

# Mobile Number Portability in India: Business & Technical Aspects

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**Abstract:** This paper presents current scenario of Mobile Number Portability (MNP), which is changing the common man's mobile usage in daily life along with its pros and cons in India. The motivation for this research work is emanated from the various concerns and issues raised by mobile users in the country and this work looks at the need for effective policies by authorities to have close monitoring and evaluation of the Mobile Number Portability schemes. The concept of mobile number portability allows us to change the operator without changing the mobile number. Now this approach in India will help the common man perspective in terms of mobile expenditure throughout the country by giving the freedom of changing the TSP without changing the mobile number. There are various challenges in this approach in India in terms of technical and financial segments of the cellular market and need to be taken care as soon as possible to get the full advantage.

**Keywords** - National Destination Number, Mobile Equipment, SIM, BSS, BTS, MSC, GMSC, Call Routing, HLR, VLR and NPDB.

## I. INTRODUCTION

The mobile number portability [1] is the network function that allows the subscribers/users to keep a unique mobile number within a specified region. This scheme allows users to use the SIM connection throughout the country without extra charges i.e. this is a roaming free scheme. To get rid all of the problems that a person faces during the time of changing his/her mobile number when he has to change the SIM or Mobile number due to various reasons. The concept of mobile number portability allows us to change the operator without changing the number. There are different types of Number Portability:

a. Operator/Service Provider Number Portability: This scheme allows us to change operator or TSP and can be done in following ways-

*Local Number Portability:* The subscriber retains its number when changing from one operator/service provider to another. E.g. the porting of existing directory number between fixed operators.

*Mobile Number Portability:* Porting of mobile telephone numbers between wireless operators.

*Non-geographical Number Portability:* Porting of 'service' numbers, e.g. '800' - numbers.

b. Location Number Portability:

The subscriber retains its number with the same operator when moving within the service area. Both move within the local area and move outside the local area. This can be combined with Service Provider Number Portability.

c. Service Number Portability:

The subscriber retains its number when changing service type. E.g. from POTS to ISDN, mobile to fixed, fixed to mobile.

The concept of mobile number portability has already been imposed by the National Regulatory Authority along with the consent of the various network operators [2] in India. This was a scheme to get a quality services from the telecommunication operators by introducing a fair competition among them. The scheme of service portability has been introduced with the help of that the users can change the telecommunication operator if he/she is not happy with the services without changing the mobile number. There are so many benefits of mobile number portability to the common man. Some of them are described below:

1) We can shift our old mobile service provider to new better mobile service portability, keeping our mobile number unchanged. Thus, we need not to inform our friends and relatives about any change in our number. This is of great benefit to businessmen and professionals where they may have to suffer losses due to change in mobile number.

2) The formalities involved in MNP are quite nominal. The subscribers have to just send a SMS followed by the filling up of customer application form for MNP.

3) A spirit of competition will run in telecom operators to provide quality service to the people at cheapest rates. This will provide huge benefit to the subscribers.

4) The porting transaction charge is quite affordable for the users.

5) The whole process of switching mobile operators will take of maximum number of seven days only.

## II. CONCEPT BEHIND CALL ROUTING IN SIMPLE SCENARIO

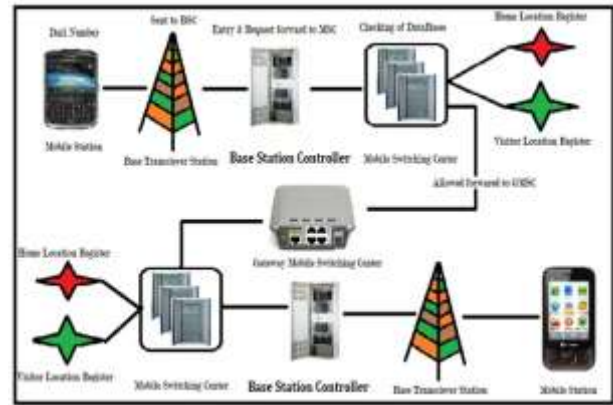
The basic concept of the mobile can be understood from the format of mobile number as specified below: -

Mobile Number= Country Code (+91- India) + Mobile Network Code (94- BSNL) + National Destination Number (180- Himachal Pradesh) + Subscriber Number (17100).

The above equation for the mobile number describes all the codes associated with a specific mobile number and these codes with help to trace the location of the mobile number. The database associated with the HLR (Home Location Register) and VLR (Visitor Location Register).

When a call is made from one number to another number it is routed as described below:

- 1) Mobile Station (Mobile Equipment + SIM) dials a number and sends it to Base Station Subsystem (BSS) via nearest BTS (Base Transceiver Station).
- 2) BSS consists of BTS (Base Transceiver Station) and BSC (Base Station Controller). Here BSC receive the dialed number, make the entry and forward it to MSC (Mobile Switching Center).
- 3) MSC checks the VLR (Visitor Location Register) for the allowed services of the Mobile Station. If yes then MSC ask BSC to allocate the available resources required for the service.
- 4) Now MSC routes the call to GMSC (Gateway Mobile Switching Centre).
- 5) GMSC routes the call to local exchange of called user.
- 6) The local exchange routes the call to MCS, MSC connects to BSS and BSS connects to the BTS of that user. Now a ring will ring on the MS of that user. Now according to his/her choices (Accept or reject the call) the routing back is done.
- 7) The answer is router back as: MS (Receiver) - BTS (Nearest to Receiver) – BSS (Receiver) – MSC (Receiver) – GMSC (Common) - MSC (sender) - BSS (Sender) - BTS (Nearest to Sender) - MS.
- 8) This final step is to receive the call by using the receiving button of the Mobile Station.



**Fig. 1** Call Routing in GSM System.

## III. CALL ROUTING IN MNP SCENARIO

The whole process of mobile number portability is based on the centralized or distributed database attached to the GMSC called Number Portability Data Base (NPDB) [2]. Three networks associated with the concept of mobile number portability are given below:

**Current Serving Network:** Current serving network is the network that currently serves the ported number. It is also called a recipient network. A recipient network or a current serving network is a network that a subscriber's number is ported to when the subscriber switches the service provider.

**Donor Network:** The network which was associated with the mobile number from the origin. The network from which the mobile number originally belongs is the donor network of that number.

**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, so it may or may not possible for a number to have old serving network.

The basic concept of the MNP can be understood from the process of migration on SIM from one TSP (Telecom Service Provider) to another which is given below: -

1. Client requests TSP-A for MNP and completes formalities for the process.
2. MSP-A will share the client details to centralized MNPDB (Mobile Number Portability Requests Data Base). Basically MNPDB is Data Base of customer information who wants MNP and in India it is actively monitored by TRAI.
3. After a specified period, mapping of services is finalized and Client is migrated to the TSP-B. Now the registration of Client will be with the HLR and VLR of TSP-B.

The call routing in this scenario is same but after the MNP service the MNPDB became the shared database between all TSPs and the validity checks are performed in that Data Base too.

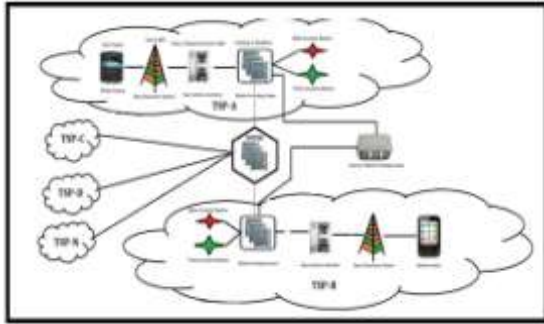


Fig. 2 Call Routing in MNP System.

#### IV. MNP STATUS IN INDIA

TRAI, The Telecom Regulatory Authority of India is the independent regulatory body which regularly issues orders and directions on various subjects such as tariffs, interconnections, quality of service, Direct to Home (DTH) services and mobile number portability to improve the Quality of Service and protects the interests of consumers in India[4]. In principle TRAI and Telecom companies agrees for MNP. The current regulation of TRAI-MNP Regulation (Sixth Amendment) full MNP (PAN India) has to be implemented by May 2015.

According to TRAI “Number portability is allowed within a circle, nation-wide or intra-circle. The customer should have completed a period of 90 days (from the date of activation of the mobile connection) with the current operator, to be eligible for porting to another operator. Although the duration for the process is 7 days for total process but the time a number is deactivated for portability is 3–4 days only.”

It looks feasibly principled but the ground reality of implementation of MNP poses many financial and technical challenges.

According to TRAI, In the month of June, 2015, 3.68 million subscribers submitted their requests for Mobile Number Portability (MNP). With this, the cumulative MNP requests increased from 160.25 million at the end of May, 2015 to 163.93 million at the end of June, 2015, whereas total wireless subscriber base has been increased to 980.81 million at the end of May, 2015. [5]

As the above statistics suggests that the telecom industry is in influx state while some service providers are struggling for customers. It also indicates that basic quality of telecom service in India is questionable.

#### V. ISSUES AND CHALLENGES TO MNP

If there are advantages of the technology there are some disadvantages also. Some of them are described below:

- 1) MNP is going to be proven a big part of mobile revolution in India. But it is also going to bring higher marketing expenses for mobile operators followed by lower profits.
- 2) Most of mobile consumers in India are having more than 2-3 SIM cards especially youngsters but they effectively use only one mobile number, which leads to very ineffective use of existing mobile numbers set. MNP will improve the effective use of existing mobile numbers [3].
- 3) MNP will give consumers many more features and freedom at competitive price without changing the mobile number.
- 4) In present time, mobile phone and SIM card are important tools during any criminal investigation. This helps police in investigating the owner of SIM card (who can be criminal). MNP could be a headache to police department because the criminals can misuse the portability duration of 90 days.
- 5) In India, 80% of mobile users are prepaid mobile users. A pointed disadvantage of MNP is that you lose all your remaining balance in your prepaid account on porting to new number.
- 6) Another aspect of mobile number portability is that it may prove to be insignificant in India as churn rate in India is already very high. Mobile users are very accustomed to switch to other operator and change their mobile number. So subscribers may not bother to go through the formalities of MNP. Use of multi SIM mobile handsets may also contribute in this reason.

All these problems with the mobile number portability lead to the development of this new approach for the Unified Subscriber Identity Module using Mobile Number Portability. For implementing the MNP, the telecom companies are facing the problems in the segments of technical and financial. The problems are discussed in brief in the following segments:

**Technical Problems:** The companies are facing the technical issues in the implementation of the MNP in India as discussed-

1. *Interoperability between different generations of Mobile Communication Technologies:* There are many technologies available with different implementations mode are available in India but their interoperability requires technical, financial and policy based system. However TRAI servers the policy part but implementation solely depends on the telecom service providers
2. *API sync with 3<sup>rd</sup> party:* There are many third party services such as OTT services over-the-top content (OTT) refers to delivery of multimedia over the existing mobile networks without the involvement of a multiple-system operator in the control or distribution of the content. It uses backend API's (Application programming interface) to harness the power of mobile networks. However syncing the API's is one of the biggest technical and policy based challenge.
3. *Mapping of VAS services among Telecom Service Providers:* Many service providers today provide extra or unique services to their customer such as Data conferencing and webcasting.  
If a user changes his provider, his services needs to transferred accordingly. If the new service provider does not provide the service the user must have alternatives for it.

**Financial Problems:** The financial issues can arise due to migration of the client as TSPs have to pay recurrent cost for various heads as discussed below:

**Operational Management Issues:** Due to very tough Competition among various service providers and low margin profit it is very difficult to provide services to the consumer.

1. *Billing Issues:* Mostly for postpaid customers services providers need a local address proof for their billing in case of MNP, the new services provider needs to ensure the address of billing for payments. In case of prepaid customers

customer loses all the talk time balances to old services provider.

2. *Cost of Upgrading and Maintenance of Networks:* As the technology evolves the services providers needs to upgrade and maintain the services this cost needs to be born by services providers
3. *Cost of Routing & Call Forwarding:* For internetwork calls each mobile service provider needs to pay the stipulated fee for routing and call forwarding.

## VI. CONCLUSION & FUTURE WORK

No doubt, MNP is good for every stakeholder but there are many issues and challenges as discussed in this paper which needs to be resolved on various levels. The TSPs want to prolong the implementation of MNP as user switches the provider very frequently. Biggest headache for TSPs is to retain the existing customers ideally it should be low cost high quality services but as we know the quality is a relative perspective of product and service. Every TSP need to develop and deliver its service with many unique features so that client should be attracted towards their brand and services. We have implemented the MNP concept partially in India for better customer services but the technical and financial issues need to be taken care of yet. The full implementation of this concept will fulfil the dream of "One country One SIM".

## ACKNOWLEDGEMENT

Blessed are those that can give without remembering and receive without forgetting. As we express our gratitude, we must never forget that the highest appreciation is not to utter words, but to live by them. My heart and soul feels greatly honoured to find this opportunity to be in thankfulness before **Almighty** for his constant innumerable blessings and also for bestowing the enough strength and courage to complete my thesis work.

We owe our sincere thanks to our common friend **Dr. Purnima Bali** and all those who contributed for the smooth running and completion of this paper.

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