Asian Journal of Convergence in Technology Volume1, Issue 5
Issn No.:2350-1146, I.F-2.71

Mobile Number Portability

Miss.Sapatnekar Aparna Ashok
Department of Electronics and Telecommunication,
V.V.P.Institute of Engg & Technology,
Solapur University, Solapur, India
sapatnekaraparna@gmail.com

Prof.R.B.Digge
Department of Electronics and Telecommunication,
V.V.P.Institute of Engg & Technology,
Solapur University, Solapur, India
drahul22@gmail.com

***Abstract*— Mobile number portability allows customer to switch mobile operator to keep their mobile number avoiding the cost of switching to new number. Changing telephone or mobile number can be a major inconvenience. The implementation of number portability initiatives in many key markets created new opportunities and improved the consumer's experience. This paper introduces the concepts of mobile number portability, issues and challenges.**

***Keywords*— Mobile Number Portability (MNP), Issues, Challenges**

I. INTRODUCTION

Mobile Number portability (MNP) enables mobile subscribers to change their service providers or their location without having to change their existing phone numbers. If the subscribers are not satisfied with the services of their service provider, they can change their service provider while retaining the existing phone number. This infuses competition among service providers and forces them to improve their service standards to check subscriber churn. [1] The rationale of introducing MNP is simple: MNP is expected to bring about considerable benefits to users of mobile telephony services. MNP helps these firms to acquire new subscribers, but operators are faced with the task of having to retain their existing subscribers, which may sometimes be harder to do. There are two types of number portability namely wireless number portability and full number portability .Wireless Number portability can be of different types namely Location Portability, Service portability and Operator Portability .Till date operator portability has been implemented internationally. Operator Portability can be Fixed Number Portability and Mobile Number Portability. [2] A significant technical aspect of implementing number portability is related to the routing of calls or mobile messages (SMS, MMS) to a number once it is ported to some other network. Number portability is essential to maximize the benefits of a competitive telecommunications market. For example, Number Portability of the type that allows users to keep their telephone number when changing operator provides significant benefits:

1. To the porting user, it eliminates the cost of informing other parties of the number change, changing stationery and other signage and, in the case of business users, of lost business
2. To callers, it eliminates the need to consult directory enquires and/or change entries in their address books or computer systems.
3. It increases competition, with significant benefits for all users, by lowering the cost to users of switching operator or service provider.

Service provider number portability call routing schemes

The Internet Engineering Task Force (IETF) has defined four flavours of call routing that support number portability. These schemes are:

A. All Call Query (ACQ)
B. Query on Release (QoR)
C. Call Dropback
D. Onward Routing (OR)

Before we discuss the technical aspects and various call routing schemes in detail, let us understand some terms in the context of mobile network and number portability.

- *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**.**
- *Old Serving Network:* The old serving network is the network that previously served the ported number before the number was ported to the new serving network. Since a subscriber can switch service provider any number of times, the old SP is not necessarily the same as the donor network**.**
- *Participant***:** A Participant is a service provider who is not related to the porting process in any way and still needs the routing information for call routing and various other activities.

A. All Call Query (ACQ)

The Originating Network receives a call from the caller and sends a query to a centrally administered Number Portability Database (NPDB) also called central database (CDB). Network operators generally keep local copies of the CDB, which is hosted on either a network element within their

network or a third party network element. The NPDB returns the routing information of the dialed number. The Originating Network uses the routing information to route the call to the new serving network.

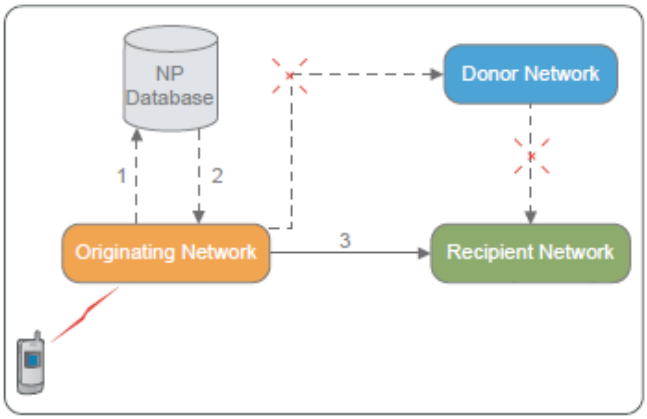

Fig 1: All Call Query

B. Query on Release (QoR)

The Originating Network receives a call from the caller and routes the call to the donor network. The donor network releases the call and indicates that the dialed number has been ported out of that network. The Originating Network sends a query to its copy of the centrally administered NPDB. The NPDB returns the routing information of the dialed number. The Originating Network uses the routing information to route the call to the new serving network.

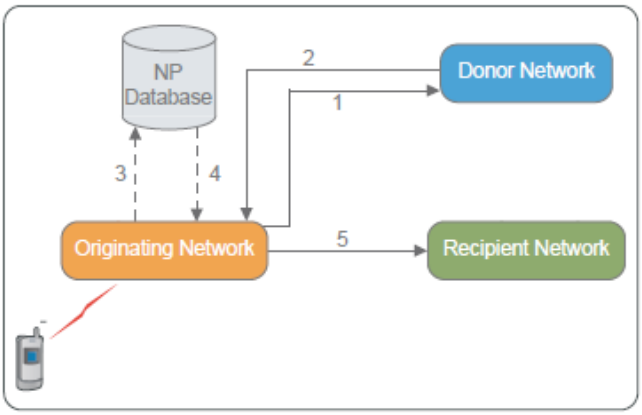

Fig 2: Query on Release

C. Call Dropback

This scheme is also known as "Return to Pivot (RTP)." The call steps are as follows.

Originating Network receives a call from the caller and routes the call to the donor network. The donor network detects that the dialed directory number has been ported out of the donor switch and checks with an internal network-specific NPDB. The internal NPDB returns the routing number associated with the dialed directory number. The donor network releases the call by providing the routing number. The Originating Network uses the routing number to route the call to the new serving network.

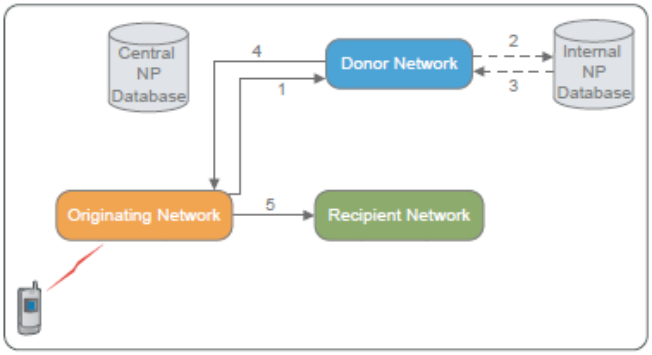

Fig 3: Call Drop Scheme

D. Onward Routing (OR)

The Originating Network receives a call from the caller and routes the call to the donor network. The donor network detects that the dialed directory number has been ported out of the donor switch and checks with an internal network-specific NPDB. The internal NPDB returns the routing number associated with the dialed directory number. The donor network uses the routing number to route the call to the new serving network. This method of routing calls is also known as Call Forwarding.

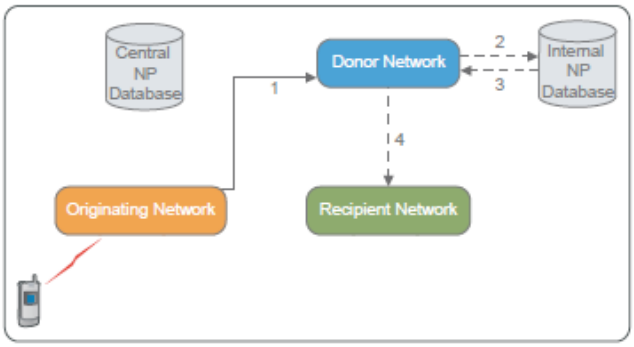

Fig 4: Onward Routing Scheme

II. Issues

The issues regarding MNP relate both the mobile operators as well as the government of India.

A. Practical Application Behind MNP

Porting mobile number is a complicated process. A lot has to be done behind successfully implementing this process. Overpriced instrumentation, ascertaining the checks and balances by constituting a third party is required to follow-up these operations

B. Worried Operators

The obligatory mobile operators have been in the room for a long time and so the number of dissatisfied customers is in direct proportion. When new companies become a part of the operator space, they have nothing to lose with MNP. Those operators who have been in the scenario from a longer time are worried of losing their customers. Also, the prized phone number sequences (ex. 9876543210) can be lost to other operators.

C. Confinement Period

When a mobile subscriber ports a number, he/she is locked in to the new operator for 3 months(90 days) and if one wishes to change his/her operator again, one has no option but to wait more for 90 days.

D. Inter-Circle Issues

The government of India has mentioned the MNP within a circle only. So one cannot maintain the possession of the same mobile number if one moves from one state to another.

E. Mobile Number Identification

Before the MNP implementation, one could easily identify the mobile operator and its attributes by looking at first few digits of the mobile number. But after the MNP implementation, the problem of identifying the operator will become much obdurate.

III. IMPLEMENTATION

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

- *Number Porting Process:* This applies to the policies and processes for porting the numbers**.**
- *Call Routing:* This applies to the scheme of routing a call to a ported number.

1. Number Porting Process: Procedure and Considerations

Number porting process involves a set of parties, which includes donor (or current serving SP), recipient (new SP) and many participants (other service providers not related to the number that is being ported). The basic requirement of the porting process is that a subscriber needs to initiate a request to the service provider. The request can be initiated to either of the service providers (current serving SP or the new SP). This depends on the regulatory policies of the country. There are two approaches by which the number porting database can be maintained and implemented.

- Peer-to-Peer approach
- Centralized approach

1. Peer-to-Peer approach**:** In this approach, there is a bilateral agreement between two service providers. The two service providers agree on the implementation of number portability based on proprietary interface. With this non-standard approach, there can be multiple commercial agreements between the service providers, which make it difficult to manage the terms of each agreement, and track the porting requests. This approach is very complex, and the complexity is further increased with increasing number of service providers.

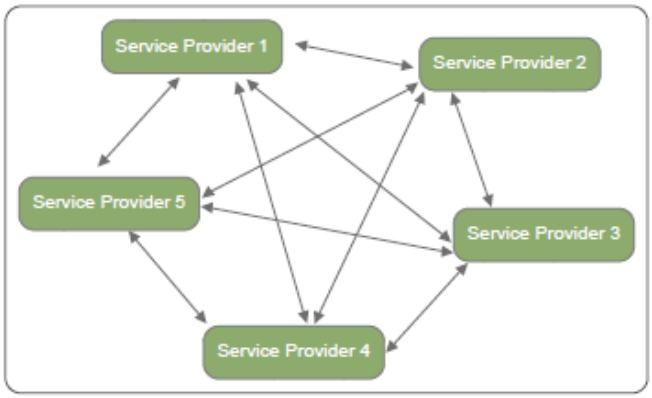

Fig 5: Peer to Peer Approach

2. Centralized Approach**:** In this approach, the regulatory authority of the country sets up the guidelines, policies and processes for number portability. All the service providers in the country have a shared and well-defined interface with a centralized NP administration center for processing the porting request of a number. This adheres to a clear set of service level agreements for each of the steps involved in the process and it is mandatory for the service providers to follow them.

Any porting request from any of the service providers is sent to the NP administration center first, to which all the service providers' number portability solutions are integrated with. A request that comes from the new SP to the NP administration center is sent to the present serving SP for clearance and once this is done the central NP administration center broadcasts the porting information to all the service providers in the country. As specified above, the porting request can be initiated by either of the current serving SP or the new SP (recipient). This is decided by the regulatory body of the country.

The centralized approach is the most preferred solution and is widely used across the globe. This is a highly scalable implementation.

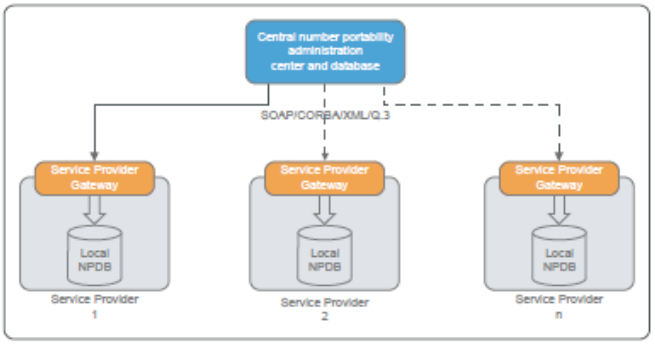

Fig 6: Centralized Approach

2. Call Routing: As discussed earlier, All Call Query (ACQ) scheme is the most efficient in terms of using network resources. The advantages of using ACQ to implement number portability are: No dependency on other network for routing the call. Easy billing for calls to the ported numbers. Call set-up time for calls to ported numbers is minimal. Minimal impact on signaling. Impact on network complexity is very less.

IV. CHALLENGES TO MNP

Cost aspects like raising the standard of the existing networks software modifications and adjustments, evaluation of effective routing mechanisms are the areas where mobile operators need to concentrate. Operators face tough challenges while operating the MNP. The operator's needs to ascertain that the new technology would be effective in addressing the settlements related to it. Furthermore, in the countries where circle concept subsists, the MNP need to unite the difference between local and national portability and also a balanced sense of interaction among the operators within the circles. Besides, operators need to assure that the time within which a subscriber can be ported in/out is not notably greater than the time required to obtain a new connection. A protracted porting period is likely to produce extra costs for the subscribers in porting and will simply deter them from porting at all. Although MNP faces a stiff challenge in terms of costs and implementations, it will progress in Indian market due to mature telecom market and increased rivalry. The major challenges of number portability are: Costs involved in upgrading the network infrastructure to support number of portability. Costs involved in maintaining the upgraded infrastructure. Costs involved in the usage of network resources to route the calls to the ported number.

V.CONCLUSION

To implement number portability, the best solution is to implement the centralized system, maintain a common number porting database, and use the All Call Query (ACQ) call routing scheme to route the calls to a ported number. The number portability gives freedom to subscriber to choose best service provider. From subscribers point of view it reduces cost, time and money.

References

[1] Journal of Emerging Trends in computing and Information sciences volume 2,Issue-2010-11
[2] Mobile Number Portability Solution Implementation, IJECT, Volume 3,Issue 1,Jan,March 2012
[3] International Journal of Advanced Research in computer science & software Engg, Volume 4, Issue 3,March 2014