



**National Telecommunications Regulatory Commission
(Grenada)**

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July 15, 2010

Mr. Embert Charles
Managing Director
Eastern Caribbean Telecommunications Authority
P.O Box 1886
Vide Bouteille
Castries
St. Lucia

Dear Mr. Charles,

Re: Proposal for the implementation of Service Provider Numbering Portability in the ECTEL Member states.

The NTRC Grenada identify Number Portability as one of the important tools that can be used to foster open competition to stimulate improvements in the Quality of Service and increase innovation within the Telecommunication market throughout all the ECTEL member states .

In this regard, the NTRC Grenada is desirous of ensuring the implementation of Number Portability between Mobile Operators and Fixed Line Operators via the assistance of ECTEL and other NTRC's by developing a regulatory framework for Number Portability.

Objectives

The main objective of this proposal is to develop a regulatory framework for the implementation of Number Portability for the telecoms industry in the ECTEL member states. The overall aim is to enable all ECTEL member states to achieve the following:

- Eliminate barriers, this gives subscribers the freedom to choose service provider when migrating within member states.
- Ensure further increases in the level of open competition among the existing Telecommunications operators.
- Act as a stimulus (incentive) for service providers to improve the Quality of Service and consumer satisfaction.
- Create innovation

Attached please find a copy of a research paper done on Number Portability. Reference to our findings, we are of the view that an externally outsourced clearing house approach for the implementation of Number portability may be advantageous in the initial stages of implementing number portability.

However, research from the European countries demonstrates that the implementation of a central number portability database system and the use of the all call query (ACQ) have proven to be the most successful approach.

Sincerely,

.....
Aldwyn Ferguson
Coordinator (Ag.)

NUMBER PORTABILITY

Introduction

Number Portability is rapidly being introduced to both fixed and mobile networks in Europe, Asia and the USA Telecommunication markets. Complying with the regulations, operators are able to correctly route calls to ported numbers using national agreed solution. This solution has either been established by the telecommunications regulator or through mutual agreement between operators and service providers.

Definition

Number portability is a circuit-switch telecommunications network feature that enables service subscribers to retain their telephone numbers when changing service providers, service types, and/or locations.

With Number portability, phone numbers are now allocated to the subscribers rather than the operators and the subscribers can more easily change operator or service provider. The Number Portability service is a network service which ensures true competition in the telecommunications market.

Donor Network: It is the network that first assigns a telephone number to a subscriber.

Recipient Network: It is the network that currently serves the ported number. A recipient network is a network that a subscriber's number is ported to when the subscriber switches the service provider

Originating network: The network on which a call has been originated

1. Types of Number Portability

There are three different types of Number Portability:

1.1 Operator/Service Provider Number Portability

The ability of a subscriber to retain the same telephone number when changing from one service provider to another.

1.2 Location Number Portability

The ability of a subscriber to retain the same telephone number when moving from one physical location to another. Location portability allows a given telephone number to be associated with any network termination device, independent of location

1.3 Service Number Portability

The ability of a subscriber to retain the same telephone number when changing from one type of service to another.

E.g. from Plain old telephone service (POTS) to Integrated Services Digital Network (ISDN), mobile to fixed, fixed to mobile.

2. Driving Forces for Number Portability

The main drivers to Number Portability are:

- Lowering telephony costs.
- Optimising network administration and allowing users to relocate and still keep the same number.
- Enabling transfers of subscribers from old platforms.
- Increasing usage of numbers per number block.

3. Benefits and disadvantages of Number portability

3.1 Benefits of Number Portability

Benefits of Number Portability for customers and operators :

❖ For customer

- Easy to choose another operator with better prices and services (and keep the numbers).
- Cost savings for business users, no need to inform customers, change business cards, advertisement etc.
- Increase competition between operators.

❖ For operators

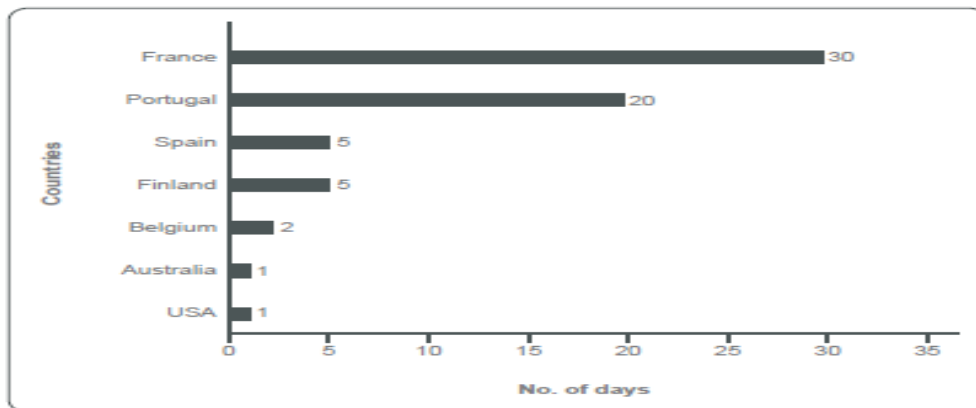
- Efficient use of Numbering Plans
- Numbers portable between exchange switches.
- More incoming calls received from the first day.

3.2 Disadvantages of Number Portability

- Number Portability is very expensive to the service provider:
 - Switch Features
 - Hardware upgrades
- Service providers must establish connectivity with the number portability administration centre (NPAC)
- Extensive switch translations
- Intense record keeping
- Billing issues

4. Factors Influencing the Success of Number Portability.

- ✓ **Subscriber Awareness:** Subscribers needs to be aware of Number Portability (NP), its advantages.
- ✓ **Simplicity:** NP success mainly depends on the simplicity of the process. There could be many rules that the regulator may impose. (For example, the period a number can't be ported). Such forced conditions hamper the success of NP.
- ✓ **Speed:** Speed is one of the major factors that affect the success of NP. Service level agreements should be stringent enough to minimize the time taken to port the number to other network. This increases the level of customer satisfaction



Example of porting time (days) in various countries

- ✓ **Cost factor:** NP success also depends on the cost of porting the number. The lower the cost, the higher the rate of porting. The cost here refers to the amount that the subscribers need to pay to port their number to some other service provider's network. This all depends on the regulatory authorities that decides who bears the cost of porting. For better success and market competition, it is recommended that the new service provider, who is getting the subscriber, bear the cost of porting.

5. Challenges of Implementing Number Portability

The major challenges of implementing number portability are:

1. Cost involved in upgrading the network infrastructure to support number portability.
2. Cost involved in maintaining the upgraded infrastructure.
3. Cost involved in the usage of network resources to route the calls to the ported number.

7. Implementation of Service Provider Number Portability

There are two fundamental issues that need to be considered in implementing number portability in a country.

1. Number Porting Process: this applies to the policies and processes for porting the numbers.
2. Call Routing process: this applies to the scheme of routing a call to a ported number.

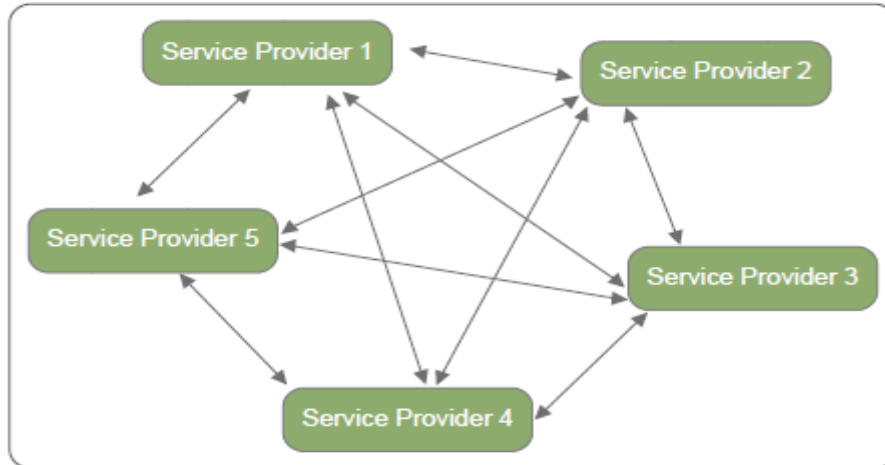
7.1 Methods of Implementation

There are basically two methods of implementing Service provider number portability, either of which can be used for the porting of both mobile and fixed line numbers:

- **Peer-to-Peer approach / Bilateral**
- **Centralized /clearing house**

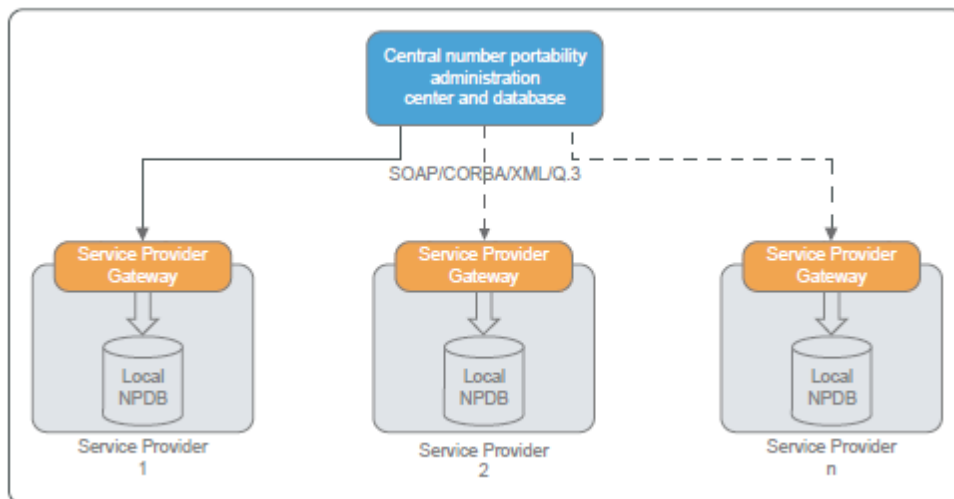
(a) Peer to Peer approach / Bilateral

In this approach, there is a bilateral agreement between two service providers. The administration of ported numbers is the responsibility of the service providers who maintain their own databases with ported numbers and routing information. The information is shared among the databases. However due to the redundancy in data sharing using this approach, it is considered to be an inefficient system.



(b) Centralized

In this approach, the administration of ported numbers is done by a neutral party, with service providers responsible only for the routing of the calls. This is considered to be a very efficient method and is the most popular approach adopted in Europe.



6. Implementation Schemes

These two methods mentioned above give rise to a number of implementation schemes for the querying and routing of calls made to ported numbers as follows:

- a) Onward Routing - OR
- b) Query on Release- QoR
- c) Call drop back

d) All Call Query- ACQ

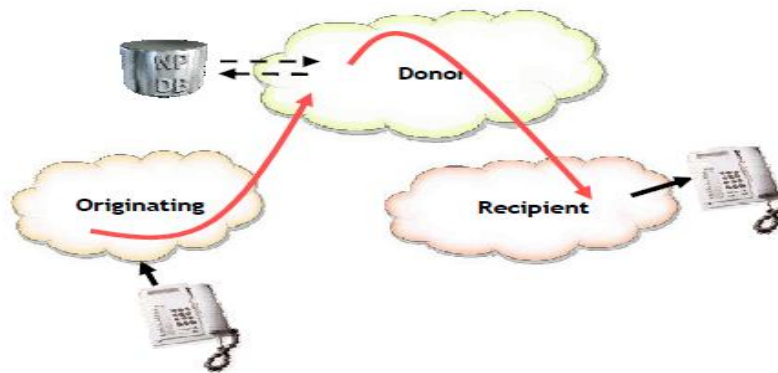
The choice implemented by various countries was determined by the technology available and in use at the time and the cost of implementation.

Descriptions of the methods used to query and route calls made to ported numbers follow:

8.1. Fixed line application approach

(a) Onward Routing (OR) (Fixed line application)

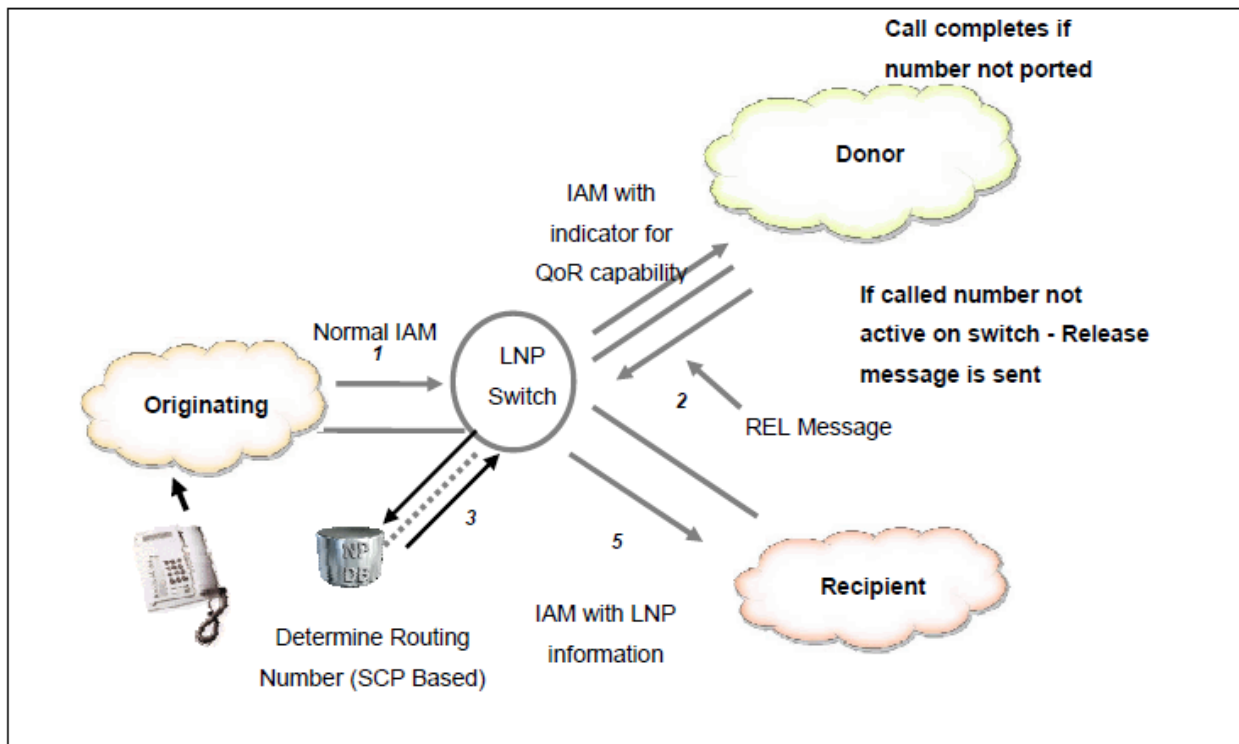
OR (Onward Routing) Scheme.



The Onward Routing method is a bi-lateral database approach and the call progression is as follows:

- 1) The dialed number is routed to the donor network as this is where the Originating Network knows that it has been assigned
- 2) The donor network identifies the dialed directory number as no longer being in its inventory because it has been ported to another network and checks with an internal network-specific Number Portability Database (NPDB)
- 3) The internal NPDB provides the routing number associated with the dialed number to the donor network.
- 4) The donor network uses the routing number to route the call to the recipient network where the user has ported his number.

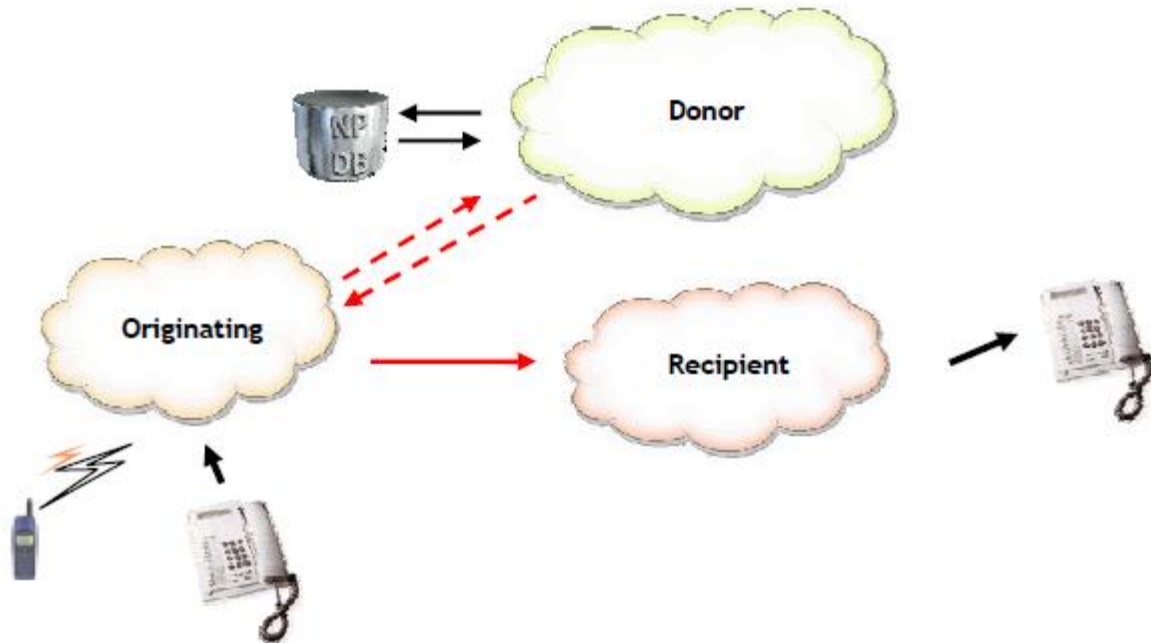
(b) Query on Release (Fixed line application)



The call progression for the Query on Release method of routing calls to ported numbers uses a centralized database as follows:

- 1) The originated call is routed to the donor network for completion. If the called directory number is resident on the donor network, the call is completed.
- 2) If however the called directory number has been ported, the donor network detects that and releases the call to the originating network with an indication that the number has been ported.
- 3) The originating network queries its copy of the centrally administered Number Portability Database
- 4) The routing information for the called directory number is provided by the Number Portability database to the originating network
- 5) The originating network completes the call to the appropriate network where the called number currently resides

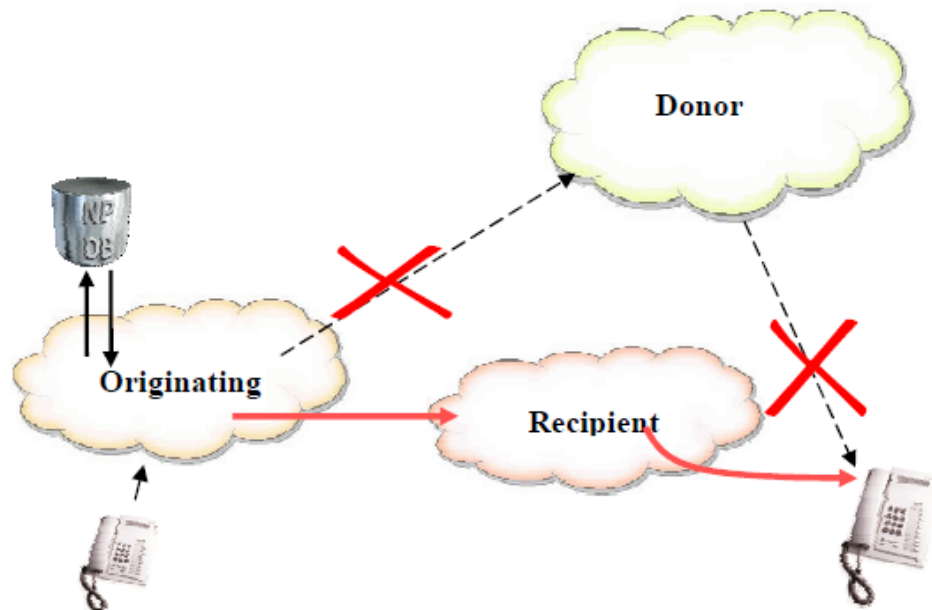
(C) Call Drop Back (Fixed line application).



The diagram shows the call progression for the Call Drop-back scheme for routing calls to ported numbers and uses a distributed database approach. This scheme is also known as "Return to Pivot (RTP)." The call progression is as follows:

- (1) The called directory number is routed from its originating network to the donor network.
- (2) The donor network detects that the dialled number is no longer resident on its network and queries its internal Number Portability database.
- (3) The internal NPDB provides the routing number of the dialled number which is passed on to the originating network.
- (4) The originating network uses the new routing number to complete the call

(D) All Call Query (ACQ) - Direct Routing (Fixed Line application)



- Optimized routing
- No tromboning
- Minimal increase of network complexity
- Minimal signaling impact
- Minimal increase of call set up time
- Fail-safe if the donor operator goes out of business

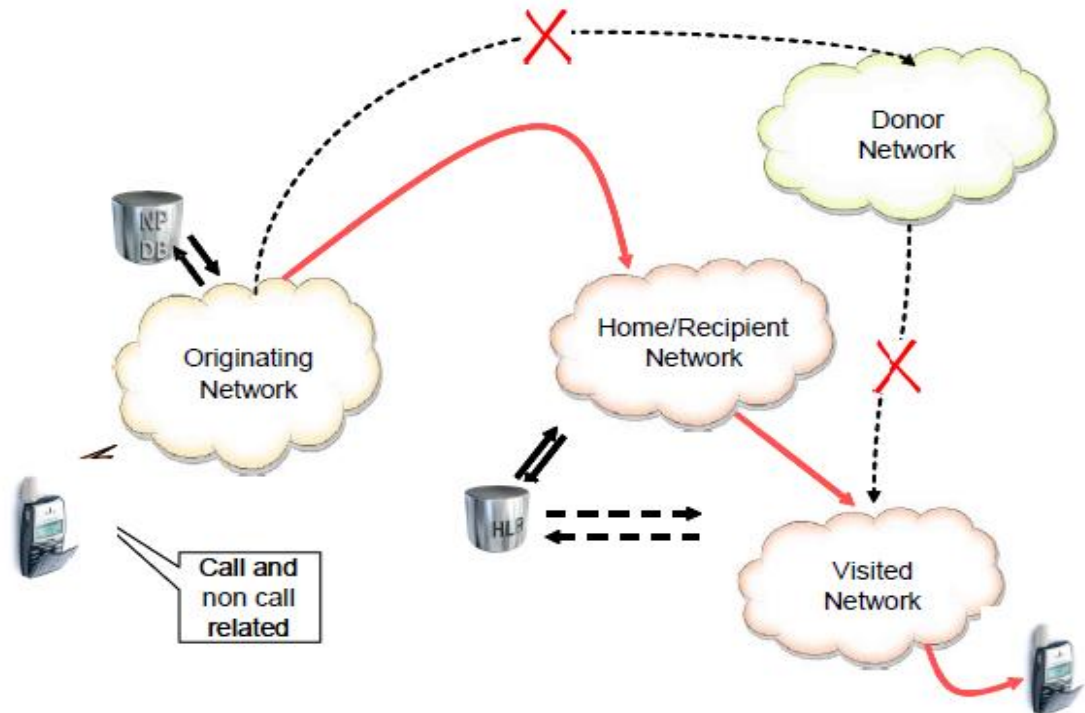
In the ACQ scheme, the routing of a call to a ported number uses the centralized database approach and typically routes calls to ported numbers in the following manner.

- 1) The originating network, upon receiving the dialed directory number, queries the NPDB which may be a mirror of the centralized NPDB or provided by a third party.
- 2) The NPDB sends the location routing number of the network on which the dialed number resides to the originating network. Whether the dialed number has been ported or not, the routing number of the network on which the dialed number resides is used to route the call.

It must be noted in the above illustration that the Donor network does not have to be queried for routing information as the NPDB is queried for routing for all originating call.

8.2. Mobile Application Approach

(a) All Call Query (Mobile application)



This Figure above shows two (2) examples of a mobile call that is

- ***Routed to a ported mobile number on its new home network:***
- ***Routed to a ported mobile number which is roaming***

1. Routed to a ported mobile number on its new home network:

The call progression for example as follows:

- a) The mobile phone initiates a call which is sent by its network to the centralized Database (NPDB) to query routing information for the number called
- b) Once the routing information is retrieved, it is used by the originating network to route the call to the new network on which the ported number now resides

2. Routed to a ported mobile number which is roaming

- a) The mobile phone initiates a call to a ported number which is currently roaming
- b) The initiating network sends the call to the NPDB to request routing information

- c) Once the routing information has been received, the call is sent to the new network of the ported number
- d) The new home network queries its Home Location Register (HLR) as to where the ported number is located and receives the information that the ported number is roaming and the routing information of the visited network.
- e) The call is passed to the visited network for completion

7. Popular method for implementation of Number Portability

Internationally, the All Call Query (ACQ) method of implementation is by far the most popular method.

9.1 The Dominican Republic

The Dominican Republic which launched Number Portability for both fixed line and mobile markets on September 30, 2009 chose the All Calls Query /centralize database mode of implementation. Some of the other methods have disadvantages such as longer call set up times and increased potential for call blocking. The ACQ method however, provides direct routing from the originating network to the network to which the telephone number has been ported and does not have the disadvantages cited above. It is therefore the most efficient method of implementing Number Portability.

9.2. Singapore

The Regulator in Singapore, the Infocomm Development Authority of Singapore (IDA), when it introduced a centralized database for Number Portability stated : “This is deemed more efficient and importantly beneficial for the telecom sector in the long run as it can better support more complex routings expected from the next generation services and application”.

9.3. Number Portability Implementation in Europe

The European Union

The method of implementation of Number Portability in Europe has not been consistent due to the network technology in use at the time of implementation. For example, six EU Member States have introduced Mobile Number Portability in different ways:

France and the UK selected an on-switch solution as the longer term solution. The Netherlands bypassed using an interim solution and decided on a long term IN solution. Sweden and Finland have introduced an interim on-switch solution but intend to migrate to a long term IN solution.

Germany has a number of technical solutions working in parallel. It is to be noted that no English speaking Caribbean nation has introduced service provider number portability to date.

See Table below for a list of countries in Europe where number portability has been implemented. It should be noted that service provider number portability has been the most popular form of implementation and the most popular method of implementation has been All Calls Query.

Country	Type of database	Routing of fixed to mobile	Routing of mobile to mobile	Time to port	Type of portability
Austria	Distributed	OR or ACQ	ACQ	3 wdays	Service provider
Belgium	Centralised	ACQ	ACQ & QoR	2 days	Service provider
Croatia	Centralised	ACQ	ACQ	5 days	Service provider
Cyprus	Distributed	ACQ	ACQ	14 days	Service provider
Estonia	Centralised	ACQ	ACQ	7wdays	Service provider
Finland	Centralised	ACQ	ACQ	5 wdays	Service provider
France	Centralised	Phase 1 OR Phase2 ACQ	Phase 1 OR Phase 2 ACQ	10 days	Service provider
Germany	Centralised	OR / ACQ	ACQ	4wdays+2	Service provider
Hungary	Centralised	ACQ / QoR	ACQ / QoR	14wdays	Service provider
Iceland	Centralised	ACQ	ACQ	10wdays	Service provider
Ireland	Centralised	OR	ACQ	2 hrs	Service provider
Italy	Centralised	ACQ	ACQ	5 wdays	Service provider

Lithuania	Centralised	ACQ	ACQ	28 days	Service provider
Malta	Distributed	OR	ACQ	4hrs	Service provider
Norway	Centralised	ACQ	ACQ	7 days	Service provider
Portugal	Centralized	ACQ/QoR	ACQ/QoR	5-20 w days	Service provider
Slovenia	Centralised	ACQ	ACQ	5 wdays	Service provider
Spain	Distributed	OR	OR	5 days	Service provider
Sweden	Centralised	OR/ACQ	OR/ACQ	5 wdays	Service provider
Switzerland	Centralised	OR	OR	5 wdays	Service provider
United Kingdom	Distributed	OR	OR	2 wdays +1cal. week	Service provider

ACQ-All Call Query

OR-Onward Routing

QoR-Query on Release

8. Proposed option for implementation

Drawing from the above table the All Call Query (ACQ) method of implementation of service provider number portability has been shown to be the most popular mode of implementation in other countries as in Europe.

It is a direct routing method in that calls to ported numbers are sent from the originating network to the new network after the routing information has been obtained from the centralized database by the originating mobile network. While experience has shown that the set up costs for the ACQ option are higher than the other options shown, the long run operation is proven to be at a much lower costs.

The ACQ system requires a clearinghouse facility. The main function of the clearinghouse is to track and bill for the usage of the centralized database used for storing the routing information for numbers. The clearinghouse may also be responsible for the day to day running of the centralized database, its operational maintenance as well as keeping it updated.

10.1 Establishment Of A Clearinghouse

The clearinghouse facility provides for the collation of the quantity of database dips from the operators interconnection agreement and apportioning and preparation for billing. It may also provide the centralized database facility on which the routing information for each working telephone number resides. It therefore has an integral part to play in the porting process and requires that an interconnection agreement provide it with the necessary information to update its database.

The establishment of a clearinghouse can assume one of two options:

1. Local
2. External

10.1.1 Locally based clearinghouse

A locally based clearinghouse may be established in either one of two ways:

1. Public domestic telecommunications interconnection agreement may collaboratively establish a Clearinghouse (centralized database included)
2. A neutral third party may establish the clearinghouse and centralized database and manage all aspects of the porting of numbers.

Irrespective of the approach to the establishment of the locally- based clearinghouse, that clearinghouse shall:

- Determine, apportion and bill database usage charges for all interconnection agreement.
- Establish the centralized database
- Update the database with location routing information when numbers are ported
- Assume responsibility for the maintenance of the database

To determining the best approach for locating the clearinghouse both the advantages and disadvantages of a locally based clearinghouse should be considered.

The advantages of a locally based clearinghouse:

1. It eliminates any possible influence that the politics, economics and policies of a foreign entity may exert upon the clearinghouse
2. It removes the requirement to increase capacity of international signaling network
3. It reduces the demand for foreign exchange as it eliminates the need to remit cost of database dips in relevant foreign currency
4. It may lower operational costs when compared to those of a foreign facility

The disadvantages of a locally based clearinghouse were:

1. Its high up front (establishment) costs
2. The long set up time
3. Time to conclude negotiations to satisfy all interconnection agreement may be long, which could delay the establishment of service provider mobile number portability.

10.1.2 Externally outsourced clearinghouse

In this option, the database service is outsourced externally to a third party in another country for all database dips and clearinghouse activities. Some countries have opted for this solution. E.g. Pakistan In like manner to the local establishment of the clearinghouse, the Authority considered the advantages and disadvantages of an externally outsourced clearinghouse.

The advantages of an externally outsourced clearinghouse are:

1. Its lower up-front capital (establishment) costs
2. It may be more cost effective in the long run, depending on take-up of service
3. Its shorter time to implement service provider mobile number portability\
4. It allows service providers to concentrate on administrative and technical issues to facilitate the implementation of number portability

The disadvantages of an externally outsourced clearing house are:

1. It necessitated the need to increase the capacity of the international signaling network to accommodate database dips
2. The possible demand for foreign exchange given the need to pay the outsourced clearinghouse in the relevant foreign currency for the cost of database dips and contractual payments
3. It raises potential privacy and security concerns given that subscriber Information needs to be given to a foreign third party

Conclusion

In concluding base on my findings, it is of the view that an externally outsourced clearing house approach may be advantageous in the initial stages of implementing number portability.

But as knowledge and experience from the European countries the implementation of a central number portability database system and the use of the all call query (ACQ) have been proven to be successful.

Therefore, before considering the establishment of a local clearinghouse facility the establishment costs and other factors should be considered.