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NICC Document

Geographic Number Portability

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Foreword

This NICC Document (ND) was originally produced by NICC PNO-ISC. This revision, produced by NICC NNA, updates earlier versions to reflect current industry practises.

Introduction

Geographic Number Portability (GNP), mandated by Ofcom General Condition 18 [1], allows subscribers to communications services to retain their geographic number when changing Communications Provider (CP).

1 Scope

This document is the Service Description for Geographic Number Portability (GNP) as deployed within the UK. It is not intended as a definition or deployment guide, as these are areas in which each CP may choose their own implementation that conforms to all the requirements of this Service Description.

This Document presents the requirements for the call control functionality necessary to support GNP.

Operation and Maintenance aspects of GNP are described in the End-to-End Process Manual [i1].

2 References

2.1 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] "Consolidated Version of General Conditions", Ofcom, available at http://www.ofcom.org.uk/telecoms/ioi/g_a_regime/gce/

[2] ITU-T Recommendation E.164 "The public telecommunication numbering plan"

[3] "Guidelines for the provision of Calling Line Identification Facilities and other related services over Electronic Communications Networks", Ofcom, available at http://www.ofcom.org.uk/telecoms/ioi/orp/cli/

2.2 Informative references

[i1] End to End Process Manual for GNP

[i.2] Ofcom statement "Conserving Geographic Numbers", 2010, available at http://www.ofcom.org.uk/consult/condocs/conserve/statement/statement.pdf

[i.3] ND1631, "NGN, PSTN/ISDN Service Interconnect, Architecture for usage of a Common Numbering Database"

[i.4] ND1022, "NGN, Common Numbering Database; DNS implementation"

[i.5] ND1023, "NGN, Common Numbering Database; Webservice Communications and common XML features"

[i.6] ND1024, "NGN, Common Numbering Database; Notification and data download webservice"

[i.7] ND1415, "NGN, PSTN/ISDN Service Interconnect, Guide to Common Numbering Database standards"

[i.8] ND1428, "NGN, PSTN/ISDN Service Interconnect, Guidance to CPs on PSTN Destination Group Usage"

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Directory Number : UK E.164 telephone number [2].

Network : The telecommunications system operated by the Communications Provider under the terms of the OFCOM General Conditions [1]

Communications Provider : The provider of electronics communications service.

Rangeholder Network : The Network from which the number has been transferred (sometimes referred to as "Donor Network")

Recipient Network : The Network which has gained the ported number.

Routeing Number : Number used to route the call to a ported number between the Rangeholder and Recipient Networks.

Routeing Number Prefix : Prefix which, together with the ported number, forms the Routeing Number.

Transit Network : A Network involved in carrying a 'ported' call between Rangeholder Network and Recipient Network, but which is not either Rangeholder nor Recipient Network.

3.2 Abbreviations

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

CLI	Calling Line Identity
CP	Communications Provider
DN	Dialled Number
ISDN	Integrated Services Digital Network
OFCOM	OFfice of COMmunications
PBX	Private Branch Exchange (CPE)
POC	Point Of Connect

4 Overview of GNP solution

The UK GNP solution is an Onward Routeing type solution, with an enhancement to avoid inefficient routeing for calls originating in the recipient exchange.

With the exception of calls originating in the Recipient exchange, calls are routed on the basis of the dialled number to the Rangeholder Network. There the Routeing Number is determined and added to the call details. The call is then routed onwards on the basis of the Routeing Number to the Recipient Network.

In determining and adding the Routeing Number the characteristics of the call are not to be modified. For this reason, call forwarding in the donor exchange is not a suitable mechanism for achieving these functions, instead the digit manipulation should occur during digit analysis in the donor exchange. However, rangeholder operators are free to choose the mechanism used to determine and add the Routeing Number within their network.

For calls originating in the Recipient exchange the call is to be routed to the called line without the call leaving the Recipient Network. This requirement does not apply to calls originating elsewhere in the Recipient Network, even if those calls transit through the Recipient exchange (however, a Recipient is free to choose to so route such calls).

Typical call flows are illustrated in Figures 4.a, 4.b and 4.c. These are representative call flows to aid understanding only. In practise, for example, transit exchanges may not be present, or dropback may be used within networks to avoid inefficient routeing. Also, a network may determine and add the routeing number at a location other than the donor exchange (for example using a database inquiry at an interconnect switch).

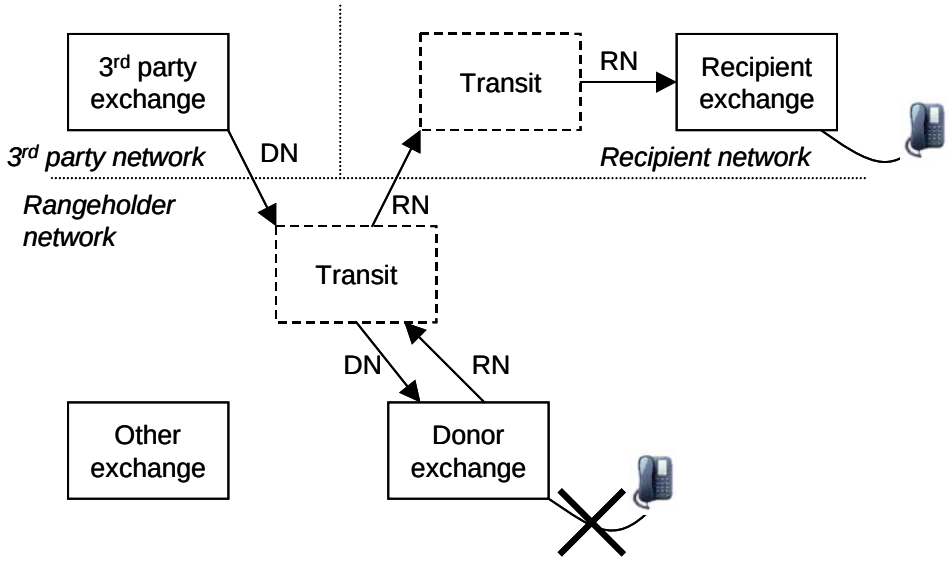
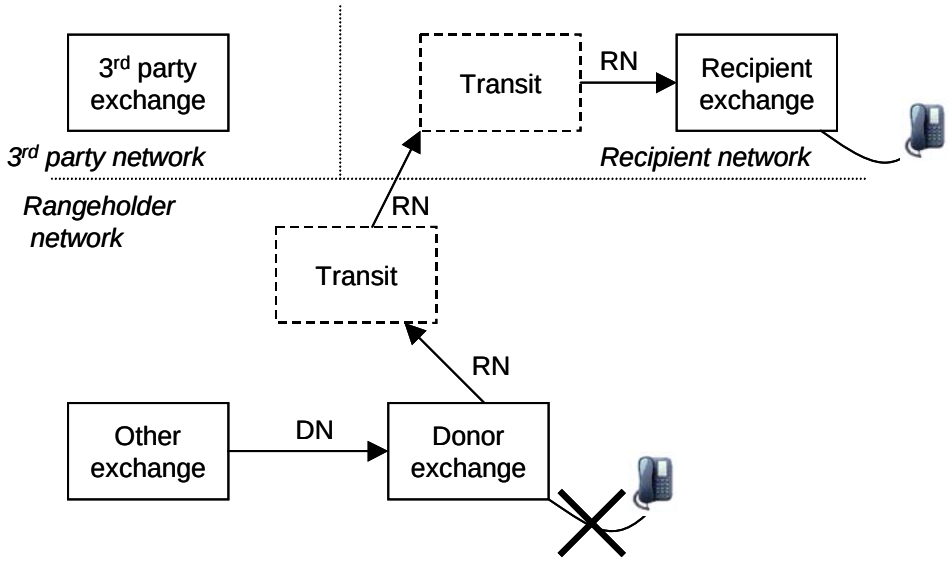
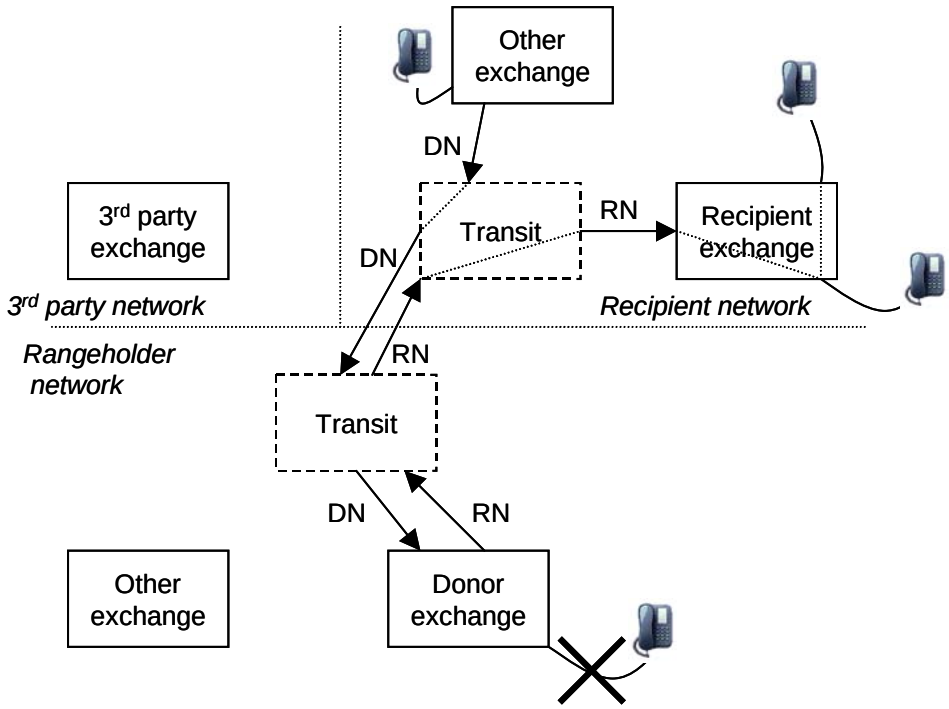


Figure 4.a : Call flow (call originates in 3rd party network)



DN = routeing based on dialled digits
RN = routeing based on Routeing Number

Figure 4.b : Call flow (call originates on Rangeholder network)



DN = routeing based on dialled digits
RN = routeing based on Routeing Number

Figure 4.c : Call flow (call originates on Recipient network)

5 Requirements

5.1 General requirements

A model comprising four network roles is used to describe GNP functionality. The network roles in the functional model are:

- the Originating Network -the network where the call is originated from;
- the Rangeholder Network - the network to which the number range has been allocated;
- Transit Network(s) - a network that carries calls between other networks;
- the Recipient Network - the network where a number is located after being ported.

A network may perform the functions of one or more network roles, with the exception that the roles of Rangeholder and Recipient Network must be performed by different networks.

GNP implementations adopted by one CP shall not affect any other CP's implementation. The means by which the Routeing Number (used to route calls between the Rangeholder and Recipient Networks) is determined is outside the scope of this document and is left to the individual CPs. However, it is anticipated that this will be accomplished by using either:

- The data decoding capabilities of the individual switches (onward routeing)
- The result of a query to a database.

Calls transferred from the Rangeholder Network to the Recipient Network will use any appropriate and feasible routeing which avoids undue post dialling delay. To avoid misrouteing, in particular circular routeing, networks should not modify or remove the Routeing Number other than at the recipient exchange. If a call containing a Routeing Number cannot be completed the appropriate failure indications shall be returned.

Routeing Numbers Prefixes are codes which uniquely identify the recipient exchange. The structure of the Routeing Number Prefixes and their allocation are subject to control by the UK Number Plan Administrators (currently Ofcom). The Routeing Numbers used will not be treated as Directory Numbers if dialled by customers.

When a number is ported from one CP to another, the CPs will be required to be able to pass the following information across the POC:

- Called Directory Number (in full national form)
- Destination Information (Routeing Number Prefix)
- Calling Directory Number (The original calling party's CLI)
- CLI Display Restrictions
- Malicious Call Intercept

The CLI Guidelines [3] must be adhered to, that is transmission of the CLI and associated information shall not be impaired by the implementation of GNP. Calls transferred across the POC from the Rangeholder Network to the Recipient Network shall have the Calling Line Identity (CLI) set to the originating caller. The CLI must not be transferred unless the status of Presentation Restriction is maintained.

5.2 Requirements of Networks

5.2.1 Requirements of Originating Networks

Unless the Originating Network is carrying out any GNP functions, there are no specific requirements imposed by GNP.

5.2.2 Requirements of Rangeholder Networks

Calls originating in the Rangeholder Network and calls received by the Rangeholder Network from other networks which are destined for the ported number shall be passed to the Recipient Network over one or more pre-determined POC.

The Rangeholder Network operator will maintain an administrative record of numbers ported and thereby ensure that any such number is not reallocated to another customer of the Rangeholder Network operator unless and until the number is relinquished.

5.2.3 Requirements of Transit Networks

Any exchange that has a call presented to it with a Routeing Number shall route the call based on that number.

5.2.4 Requirements of Recipient Networks

The Recipient Network will perform the call termination functions. If a call is received with a Recipient Network's Routeing Prefix but to a number which has not been ported to it, then the call shall be failed.

The Recipient Network will ensure that all calls for the ported number originating in the Terminating Local Exchange shall be directly connected without being presented over a POC to the Rangeholder Network, unless agreed with the Rangeholder Network and appropriate means of accounting for such calls being in place.

All calls originated by the ported number shall have the Calling Line Identity set to that number and not to any additional number that may be being used for completing incoming calls.

The Recipient Network operator will keep other CPs informed of any change in the circumstances of the service provided to the ported number that may impact affected Network's ability to transfer calls effectively between the two networks. This includes, inter alia: 1) transfer of the number to another exchange in the Recipient Network, 2) change in the size of circuit group e.g. from single line to PBX.

6. Numbering Format

6.1 Background

The Specified Numbering Scheme which is utilised in the UK is of the format SABCDEXXX(X), where the 'S' digit identifies the category of service. For geographic numbers assigned to fixed lines, 'S' is '1' or '2'. A trunk access prefix of zero is used when dialling nationally, i.e. the format of the dialled number is 0SABCDEXXX(X). The maximum number length is ten digits, i.e. eleven digits including the trunk access prefix. Most geographic numbers are of this length, however a minority are of nine digits (i.e. ten digits with the trunk access prefix).

In order to route calls to the appropriate terminating operator, analysis of the first six or seven digits of the UK telephone number (excluding the trunk prefix) is required.

Systems used within the UK impose limitations upon the number length that can be carried; at the time of the design of the scheme the lowest common denominator that could be assumed is that called party address field requirements should not exceed 18 digits.

6.2 Requirements

The generic approach to number portability set out in Section Four requires that a Routeing Number be used. The Routeing Number is added by the Rangeholder Network, and subsequently be used to route the call to the Recipient exchange.

No additional numbers shall be allocated from the user-diallable part of the Specified Numbering Scheme in order to implement number portability, i.e. the Routeing Number should not be taken from the space available for service provision.

The format of the Routeing Number should not cause it to exceed the maximum number length specified or require networks to analyse any further digits than specified in Section 6.1.

6.3 Routeing Number format

The Routeing Number shall consist of a Routeing Prefix and the Called Party Number.

The Routeing Prefix shall be six digits long, with the first digit being''5'. The subsequent digits of the Routeing Prefix shall identify the Recipient exchange.

6.3.1 C7 Signalling using Interconnect User Part (IUP)

In IUP the Routeing Number shall be a concatenation of the Routeing Prefix, trunk access code and the Called Party Number. As the trunk access prefix is carried within C7 Interconnect User Part (IUP), this means that the leading '5' of the Routeing Prefix (hence Routeing Number) is sufficient to identify it as a Routeing Number as against;

- a call to a non-ported number, which will have a leading digit of '0'
- a call utilising an access code, which will have a leading digit of '1'
- a call utilising the Targeted Transit service, which will have a leading digit of '7'
- a call to emergency services, which will have a leading digit of '1' (112) or '9' (999)

6.3.2 Other signalling systems

In other signalling systems, the trunk access prefix may not generally be carried. In this case, indication will be required that the call is to a ported number, and hence a Routeing Number is being used.

6.4 Administration

In accordance with Ofcom General Conditions 17 and 18 [1], CPs wishing to implement number portability shall apply to the Numbering Scheme Manager for an allocation of Routeing Prefixes.

CPs shall maintain records of utilisation of Routeing Prefixes, which in accordance with the Ofcom General Condition 17 shall be available for inspection by the Numbering Scheme Manager.

7. Evolution to longer term solutions

In the Ofcom 2010 statement "Conserving Geographic Numbers" [i.2], Ofcom concluded;

We understand and agree with the comments…about the likely broader benefits of a common numbering database, including the prospect that such a system could allow allocation of geographic numbers to meet demand more efficiently than is possible now. We consider that a solution for interconnected fixed networks using such an approach could become viable if and when next-generation core network technology is adopted widely by network providers. While the timescale of such adoption is currently uncertain, we would encourage network providers to consider the benefits of incorporating the capability for such an approach into their next-generation network designs.

Usage of a common numbering database would change the implementation of GNP. When Ofcom had earlier mandated the usage of such a database (note 1), NICC developed a suite of standards. Although it cannot be guaranteed that any future standards will adopt the same approach, these standards provide suitable guidance to the arrangement favoured by NICC when the longer term solutions were last examined;

- ND1631, "NGN, PSTN/ISDN Service Interconnect, Architecture for usage of a Common Numbering Database" [i.3]
- ND1022, "NGN, Common Numbering Database; DNS implementation" [i.4]
- ND1023, "NGN, Common Numbering Database; Webservice Communications and common XML features" [i.5]
- ND1024, "NGN, Common Numbering Database; Notification and data download webservice" [i.6]
- ND1415, "NGN, PSTN/ISDN Service Interconnect, Guide to Common Numbering Database standards" [i.7]
- ND1428, "NGN, PSTN/ISDN Service Interconnect, Guidance to CPs on PSTN Destination Group Usage" [i.8]

Note 1 : the changes to the regulation which mandated the usage of a common numbering database were subsequently rescinded.

History

Document history		
Issue 1	May 2000	Initial Issue
1.2.1	September 2010	Refresh to reflect actual implementation