic numbers (except mobile numbers, which are still under study) before the year 2000.

National number administration and management are under the control of NRAs (National Regulatory Authorities) according to EU regulation. Two levels can be distinguished: the establishment of the national numbering and dialling plan (administration), and the assignment of numbers from the plan on a national level (management). It would be worth considering reducing the degree of structuring in national numbering and dialling plans in order to facilitate number portability. It may be advantageous to assign numbers to users directly, instead of via number blocks for network operators or service providers.

4.   **Work Requirement**

−   investigate present and future effects of the different types of number portability on number administration and management in European countries, in some relevant non-European countries and on an international level where number portability has been implemented

−   identify trends that may affect numbering administration and management in a way that reinforces or counteracts the effects of number portability

−   provide analytical comments on developments in number administration and management as a consequence of the introduction of number portability, while taking related trends into account

−   propose measures to assist NRAs in preparing for these developments

5.   Methodology

Relevant cases of number portability will be surveyed and persons involved in number management and administration will be interviewed on present and future effects of number portability and related trends. ETO will present the information in a first interim report and subsequently discuss it in a workshop with European NRAs, European organizations, and user representatives. ETO will present a second interim report, resulting from the workshop discussions and from written comments, with initial proposals for actions by NRAs. The final report will contain proposals that are more detailed.

6.   Execution and Manpower

The study should start in April 1999. ETO will produce the first interim report in August 1999 and the second interim report in January 2000. ETO will present the final report for approval in April 2000. ETO anticipates that it can carry out this study with eight man-months of work.

Annex B   List of abbreviations

ACA	Australian Communications Authority
ECMA	European body standardising information and communication systems
ECTEL	European Telecommunications and Professional Electronic Industry
ECTRA	European Committee on Telecommunications Regulatory Affairs
ECTRA/PTN	ECTRA Project Team on Numbering
EIIA	European Information Industry Association
ETNO	European Public Telecommunications Network Operators' Association
ETO	European Telecommunications Office
ETSI	European Telecommunication Standardisation Institute
EU	European Union
GSM	Global System for Mobile
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardisation Sector
NPM	Numbering Plan Manager
NRA	National Regulatory Authority
PRS	Premium Rate Service

Annex C   List of definitions

Administration	Administration of naming and addressing plans is the establishment of conventions for naming and addressing and of subsequent changes to those conventions.
Assignment	Assignment is the combined process of allocation and preceding reservation. If there is no reservation, assignment is equivalent to allocation.
Fixed local loop numbers	Directory numbers used for network termination points in the fixed local loop.
Geographic numbers	Directory numbers used for network termination points in the fixed local loop which carry information on the geographic area within a country where these numbers can be used.
Individual assignment	Number assignment by the numbering plan manager in units of a single number. The numbers may be assigned to network operators or service providers or directly to users.
Management	Management of naming and addressing plans consists of: - assignment of names and addresses - supervision of use of assigned resources - changes in the conditions imposed on assignees - withdrawal of assigned resources.
Numbering Plan Manager (NPM)	An NPM is a national body that carries out the national numbering plan management.
National Regulatory Authority (NRA)	An NRA is a national body independent of telecommunications organisations that has formally been recognised as such by the state and authorised to administer or manage national numbering, naming or addressing plans.
Non-geographic numbers	Directory numbers which can be used nation-wide, both for mobile and fixed network services.
Special-tariff numbers	Non-geographic numbers for special-tariff services like freephone, shared-cost and premium rate (= shared-revenue) services.

Annex D   Bibliography

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Annex E   ETO progress report on number portability in public telephony networks in ECTRA countries
(Last update on 10 July 2000)

1. Background information

Introduction

Number portability in public telephone networks is considered to be an essential factor contributing to the development of competition in public telephone networks.

ECTRA Recommendation ECTRA/REC(96)01-E 7 November 1996 states that CEPT members should implement number portability between operators in the fixed local loop as soon as competition in the local loop is launched. Where implementation of number portability between operators is not feasible at that date, it should take place no later than three years after the liberalisation of voice telephony service.

The EU has set deadlines for its 15 Member States for the introduction of number portability between operators. The EEA countries Iceland, Liechtenstein and Norway are not EU Member States but also implement EU regulation on telecommunications. Directive 98/61/EC of the European Parliament and of the Council sets deadlines for subscribers on public fixed telephone networks (including ISDN) to be able to retain their numbers independently of the service provider. This applies in the case of geographic numbers at specific locations and in the case of other than geographic numbers at any location. The deadlines are 1 January 2000 or two years after any later date agreed for full liberalisation of voice telephony services. Extension of service provider portability to mobile users is proposed by the European Commission in its 'The 1999 Communications Review' of November 1999.

This ETO progress report on number portability in ECTRA countries reflects the state-of-the-art of regulation on number portability in ECTRA countries. Of the 43 ECTRA countries, 25 countries have responded to an ETO questionnaire on number portability: Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Luxembourg, Norway, The Netherlands, Poland, Portugal, the Russian Federation, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. Four of the countries which have responded have not yet made decisions on the issues concerned. Those countries are Croatia, Ireland, Latvia and Poland. Some information from other sources has been added for Ireland and inserted for Italy. The progress report is a living document that will be updated when new information is received.

In sections 2 to 8 of the progress report, the review on number portability for fixed and mobile telephony services is presented in tables. Note that in certain places question marks have been added, indicating that the given data still need to be verified. Empty

boxes indicate that relevant data are not known or are under consideration. Terms used in the tables are explained below.

Three types of number portability are distinguished:

Service provider portability: the customer can retain his number when changing network operator or service provider (while not changing service or location).

Service portability: the customer can retain his number when changing service (while not changing location or network operator or service provider).

Location portability: the customer can retain his number when changing location within a geographic numbering area (while not changing service or network operator or service provider).

Only portability of the <u>full</u> number has been taken into consideration. Partial portability, in which case only part of the number is ported (usually all digits except the initial digits), has not been included. Service provider portability is the most important factor when considering the development of competition and consumer protection and is therefore subject to regulation. Service portability and location portability may or may not be regulated. Service portability and location portability should in any case be within the limitations set by the national numbering plan and the charging requirements.

Several categories of telephony services are considered separately:

Fixed local loop services, i.e. PSTN services based upon the traditional telephony services, the so-called plain old telephony services (POTS), and equivalent ISDN services.

Cellular mobile services, e.g. NMT, GSM and DCS1800.

All other types of services, e.g. freephone, premium rate, personal number and paging.

The effectiveness of service provider portability in stimulating competition depends on the solution chosen and the cost allocation. The solution may not regulated but cost allocation will be. Both factors are covered in detail below.

Several solutions are distinguished for implementing service provider portability between the networks:

Onward routing (OR): The call is delivered first to the network to which the ported number belonged (donor network). The call is identified in the donor network as being a call to a ported number and the call is routed onward to the new destination.

Call drop back (CDB): CDB is an enhancement of OR. When the donor network receives the call, it releases the call again and it returns a message indicating that the number has been ported and providing routing information. This drop back message is

used by a transit or an originating network to route the call onward to the new destination.

Intelligent-network-related (IN-related): IN-related solutions use a database which is interrogated to identify whether the called number has been ported and, if so, to which destination. A range of IN-related solutions are possible, including all call query (ACQ) and query on release (QoR).

Signalling relay (SR): SR is a solution for GSM using existing GSM functions. The basic idea is that the donor network by using the signalling relay function sends a routing enquiry to the recipient network which returns the routing information required to properly route the call. The routing information can be used either to reach the recipient network or the visiting network (the network where the called party is roaming).

There are three main types of costs for implementing service provider portability:

The system set-up costs are the costs needed for having number portability provisions in networks and support systems.

The extra conveyance costs are the additional conveyance costs of number portability for individual calls. For advanced IN solutions there may be no extra conveyance costs.

The administration costs are the costs incurred in the porting of an individual number.

For all types of costs only the incremental costs should be taken into account.

Methods of allocating the costs of service provider portability distinguish between conveyance costs and administration costs (each party bears its own system set-up costs in all cases):

The old service provider (in most cases the donor service provider, where the number was originally used) pays all costs.

The new service provider (the recipient service provider, where the number is used since its last porting) pays all costs.

Regulated share: the costs are shared between the old and the new service provider according to a ratio fixed by national regulation.

The cost allocation is negotiated between the old and the new service provider, possibly between certain limits derived from national or EU regulation on interconnection agreements.

The costs are borne directly by the customer who is porting the number.

All parties bear their own costs.

2. Dates of identification of barriers against service provider portability in the local loop, dates of removal of regulatory barriers and dates for the introduction (intro date) of full liberalisation of voice telephony services

The data indicate the month and year or 'no barriers' or 'started', whichever is applicable.

Country	Date of identification of barriers	Date of removal of barriers	Intro date for liberalisation
Austria (EU)			01.1998
Belgium (EU)	12.1997	01.2000	01.1998
Cyprus			01.2004
Czech Republic	12.1999	12.2000	01.2001
Denmark (EU)	no barriers	no barriers	before 01.1998
Finland (EU)	no barriers	no barriers	before 01.1998
France (EU)			01.1998
Germany (EU)	no barriers	01.1998	01.1998
Greece (EU)			01.2001
Hungary	12.1999	12.2001	01.2002
Ireland (EU)	no barriers	no barriers	12.1998
Italy (EU)	09.1997	01.1998	01.1998
Luxembourg (EU)	no barriers	no barriers	07.1998
Norway (as EU)	01.1998	01.1998	01.1998
Netherlands (EU)	no barriers	no barriers	before 01.1998
Portugal (EU)			01.2000
Russian Federation	12.1998	01.2000	
Slovak Republic	01.2002	01.2003	01.2003
Slovenia	01.1998	12.2000	12.2001
Spain (EU)	07.1997		12.1998
Sweden (EU)	06.1997	07.1999	before 01.1998
Switzerland	11.1997	01.1998	01.1998
United Kingdom (EU)	no barriers	no barriers	before 01.1998

3. Implementation of service provider portability for fixed local loop services

The table below contains the following data regarding service provider portability for fixed local loop services (FLLSs):

- the introduction date ('intro date', month and year)

- who offers number portability (NP; all SPs = all service providers)

- the solution used between networks (OR = onward routing, CDB = call drop back, IN-related; see section 1 for clarification) irrespective of whether it is regulated or not

- who pays the costs for extra conveyance and administration (donor = donor SP, recipient = recipient SP, reg. share = regulated share, negotiated, customer, bear own = all parties bear their own costs; origin. SP = SP where call originated; see section 1 for clarification).

Country	Service provider portability for fixed local loop services				
	Intro date	Who offers NP	Solution between networks	Who pays the costs	
				Conveyance	Administration
Austria	01.1998	all SPs	CF -> QoR	reg. share?	customer?
Belgium	01.2000	all SPs	OR+IN rel.		
Czech Republic	01.2001				
Denmark	10.1999	all SPs	IN-related	negotiated	negotiated
Finland	06.1997	all SPs	IN-related	reg. share	reg. share
France	01.1998	all SPs	OR	recipient	recipient
Germany	01.1998	all SPs	OR+IN-rel.	bear own	bear own
Greece	01.2003	all SPs			
Hungary	01.2002	all SPs	IN-related		
Ireland	01.2001?	all SPs	IN-related	origin. SP	
Italy	01.2000	all SPs	OR	recipient	recipient
Luxembourg	01.2000	all SPs	OR		
Netherlands	01.1999	all SPs	IN-related	negotiated	negotiated[2]
Norway	06.1999	all SPs	OR->IN-rel[3]	negotiated	recipient
Portugal[4]	06.2001	all SPs	QoR+RE[5]	t.b.d.	t.b.d
Russian Federation	01.2000		IN-related		
Slovak Republic	01.2003	all SPs	IN-related		
Slovenia	12.2000				
Spain	01.2000	all SPs	OR+ACQ	recipient	recipient
Sweden	07.1999	all SPs	OR+IN-rel.[6]	recipient	recipient
Switzerland	01.2000	all SPs	OR+ACQ	negotiated	negotiated
United Kingdom	07.1996	all SPs	OR	donor	recipient

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[2] The maximum amount that the customer can be charged (by the recipient) is about 9 Euro.

[3] The date of change from the OR to the IN-related solution is 01.2001.

[4] A public consultation on the details of number portability implementation is launched in January 2000.

[5] Administrative procedures through a Reference Entity

[6] If an IN-related solution cannot be implemented by 07.1999, then OR will be used as an interim solution.

4. Implementation of service portability and location portability for fixed local loop services

The table below contains the following data regarding service portability and location portability for fixed local loop services (FLLSs) irrespective of whether these are regulated or not:

- the introduction date ('intro date', month and year)

- who offers number portability (NP; incumbent, all SPs = all service providers).

An example of service portability for fixed local loop services is portability from analogue telephony to ISDN.

Country	Service portability for FLLSs		Location portability for FLLSs	
	Intro date	Who offers NP	Intro date	Who offers NP
Belgium	?.2000	all SPs	01.2000	all SPs
Czech Rep.	01.2001		01.2001	
Denmark	01.2001	all SPs	01.2001	all SPs
Finland			06.1997	all SPs
France			01.2001	all SPs
Germany	01.1998	all SPs	-	-
Hungary	01.2002	all SPs	01.2002	all SPs
Ireland	12.1998	all SPs	12.1998	all SPs
Luxembourg		incumbent		
Netherlands	01.1999	all SPs		
Portugal[7]	yes[8]	all SPs	yes[9]	all SPs
Russian Federation			12.1991?	incumbent
Slovak Republic	01.2003	all SPs		
Slovenia	12.2000		12.2000	
Sweden				all SPs
Switzerland	01.1998	all SPs	01.1998	all SPs

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[7] Both service portability between from analogue telephony to ISDN and location portability within a given geographic numbering area is not regulated but common practice exercised by the incumbent. A public consultation on the details of number portability implementation is launched in January 2000.

[8] Fixed telephony service over PSTN and ISDN is considered the same service

[9] It is a commercial offer, although restricted to geographic areas

5. Implementation of service provider portability for cellular mobile services

The table below contains the following data regarding service provider portability for cellular mobile services (t.b.d. = to be determined):

- the introduction date ('intro date', month and year)

- who offers number portability (NP; incumbent, all SPs = all service providers)

- the solution used between networks (OR = onward routing, SR = signalling relay; see section 1 for clarification) irrespective of whether it is regulated or not

- who pays the costs for extra conveyance and administration (donor = donor SP, recipient = recipient SP, negotiated, bear own = all parties bear their own costs; for clarification, see section 1).

Country	Service provider portability for cellular mobile services				
	Intro date	Who offers NP	Solu-tion	Who pays the costs	
				Conveyance	Administration
Belgium	?.2000	all SPs			
Czech Republic	01.2001				
Denmark	01.2001	all SPs		negotiated	negotiated
Germany		all SPs		bear own	bear own
Hungary	01.2002	all SPs			
Ireland	01.2000				
Italy	t.b.d.	t.b.d.	t.b.d.	t.b.d.	t.b.d.
Luxembourg	?.2001	all SPs			
Netherlands	04.1999	all SPs	SR	negotiated	negotiated[10]
Portugal	At the same time as UMTS[11]	All SPs	QoR	t.b.d.	t.b.d.
Russian Federation	12.1991?	incumbent	OR	recipient	recipient
Slovenia	12.2000				
Spain	07.2000 [12]	all SPs	t.b.d.	recipient	recipient
Sweden	01.2001 [13]	all SPs			recipient
Switzerland	01.2000	all SPs	SR	negotiated	negotiated
United Kingdom	01.1999	all SPs	SR	donor	recipient

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[10] The maximum amount that the customer in can be charged (by the recipient) is about 9 Euro.

[11] Foreseen to January 2002

[12] Date of introduction of the functionality in the networks.

[13] The date has been proposed by the NRA and is subject to public consultation at present.

6. Implementation of service portability for cellular mobile services

The table below contains the following data regarding service portability for cellular mobile services irrespective of whether it is regulated or not:

- the introduction date ('intro date', month and year)

- who offers number portability (NP; all SPs = all service providers).

An example of service portability for cellular mobile services is portability from analogue services such as NMT to digital services such as GSM. Portability between GSM900 and GSM1800 (formerly DCS1800) is no longer considered to be an example of service portability.

Country	Service portability for cellular mobile services	
	Intro date	Who offers NP
Czech Republic	01.2001	?
Denmark[14]	01.2001	all SPs
Germany	02.2002	all SPs
Spain	07.2000[15]	all SPs
United Kingdom	06.1997	all SPs

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[14] In addition, portability between mobile and fixed services will be available.

[15] Dat of introduction of the functionality in the networks.

7.   Other non-geographic services such as freephone, premium rate, shared cost and personal number services to which service provider portability applies

Country	Other non-geographic services to which service provider portability applies
Belgium	freephone + premium rate + personal number
Czech Republic	freephone + premium rate
Denmark	all other services
Finland	freephone + premium rate + shared cost
France	freephone + premium rate + shared cost + personal number
Germany	freephone + shared cost + premium rate + personal number
Hungary	all other services
Ireland	freephone + premium rate + shared cost + personal number
Italy	freephone + premium rate + shared cost
Luxembourg	freephone + premium rate + personal number
Netherlands	freephone + premium rate
Norway	freephone + premium rate + shared cost + personal number
Portugal	freephone + premium rate + shared cost + personal number
Slovak Rep.	freephone + premium rate
Slovenia	freephone + premium rate
Spain	freephone + premium rate + shared cost + personal number
Sweden	freephone + premium rate + shared cost
Switzerland	freephone + premium rate + shared cost + personal number
United Kingdom	freephone + premium rate

8.   Implementation of service provider portability for all other non-geographic services such as freephone, premium rate services, personal number services

The table below contains the following data regarding service provider portability for all services mentioned in the table of section 7:

- the introduction date ('intro date', month and year)

- who offers number portability (NP; all SPs = all service providers)

- the solution used between networks (OR = onward routing, IN-related; see section 1 for clarification) irrespective of whether it is regulated or not

- who pays the costs for extra conveyance and administration (donor = donor SP, recipient = recipient SP; reg. share = regulated share, negotiations, customer, bear own = all parties bear their own costs; origin. SP = SP where call originated; for clarification, see section 1).

Country	Service provider portability for all other services				
	Intro date	**Who offers NP**	**Solution between networks**	**Who pays the costs**	
				Conveyance	**Administration**
Austria	01.2000	all SPs			
Belgium	01.2000	all SPs			
Czech Republic	01.2001				
Denmark	07.1999	all SPs		negotiated[16]	negotiated
Finland	01.2000	all SPs	OR+IN-rel.	negotiated	negotiated
France	?.1998[17]	all SPs	IN-related		
Germany	01.1998	all SPs	OR+others	bear own	bear own
Greece	01.2003?	all SPs			
Hungary	01.2002	all SPs	IN-related		
Ireland	01.2000	all SPs	IN-related	origin. SP	recipient
Italy	01.2000?	all SPs	IN-related	recipient	recipient
Luxembourg	07.2000?	all SPs			
Netherlands	01.1998 [18]	all SPs		negotiated	negotiated[19]
Norway	06.1999	all SPs	OR->IN-rel.[20]	negotiated	recipient
Portugal[21]	06.2001	all SPs	QoR+RE	t.b.d.	t.b.d.
Slovak Republic	01.2003	all SPs	IN-related		
Slovenia	12.2000				
Spain	01.2000	all SPs		recipient	recipient
Sweden	07.1999	all SPs	OR+IN-rel.	recipient	recipient
Switzerland	01.2000	all SPs	OR+IN-rel.	negotiated	negotiated
United Kingdom	06.1997	all SPs	OR	reg. share	recipient

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[16] Also the system set-up costs for NP for other services is negotiated.

[17] The given date only applies to freephone services.

[18] The introduction date is only valid for numbers which are not mass or media numbers. The introduction date for mass and media numbers is 01.1999.

[19] The maximum amount that the customer can be charged (by the recipient) is about 9 Euro.

[20] The date of change from the OR to the IN-related solution is 02.2001.

[21] A public consultation on the details of number portability implementation is launched in January 2000.

Annex F   ETO questionnaire with collected responses

Introduction

Number Portability (NP) affects national number administration and management both directly and in the longer term. The numbers referred to here are the numbers defined in ITU-T Recommendation E.164. ETO expects that NP, including all types of NP, will fundamentally affect national number administration and management in the longer term. The new ETO study for the European Commission (note author: afterwards it was decided to do the study for ECTRA) is particularly aimed at rapid identification of both the direct effects and longer-term effects with a view to making proposals to the NRAs of CEPT member countries. ETO anticipates that the effects identified will include a range of aspects that are also the result of synergetic developments outside the NP context.

The objective of the ETO questionnaire on the effects of E.164 NP is:
-   to achieve a common understanding of the effects of NP and other synergetic developments
-   to collect examples of the effects of NP and other synergetic developments.

The term 'direct effects' refers to effects which actually have taken place, or will take place, directly linked to the introduction of one or more of the types of NP. These effects could concern for example changes in the national numbering plan, changes in the way numbers are assigned or changes in assignment conditions. Please provide a description on the next page in section B of the direct effects which have taken place or will take place in your country.

Identification of the longer-term effects requires a broader view of developments and trends. Please give your views by indicating for each of the nine statements in section C whether you agree, disagree, partially agree, or have no opinion. Please, also provide examples from your own country or other countries which support your view. If you have any other views about longer-term effects which are not covered by the nine statements, please add comments at the end of section C.

Please return the completed questionnaire **before 15 May 1999** to:

> European Telecommunications Office (ETO)
> Attention Jack Nuijten
> Strandboulevarden 92, 5th floor
> DK-2100 Copenhagen
> Denmark

For questions and comments you can contact Jack Nuijten:

Direct telephone:	+45 35 25 58 03
General telephone:	+45 35 43 80 05
General facsimile:	+45 35 43 60 05
Electronic mail:	jack@eto.dk

A   Details of respondent

Please provide your details below:

- Country represented:

- Organisation represented:

- Name respondent:

- Telephone number:

- Facsimile number:

- Electronic mail address:

Summarised response:

Austria (NRA), Denmark (NRA), Finland (NRA), Germany (NRA), Greece (NRA), Ireland (NRA), Luxembourg (NRA), The Netherlands (NRA), Portugal (NRA), Slovak Rep. (NRA), Sweden (NRA), Switzerland (NRA), United Kingdom (NRA), United Kingdom (consultancy), Australia (NRA), United States of America (Lockheed Martin IMS, the Number Portability Administrators for North America).

Czech Rep. (NRA), Estonia (NRA) and Poland (NRA) also responded but did not provide an opinion on any of the questions.

B   Direct effects of NP on national administration and management

Please provide a description below of the direct effects which have taken place or will take place on national number administration and management in your country:

Collected responses:

Danmark: the donor service provider will be responsible for payment of charges and the correct usage of numbers for the number blocks received from the NRA.

Finland: a new number range for numbers with nation-wide location portability was introduced in 1997 and these numbers are individually assigned by the NRA directly to users.

Germany: the need for blocks of geographic numbers reduces because of the NP impact.

Ireland: conditions of assignment will change, audit conditions for additional assignment will change, plans being considered to move to central assignment of individual non-geographic numbers.

Luxembourg: the NRA will have to manage a list of ported numbers, a range of routing numbers for ported numbers has been foreseen.

The Netherlands: apart from regulation on NP are the effects: need for information on ported numbers and, possibly in the future, the use of a central reference database.

Switzerland: numbering resources for routing.

Australia: need for rules to specify the transfer of ported numbers between operators and to specify which operator holds a number which has been ported, need for a database that tracks which operator holds a particular ported number, need for rules to specify responsibilities for routing of calls to ported numbers, highly detailed rules for delegation of assignment tasks as is planned for shared cost and freephone numbers.

C   Longer-term effects of NP and synergetic developments

Please provide your view upon each of the nine statements below:

Clarification of collected responses:

For each of the nine statements, the number in each of the boxes 'agree', 'disagree', 'agree partially' and 'no opinion' is the number of respondents that have chosen that particular box.

1. Service portability will become more available, for example portability between mobile and fixed services. This implies disappearance of information about service and tariff in numbers that users dial.

   Collected responses:

   | 9 | agree | | 2 | disagree | | 5 | agree partially | | 0 | no opinion |

   Examples from your own country or other countries which support your view:

   From agreeing respondents:
   - in Denmark fixed-mobile NP will be introduced
   - in Sweden the long-term goal is a closed, unstructured numbering plan where there is no distinction between geographic and mobile/personal numbers
   - in Australia interest has been expressed in using mobile numbers for services that include a fixed network element (e.g. centrex) and in using geographic numbers for wireless local loop and mobile services, a wireless local loop operator has recently been allocated both geographic and mobile numbers
   - in the United States of America wireless carriers must prepare for service portability to be introduced not later than in 2002.

   From disagreeing respondents:
   - customers want clear tariff information and mobile operators in Austria want branding
   - service portability is only applicable and beneficial for certain services
   - in Luxembourg the new numbering plan includes a service-independent number range which can be used for fixed and mobile services, users want recognition of the service within the number including a tariff indication.

   From partially agreeing respondents:
   - service portability is not feasible for certain types of services, e.g. freephone
   - service portability is definitely not feasible for some services, e.g. special-tariff services
   - in Portugal service portability between fixed and mobile services is not yet foreseen
   - mechanisms regarding tariff transparency should be envisaged before having service portability
   - availability of service portability may be a long-term possibility, but in the United Kingdom the number changes in 2000 are designed to enable users to identify tariffs from the numbers dialled
   - availability of service portability only foreseen when tariffs converge as callers should not be surprised by unexpectedly high tariffs.

2. Alternative means of informing users about tariffs of calls will become more and more available: instead of the number itself, means such as recorded announcements and screen messages will be used.

Collected responses:

| 6 | agree | 0 | disagree | 10 | agree partially | 0 | no opinion |

Examples from your own country or other countries which support your view:

From agreeing respondents:
- voice-response systems could be demanded for high-tariff calls
- in Denmark recorded tariff announcements are used for directly connect-through by the directory enquiry service and for the supplementary service call completion to busy subscriber
- in Germany recently one long-distance carrier has introduced a recorded announcement of the tariffs for calls via its network; several operators will introduce advice of charge to present tariff information across network boundaries to the calling party by the end of 1999
- in Netherlands recorded announcements of the tariffs for calls to premium rate numbers and mentioning of tariffs in advertisements for these numbers
- in Portugal audiotex service providers are obliged to announce the price per minute at the start of a call to them and to send a signal each minute during the call
- some means of tariff information is most likely needed.

From partially agreeing respondents:
- in Austria only for value-added services area is tariff information planned with alternative means (voice or display)
- tariffs for calls to premium rate numbers should be indicated in a publication of the numbers
- tariff information must be available for all users and not, for example, only for ISDN users
- recorded announcements show limitations in multi-language countries and may also cause problems with 'automatic terminal equipment' (e.g. fax machines)
- alternative means for tariff information will probably be available in the long term, however, NP may not be the driver
- even when advice-of-charge services are available, their availability is not advertised
- in Australia message preambles with tariff information are now standard for most voice calls to premium rate numbers, a 'ring back price' service is available for international calls providing the cost of a call after completion of the call, but alternative means for tariff information are not likely to completely supplant current tariff information in numbers.

3. The use of simplified dialling procedures by consumers (for example by abbreviated dialling, automated dialling and dialling by voice recognition) is increasing. This undermines the benefits of local dialling. At the same time abolition of local dialling is becoming more attractive as it enables development towards nation-wide location portability.

Collected responses:

| 7 | agree | 1 | disagree | 6 | agree partially | 2 | no opinion |

Examples from your own country or other countries which support your view:

From agreeing respondents:
- in Portugal the new numbering plan is closed and uniform, which is possible also because of increasing use of simplified dialling procedures
- in the Slovak Republic the new numbering plan is still open but is designed to enable simple closing of the plan
- in Sweden the long-term goal is a closed, unstructured numbering plan
- in Switzerland the numbering plan will be closed in 2001 which will open the door for nation-wide location portability
- not much value seen in retaining local dialling: in the United Kingdom the area covered by local dialling has been reduced substantially while there seem not to be any complaints.

From disagreeing respondents:
- in Ireland nation-wide location portability is unlikely as geographic information is still contained in the numbers.

From partially agreeing respondents:
- nation-wide location portability would cause loss of geographic information and, if tariffs are distance dependent, of tariff information
- in The Netherlands nation-wide location portability is not yet foreseen
- long-term issue of abolition of local dialling is related to 'mobility', not just NP, with drivers likely to be associated with the ability to offer IN solutions to perceived user needs
- in Australia the replacement of 55 local numbering areas with just 4 has met with little opposition or difficulties, however, users still place a high value on having location information in geographic numbers.

From respondents with no opinion:
- in Denmark nation-wide location portability was an element in the choice for abandoning a geographical plan
- in the United States of America there is a strong movement towards 10 digit dialling, in particular as a deterrent to number resource exhaust.

4. National numbering plans will become less and less structured, both as regards the geographic numbers, if they still exist, and as regards the non-geographic numbers.

Collected responses:

| 4 | agree | | 6 | disagree | | 5 | agree partially | | 1 | no opinion |

Examples from your own country or other countries which support your view:

From agreeing respondents:
- 'less detailed and more abstract' numbering plan both in geo and non-geo foreseen in a few years
- in Sweden the long term goal is a closed, unstructured numbering plan where there is no distinction between geographic and mobile/personal numbers.

From disagreeing respondents:
- in the United Kingdom the number changes in 2000 are designed to enable users to identify geographic and non-geographic information from the numbers and this scheme is likely to remain until 2015 at least
- in Australia operators have interest in new uses of numbers for new services that would increase the complexity of the structure of the numbering plan and users wish to retain detailed geographic information in the numbers
- in the United States of America more structure is being placed on the numbering plan due to the need to protect the remaining resource and preserve the numbering plan.

From partially agreeing respondents:
- implementation of NP and new products makes it difficult to maintain rigid distinction between e.g. fixed and mobile services, on the other hand distinction between different types of special-tariff services (such as freephone) is maintained
- the structure of the numbering plan is important to distinguish between services or between tariffs
- it seems important to differentiate only a minimum of services (geo, mobile, personal = geo or mobile, freephone, less than normal tariff, more than normal tariff) in order to limit the need for service portability
- although in Portugal the numbering plan is closed geographic information in the numbers is still maintained
- as long as service portability is not implemented, a 'newly organised' numbering plan will remain structured in some way
- in the Slovak Republic the new numbering plan has less structuring of geographic numbers (less local numbering areas) but more structuring of non-geographic numbers (more non-geographic services).

5. The commercial and personal value of numbers is increasing through developments like the introduction of NP, because NP provides a better chance for customers to retain numbers for a sustained period of time.

    Collected responses:

    | 12 | agree | | 1 | disagree | | 3 | agree partially | | 0 | no opinion |

    > Examples from your own country or other countries which support your view:
    >
    > From agreeing respondents:
    > - the lifetime of numbers may be limited anyway if numbers are replaced by names
    > - value increases in geographic and mobile numbers but also, apart from the NP effect, in service (freephone and premium rate) numbers
    > - users want to have the ability to retain their numbers to enable a stable basis for publications and advertisements
    > - in the United States of America the introduction of NP combined with individual assignment for freephone numbers has shown that, under these conditions, users attribute high commercial value to numbers
    > - in the United States of America number demand has increased as competition has increased with NP and the need to market numbers more aggressively is also increasing.
    >
    > From disagreeing respondents:
    > - NP is not increasing the value significantly, the value is independent of NP.
    >
    > From partially agreeing respondents:
    > - exhaustion of numbers will require number changes
    > - in Germany location portability is not imposed and may be offered within a local numbering area
    > - NP is not the only element on which the lifetime of a number depends, a future-proof numbering plan has more effect on the lifetime of numbers than NP.

6. Distortion of competition would best be avoided by number assignment by the numbering plan manager (NPM) being made directly to users.

Collected responses:

| 3 | agree | 3 | disagree | 8 | agree partially | 2 | no opinion |

Examples from your own country or other countries which support your view:

From agreeing respondents:
- in Germany freephone, shared-cost and personal numbers are already assigned directly to users
- a centralised database for all geographic numbers would be advantageous:
  - simple access for NRA to number information (e.g. assignee, status)
  - accurate data available for directory enquiry services
  - accurate data available for billing by long-distance carriers
- assignment directly to users also ensures a consistent approach for golden numbers
- if assignment directly to users is done centrally and routing is adequate, no harm is seen in adding number trading for some services.

From disagreeing respondents:
- in Denmark the burden of assignment directly to users outweighs the possibility to avoid distortion of competition and furthermore, numbers can not be used at all for routing and charging purposes
- in Australia the NRA is studying number management problems related to assignment directly to users, but the NRA is not aware of any competition problems that assignment directly to users would solve.

From partially agreeing respondents:
- in Austria service (e.g. freephone) numbers are assigned directly to users
- but it is difficult for the NPM to control numbers assigned directly to users
- agree for some services but not for geographic services
- agree for numbers with added commercial value (freephone and premium rate numbers) but not for geographic and mobile numbers as customers use NP to have their preferred number with the operator of their choice and because, except for ported numbers, individual routing of these numbers is not yet commonly available
- when, for commercial reasons, it is important for a user to choose a number it is desirable when the user can choose from a pool of all available numbers, but this does not apply to geographic numbers for which also other means of preventing competition distortion can be used without assignment directly to users
- there may be a need for different assignment procedures per type of number
- the issue of competition distortion may be true for personal numbers and numbers for special tariff services, especially if alphanumeric dialling is supported, but it is not an issue for geographic and mobile numbers
- the issue of competition distortion may be so, but other criteria need to be taken into account, such as development of switched networks (IN) and the practicability of systems for assignment of geographic numbers in particular.

7. Number assignment by the NPM directly to users adds to effective use of capacity as individual numbers are only assigned when they are actually to be used.

Collected responses:

| 9 | agree | 2 | disagree | 5 | agree partially | 0 | no opinion |

Examples from your own country or other countries which support your view:

From agreeing respondents:
- assignment directly to users only in the service number areas
- assignment directly to users could eliminate reserves of numbers currently held by companies, however it also eliminates information in numbers to allow a simple way of routing and charging
- block assignment has two disadvantages:
  - numbers from block largely unused, in particular directly after assignment
  - choice of a customer of a particular operator is limited
- in Switzerland assignment directly to users is considered for personal numbers and numbers for special tariff services (freephone, shared cost and premium rate)
- in the United Kingdom assignment of non-geographic numbers directly to users is considered for introduction around 2002
- management of assignment is a critical factor in the effective use of number capacity.

From disagreeing respondents:
- in Finland most of the numbers (with nation-wide location portability) assigned directly to users are not in use at the moment.

From partially agreeing respondents:
- examples can be given where block assignment is more effective, e.g. in case where terminals are supplied with a number (prepaid phones)
- assignment directly to users more difficult to manage due to quantity of numbers
- in Portugal assignment directly to users of some non-geographic numbers, in particular freephone numbers, is considered, but block assignment of geographic numbers (10,000 numbers per block) seems to be a good compromise between effective use of capacity and user's commodity
- in Australia there is no direct experience with assignment directly to users as yet, but 'warehousing' of numbers by operators and service providers under the current system of block assignment can be very extensive
- in the United States of America number pooling trials are currently conducted which is consistent with the idea of number conservation by assignment directly to users.

8. An increased workload in assignment may be a reason for the NRA to delegate assignment and an opportunity to allow more self-regulation by industry.

Collected responses:

| 5 | agree | | 4 | disagree | | 6 | agree partially | | 1 | no opinion |

> Examples from your own country or other countries which support your view:
>
> From agreeing respondents:
> - the NRA should provide clear guidance and a legal framework for self-regulation
> - In Australia the NRA is preparing a delegation of assignment tasks for shared cost and freephone numbers by number pooling in conjunction with the commencement of NP for these numbers.
>
> From disagreeing respondents:
> - in Austria is self-regulation for number assignment not foreseen
> - independence required at least as long as there are dominant operators.
>
> From partially agreeing respondents:
> - independence should be guaranteed and NRA should stay in control
> - relation between increased workload and stimulation of self-regulation is not seen, however delegation of assignment tasks is considered to be possible
> - in small countries is workload in assignment not so heavy, but for fair competition it is useful to create a numbering forum
> - in Switzerland delegation of assignment tasks is considered for personal numbers and numbers for special-tariff services, but the NRA should stay in control of policy and of supervision of the assignment process
> - delegation of assignment tasks yes, but self-regulation by industry not sure
> - the increased workload may be best managed by an independent body reporting to the NRA.

9. As NP proliferates, more routing numbers, either E.164 numbers or numbers from other resources, need to be assigned.

Collected responses:

| 5 | agree | 5 | disagree | 2 | agree partially | 4 | no opinion |

Examples from your own country or other countries which support your view:

From agreeing respondents:
- in Switzerland a National Destination Code will probably be used for routing numbers
- the extent of the need for routing numbers depends on the implementation methods, availability of transit networks and other factors.

From disagreeing respondents:
- does not depend on NP but on growth of the services (such as freephone) area
- the need for more routing numbers depends on the technical solution chosen for NP: in Finland the routing number is formed by adding a hexadecimal prefix to the directory number
- no relation between NP and routing numbers seen
- the need for more routing numbers depends on the technical solution chosen for NP: in the United States of America the resources are now being assigned more efficiently as the LRN (local routing number) method allows for less numbers to be used instead of more numbers.

From partially agreeing respondents:
- in Luxembourg the new numbering plan has one range of 4-digit numbers which will be used for routing numbers by prefixing a 4-digit number identifying the recipient operator to the directory number
- NP causes some need for routing numbers, but with more advanced networks and signalling there will be less need for routing numbers.

Please explain any other effect or synergetic development not mentioned above that you are aware of and provide other comments if required:

The United States of America: number pooling, as a number conservation method, is only being considered due to the ease with which it is incorporated into the NP service.

Annex G   Report on the ETO workshop on the impact of number portability at ETO on Friday 26 November 1999

Introduction

A workshop was held to discuss the results of the first interim report of the ETO study on the effect of number portability on national number administration and management. The workshops' objective was to provide input for a refined text in the second interim report. The second interim report is expected in the beginning of February.

The impact of number portability was lively and openly discussed by a small but broad mix of participants representing users, operators and regulators (including one participant from Lockheed Martin, North American Numbering Plan manager in the USA).

The assumption on which the study was based was that number portability was a user's need which could be easier fulfilled as technology is developing. The study did not only cover the effect of number portability on other developments but also effects in reverse direction and interaction with synergetic developments having similar effects. The term 'impact' would better cover the scope than the term 'effect'.

The discussion was started with what was meant by 'long term'. It was agreed that the long term could not clearly been defined. The study concerned addresses effects of which some initials signs are visible at present but which may become apparent after another five years or more. It was proposed not to limit the thinking about the future of number portability to E.164 numbers but to take a broader view. Ultimately such a broader view would have to be translated back to E.164 numbers again being the defined scope of the study concerned.

The nine statements on the long-term presented in the first interim report on the subject, were discussed. No new statements were added. The workshop report mainly reflects opinions that were considered to be relevant in the context of the study and had not yet been taken into account in the first interim report. The opinions have been structured according to the postulates were they seem to fit best, even though they may have been expressed while discussing other items.

The general conclusion was that the statements should be refined considerably, allowing effects both from and on number portability, taking different situations into account: different services, different customers, different countries and different timescales. To allow room for the different situations, the study should not lead to proposals concerning precisely defined services and time scales. Although numbering may affect the market, the market rather affects numbering. Some phenomena which ETO had identified as 'effects' of number portability were in fact facilitators or provocations for the introduction of number portability - cause and effect were the opposite.

The following sections refer to the postulates provided in the first interim report and summarise the reflection of the workshop.

Service portability will become more available, for example portability between mobile and fixed services. This implies disappearance of information about service and tariff in numbers that users dial.

Disappearance of information in numbers is a cause for service portability rather than the other way around. The study should rather address the factors that block or enable service portability. The need for service branding increases with competition. There are two causes for tariff differences: choice for marketing and imposition by costs. The situation may differ per service. For example, freephone numbers and geographic numbers have a completely different customer basis.

Alternative means of informing users about tariffs of calls will become more and more available: instead of the number itself, means such as recorded announcements and screen messages will be used.

Numbering freephone using '800' will certainly remain. Simplification of tariffs would also facilitate better increasing tariff transparency. Tariffing by premium rate service customers may be done separately from the telephone bill thus making tariffing non-transparent.

The use of simplified dialling procedures by consumers (for example by abbreviated dialling, automated dialling and dialling by voice recognition) is increasing. This undermines the benefits of local dialling. At the same time abolition of local dialling is becoming more attractive as it enables development towards nation-wide location portability.

Information on tariff will be used less in numbers, geographic information remains relevant. For some users it is important to have an identity of a certain location in the number. It is a way of showing that the user is, for example, the local plumber. The location reflected by the number may differ from the actual user's location. To use a number with a location identity in different locations, other means than location portability are available, for example call forwarding. It was questioned whether nation-wide location portability is really an issue.

National numbering plans will become less and less structured, both as regards the geographic numbers, if they still exist, and as regards the non-geographic numbers.

Loss of structure will be an evolutionary process occurring over a long period. Some structure will remain as numbering is used for service differentiation. There will be a shift from tariff information to service information. The routing part of the numbering plan will also remain structured in order to serve it's purpose.

The commercial and personal value of numbers is increasing through developments like the introduction of NP, because NP provides a better chance for customers to retain numbers for a sustained period of time.

The value of a geographic number is already there by the use of it and by the information in it. Valuable numbers comprise only a small portion of the total number capacity. Premium rate numbers and freephone numbers are valued differently: freephone numbers are long-term tools, premium rate numbers are often short-term tools.

Distortion of competition would best be avoided by number assignment by the numbering plan manager (NPM) being made directly to users.

No specific comment. See further under item 7.

Number assignment by the NPM directly to users adds to effective use of capacity as individual numbers are only assigned when they are actually to be used.

Individual assignment is in the USA the real key issue for introducing mobile number portability. Auditing the use of assigned numbers is a problem, even more so with individual assignment. For example, how should a reserved number or a number in use be defined to prevent 'warehousing'? Users can also get numbers from different blocks when block assignment is used. The choice of numbers by users from all available numbers can be just as transparent with block assignment as with individual assignment. The NPM should not sell numbers to get a profit.

An increased workload in assignment may be a reason for the NRA to delegate assignment and an opportunity to allow more self-regulation by industry.

In the UK both individual assignment and delegation of assignment are discussed but the two issues are not related to each other. Number assignment is integrated in the service provision. To change to individual assignment may be costly. Individual assignment may cost more than two-stage assignment with block assignment to the operators. To keep assignment manageable, you should not have too much in one place. If NP is not used much, then individual assignment may cause a big overhead. Europe is different from the USA: there is no need for individual assignment in Europe.

As NP proliferates, more routing numbers, either E.164 numbers or numbers from other resources, need to be assigned.

Not discussed.

Annex H   Comments from ENF members

ETNO Reflection Document on the ETO Second Interim Report on "Effect of portability on number administration and management"

ETNO has gladly noted that most of its comments to the previous version of the report have been taken into consideration, thus bringing more clarity and understanding to this new version of the report.

ETNO recognises that the focus of this report is on the effects of the introduction of Number Portability. However, ETNO is concerned to ensure that the conclusions of this report are not taken out of context from other factors which must be considered in deciding the evolution path for telecommunication services and numbering, such as the demand by customers and the economic value.

ETNO has noted some remaining points which should improve the coherence of the report. They relate to the Executive Summary and the Conclusion as well and are described below.

The conclusion lists some items for consideration by NRAs both for the long term and the short term. ETNO thinks the time frame should be indicated for each item, since the impact may be much different. For instance, portability between fixed and mobile services may only happen on a long-term perspective, as was acknowledged by the Commission itself during the public hearing on the Review 99.

ETNO questions on what base ETO can foresee this portability to happen, since it was almost unanimously rejected by the participants to the hearing.

ETNO is also surprised by the statement of individual assignment directly to users for <u>valuable</u> numbers used for special-tariff services. If individual assignment is to be considered for these (non-geographic) services, it should not be focused on valuable numbers and should be limited to some ranges of non-geographic numbers. ETNO would like again to stress the burden that would be imposed on operators in that case and the need to proceed to a case-by-case evaluation of the advantages and disadvantages. Similar considerations would have to be given in case number trading is allowed.

A1
ETNO agrees that if NP is a primary objective in numbering, it will have an impact on the structure of the plan. However, this will not necessarily result in a complete loss of structure. It depends on the decisions taken on the introduction or not of location portability and service portability. ETNO thinks the wording of this statement should be somewhat softened, e.g. by using could instead of would.

A2
The last sentence should be softened e.g. by saying "Service portability is certainly not foreseen for special tariff services as long as the need for users to have tariff information in the number remains".

B4
In case of delegation assignment, ETNO is not convinced that the entire workload would be transferred to the NPM, because operators will still have to perform translation and routing of numbers in their own database. Anyhow, ETNO thinks that the term functionality would be more appropriate than the term workload.

Annex G
The ETNO CP 63 (available on the ETNO web site) on this issue should be added to the bibliography.

Source: ETSI SPAN2 NAR

Subject- 2nd Interim report on 'The effect of Number Portability on National Number Administration and Management'.

At the SPAN2 meeting in Sophia Antipolis (10-14 April 2000) the above document was reviewed. ETSI wish to make the following observation.

1. Whilst the report reflects the view that several developments may diminifh the importance of deriving tariff information directly from the number, it is the view of ETSI that the importance of conveying tariff information in this way is still stressed to highly. ETSI SPAN2 consider that this practice severely restricts flexibility within numbering schemes and is becoming less meaningful to customers due to the variety of services offered, changes to the charging paradigms and a multitude of pricing packages and discount schemes. This approach is not favoured within ETSI.

2. On the above basis the promotion of recorded announcements to provide this information is questioned outside of the premium service environment.

3. ETSI support the view that itemised billing may provide an adequate method of conveying pricing information to customers as costs reduce with the increasing level of competition.

4. ETSI hold the view that number portability should have minimal impact on customer perception.

5. Concern was expressed over the possibility that mobile customers who chose to port their numbers may be subjected to vastly different charging regimes as a direct consequence, without being aware.