



Public Consultation Paper

On

Implementation of Number Portability

Telecommunications Regulatory Commission of Sri Lanka

15.01.2021

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1. Introduction

Number Portability (NP) is the ability of telephone subscribers to switch between service providers or locations while retaining their original telephone numbers.

Telephone subscribers are predominantly reluctant to switch their network operator if they would have to change their telephone number. Therefore, telephone number act as a barrier to change the network even if the subscriber does not satisfy with the service offered by service provider.

Since Number portability enables the subscriber of telephone services to change their service provider whilst keeping their existing telephone number it creates an environment which foster consumer choice. By enabling subscribers to switch between service providers, removing the barriers and inconveniences automatically promotes effective competition among different telecom networks.

Also this leads way for improving quality of service, network coverage which rewards the service providers who maintains networks successfully. Hence NP has been recognized as an important driver of competition by regulators around the world.

Number Portability which allows subscribers to keep their telephone number when changing operator provides significant benefits to many parties such as to porting user, to callers as well as to the telecom industry as a whole. Those are

- to the porting user : eliminates the cost of informing other parties of the number change such as reprinting stationery and changing signage, for business users, of lost business;
- to callers : eliminates the need to reach directory enquires and/or change entries in their address books or computer systems;
- to Telecom industry : increases competition, with significant benefits for all users, by lowering the cost to users of switching operator or service provider and improvements in service quality

It is important to note the fact that prior to switching operators, subscribers need to be completely aware of the services offered by the new operator and the terms and conditions of the new contract, as only the number that is ported but not the existing services or tariff plan given by the existing service provider along with the number.

Number portability is implemented in different ways in different countries across the globe and the customer experience also varies from country to country. However, in general there has been a marked change in the telecom industry of each country upon the implementation of Number Portability. We Telecommunications Regulatory Commission of Sri Lanka (TRCSL) as regulator also expects healthier competition and improvement in quality of service in telecom networks of Sri Lanka.

This consultation paper sets out to invite comments and views from the industry, academia and other parties who are interested regarding the proposed implementation of Number Portability in telecommunication networks of Sri Lanka.

2. Background

In terms of the Telecommunication Act No. 25 of 1991 as amended, the Commission shall exercise its powers in a manner which it considers is best calculated to promote the national interest and in particular;

- to protect and promote the interest of consumers, purchasers and other users and public interest with respect to charges for, and the quality and variety of telecommunication services provided and telecommunication apparatus supplied.
- to maintain and to promote effective competition between persons engaged in commercial activities connected with telecommunication and promote efficiency and economy on the part of such persons.

Considering the present situation in the telecom industry in Sri Lanka, Commission has decided in principle to implement Number Portability between mobile to mobile and fixed to fixed telecom networks. to promote effective competition in the telecom sector based on various concerns of subscribers including Quality of Service, customer service, network coverage, tariffs, variety of services offered etc. thereby maximizing subscriber benefits.

2.1 Number Portability Types

There are three main types of portability services in use and those are described below.

1. **Operator portability** : the ability of an end user to retain the same telephone number when changing from one operator to another.

There are three types of operator portability as given below:

- **Geographic number portability** – operator number portability which allows fixed PSTN numbers to be ported between operators
 - **Non-geographic number portability** - operator number portability which allows non-geographic numbers to be ported between operators or service providers
 - **Mobile number portability** - operator number portability, which allows mobile numbers to be ported between operators.
2. **Location portability** : the ability of a fixed telephony subscriber to retain the same telephone

number when moving from one physical location to another. Location Portability is only applicable to geographic numbers, as by their nature, non-geographic numbers do not incorporate location information.

3. Service portability : the ability of an end user to retain the same telephone number as the person changes from one type of service to another where the retention of number is significant.

Questions

1. *Will there be any significant impact to the telecommunication industry by introducing Number Portability ?*
2. *If so, please elaborate negative and positive impacts.*

3. Implementation

Terms Used in Number Portability

Donor network	: The network to which customer subscribed before porting.
Recipient network	: The network to which customer subscribed after porting.
Originating network	: The network where the calling party is connected.
Terminating network	: The network where the called party is connected.
Number range assigned operator	: The operator to whom the number range is allocated by TRCSL

From technical point of view, the implementation of number portability requires a considerable amount of work and changes in the telecommunications infrastructure. Typically, the implementation includes a number portability database (NPDB) and selection of a suitable routing methods for different types of calls and messaging services. However the time taken to port a number is the main performance indicator as the procedures and processes involved in porting is not as simple as one may think. Also, it is important that the final solution could be able to be modified at a later stage if a need arises.

The analysis of the sequence of events that occurs when a call is made to a ported number is essential to understand the processes to be followed, actions to be taken and to decide which option is best suited. The typical sequence of actions that occurs when a ported number is called can be described as follows.

Assume there are two subscribers 07X ABC 1234 (Sub 1) and 07X DEF 3456 (Sub2)are in the same network (Network A - network prefix 07X) initially. Then subscriber 2 with number 07X DEF 3456 change the subscribed network retaining same number to Network B (network prefix 07Y).

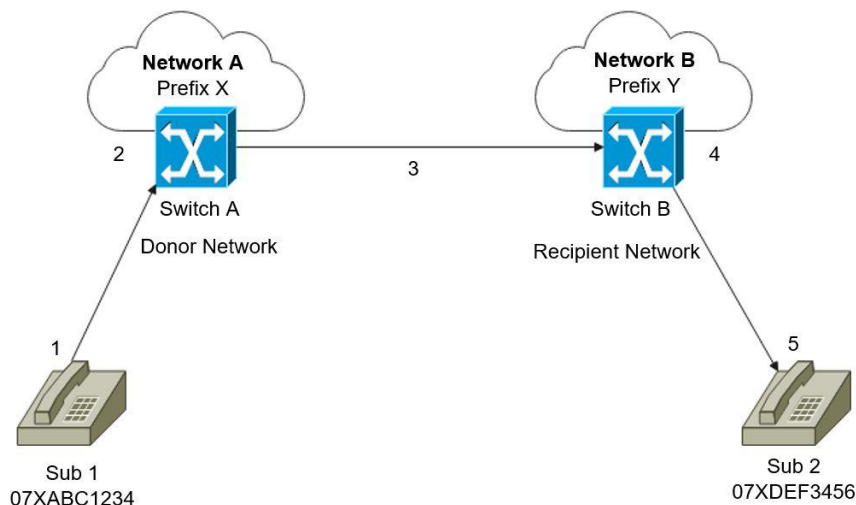


Fig. 1 – Arrangement after porting to Network B

There is a sequence of actions when Sub1 make a call to Sub2 as follows

1. Sub 1 dials number 07X DEF 3456
2. Switch of Network A searches the number and identify that it has been ported and now its in the Network B
3. Call is routed to network B
4. Switch B identify that number 07X DEF 3456 has been ported and now in Network B
5. Connect the call to Sub 2

From the above it is clear that there two stages in routing the call once a ported number is called. The first stage is identification that the call is for a ported number. This is referred as interception stage. Once the switch identify that the number is ported then the call is routed to the respective network which is the second stage and it is referred as routing stage.

To carry out the process of interception, the list of ported numbers should be available with the switch of each network. This solution is referred as on-switch solution where list of ported numbers is stored in each network and then each switch does the call forwarding. But this method has limitations such as non scalability, inflexibility etc. Hence the use of common database which can be accessed or queried by each network is preferred.

3.1 Call Routing

The routing of calls to a mobile network associated with a ported mobile number can be handled in multiple ways. Routing methods can be divided into two broad classes such as direct routing and indirect routing. In any method Number Portability Database (NPDB) is utilized where the records of the ported numbers are stored.

There are different calling scenarios available as follows when NP is implemented, and routing scenarios will also be different in each case.

1. Number is within the ranges assigned to originating network, but is ported out
2. Number is within the ranges assigned to originating network, and is not ported out
3. Number is not within the ranges assigned to originating network, but is ported into originating network
4. Number is not within the ranges assigned to originating network, and is ported to another network
5. Number is not within, the ranges assigned to originating network, and is not known to be ported

3.1.1 Indirect Routing

The originating network sends the message to the number range owner network. Originating network does not access the NPDB. The number range owner network looks up the number in NPDB. If the number has been ported to another network, the message is then forwarded to the relevant network to which the number is actually subscribed. This is an interdependent scenario where several operators have the responsibility in routing.

Although it is easier to implement this solution, become inefficient when the number porting occurrences increase as required routing actions to complete a call is more. Some countries have initially used this method of routing but subsequently changed due to operational problems encountered while operating.

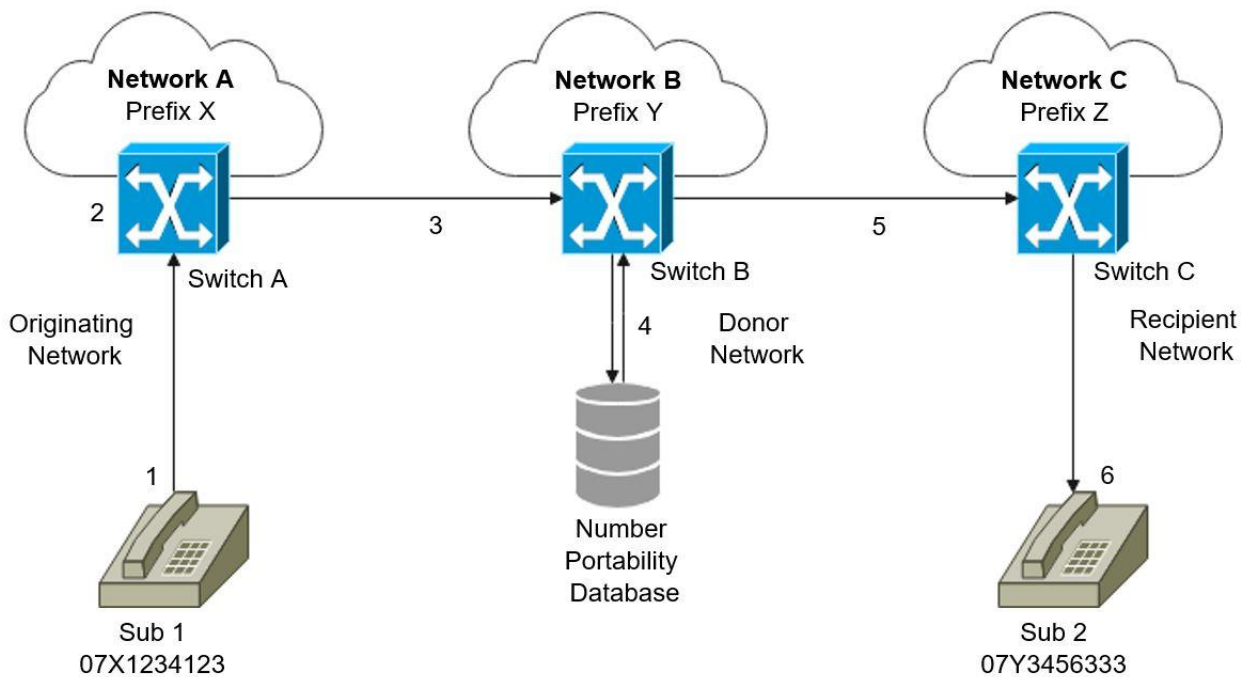


Figure No. 2 – Indirect routing

3.1.2 Direct Routing

In independent routing, originating network has the responsibility of routing call without depending on the intermediate networks such as donor network or recipient network. This solution is hence referred as direct routing. In direct routing, the originating network can directly access the NPDB, and it looks up the number in NPDB. Then it is possible to avoid routing the messages through the number range owner network or donor network.

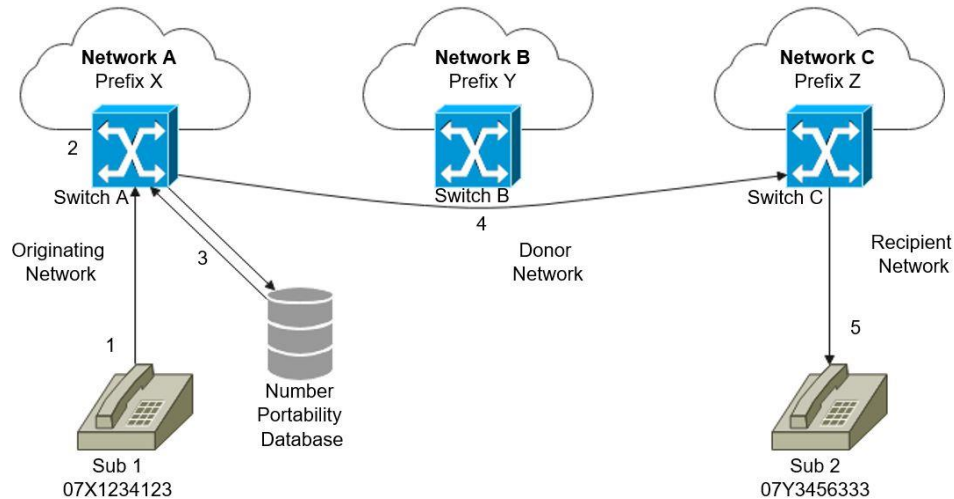


Figure No. 3 – Direct Routing

There are two ways to access the database, using the All-Call-Query, or the Query-on-Release methods.

All-Call-Query method: The originating network first looks up the network of the dialed number in the central database and then routes the call directly to the recipient network.

Query-on-Release: The originating network first looks up the status of dialed number with the donor network. The donor network returns a message to the originating network identifying if the number has been ported or not. The originating network then queries the central database to obtain the information regarding the recipient network and routes the call directly to the recipient network.

Some mobile subscribers may wish to avail themselves of number portability, particular attention must be given to NP implementation in these networks. Value-added services such as SMS (short messaging system) and voice mail also need to be catered for.

In the above context it is clear that although there different technical solutions for the implementation of Number Portability final solution has to be selected based on the evaluation of several factors such as

- Number of operators involved and types of operators
- Characteristics of each network such as network architecture
- Interconnection structure
- time required for the implementation

However it is essential that all major parties involved in this process i.e. operators and regulator agree upon the final methodology to ensure successful implementation of NP.

Questions on Routing :

1. *Do you agree with All Call Query (ACQ) system or what is your preference from the below mentioned methods?*
 - All-Call-Query*
 - Query-On-Release*
 - Onward Routing (Call Forwarding)*
 - Any other solution*
2. *What are the advantages of the suggestion?*
3. *Will there be any technical issues in the portability of services such as SMS, data, voicemail, or fax?*

3.2 Number Portability Database

The Number Portability Database (NPDB) maintains the data of ported numbers and the respective service provider information. This information is essential to determine the correct terminating network for the calls or messages associated with a porting number.

The model of NPDB can be either centralized, distributed or hybrid. Centralized Database (CDB), contains a single reference database comprising of data for the numbers of all service providers. The reference database is regularly copied to operational databases of service providers. In the distributed model there are multiple databases, each containing subsets of the total data, e.g. only the numbers assigned to particular service provider. Most of the countries have implemented centralized database.

Questions on Database

1. *What model do you suggest for managing and maintaining Centralized Database(CDB)? (e.g. outsourcing to a 3rd party, consortium of all operators etc.)*
2. *Who will bear the cost of establishing and maintaining CDB ?*
3. *Who will administer the CDB ?*
4. *Is it required to have a redundant database along with CDB? Please elaborate your answer with reasons.*
5. *Is it required to have a localized databases with each operator in addition to the CDB?*
6. *How should NPDB updates be synchronized between different operators?*

4. Porting Administration

Number portability is mainly changing operators while retaining the originally assigned number which means the transfer of service from one operator to the other. Practically it means closure of account with the Donor operator and starting a new account in Recipient operator. It is necessary to develop a procedure for porting a telephone number.

The procedure starts from the point where the subscriber requests to port his/her number. There is a series of steps that needs communication between subscriber and the respective operators. This includes user request verification by the number range assigned operator, and checking any dues to be paid by subscriber etc. Actual time taken to port a number depends on the responding time by each party and the efficiency of the procedure.

4.1 Handling Porting Process

There are two approaches for this process as donor led process and recipient led process. According to the respective process adopted by any country a subscriber can make request for porting either to the donor operator or to recipient operator.

When there are rejection of number porting requests by operators creates "dissatisfaction and frustration" among subscribers. The rejection may be due to wrong submission or incorrect entry of porting application by the potential subscriber. In addition to that when it comes to large number of requests at a time, there is an obvious workload to such party.

The transfer process therefore needs to be simple and user-friendly for the subscriber. There are diverse options for achieving these objectives. One is separate interactions with both operators for closing account at the previous operator and opening a new account with new operator. In this process more work is with the subscriber. Another option is whole process is handled by the recipient operator where subscriber request is made to the recipient operator. Subscriber has less burden in this method.

To control the rejection of portability requests and to lessen the burden of handling large number of requests at one time, the role of a NP Clearing House (CH) can be introduced into this ecosystem. CH will have all the details of subscribers required for completion of the porting process.

4.2 Porting Procedure

Porting procedure has several important steps. Authentication is the most important step in this procedure. Other steps are communications between parties involved approval or refusal to port.

Authentication procedure is normally built into porting processes to ensure that the person requesting Number Portability is authorized to do so. Authentication procedure has to be implemented in such a way that it is convenient to the user and also ensuring that it doesn't take a long period to complete. This can have significant effects on the strength and robustness of the porting process. The variables in this procedure are whether authentication is performed based on account records or the supporting document given at the time of porting request, who performs the authentication, how communications are done, whether maximum timelines are defined, level of trust between parties involved in the process.

4.3 Communications during the process

It is required to establish a protocol in communicating or exchanging information between different parties involved in the process. Pre-defined timelines for responding should also be established to ensure that responses are not unnecessarily delayed and porting process is efficient. In order to reduce the risk of fraud in information proper communication channels are required.

4.4 Porting Time

A lengthy porting procedure may lead to long porting time which cause extra cost to subscribers or discourage them porting. In the meantime very short porting time may cause insufficient time to carryout proper checks at each stage of the process to avoid possible frauds and ensure proper completion of porting activity. Hence the time to port should be decided considering all these factors into account.

Questions on Porting Administration :

1. *Is there a requirement of implementation of a Clearing House(CH)?*
2. *If so,*
 - a. *What functions do you suggest for CH ?*
 - b. *Who will bear the cost of establishing and maintaining CH ?*
3. *Should the Clearing House(CH) and Centralized Database be managed by the same entity?*
4. *What should be the maximum allowable time to complete the porting process (porting time) ?*
5. *Who should pay the costs associated with porting? Is it by the subscriber or should it be absorbed by the recipient operator ?*
6. *Should porting charges be regulated ?*
7. *If not, then what measures do you suggest which will ensure that the portability charges are not set to discourage portability?*
8. *How frequent a subscriber can port his number among different networks?*

5. Impact on National Numbering Plan

Different operators have been allocated different number levels according to the National Numbering Plan. In the case of fixed operators number prefixes are allocated according to the geographic areas where all three fixed operators use same prefix i.e. 011, 081, 091 etc. but different number levels have been allocated to different operators. Each mobile operator has been allocated operator specific prefix. i.e. 071, 072, 075, 077, 078 etc.

With the implementation of Number Portability this structure will no longer exist since individual numbers within a number block previously 'allocated' to one operator are ported to other operators. The main effect, if any, of Number Portability on the National Numbering Plan is the loss of structure in the National Numbering Plan. Number Portability between operators ultimately implies that identification of operator by numbers doesn't exist anymore.

On the other hand there may be many numbers connected to a completely different operator from the number range owner network. Therefore number resource allocated to that operator may exhaust early while actual effective number of subscribers in that network is much lesser than the available numbers in the range. This could lead to a problem in managing the scarce numbering resource in more efficient and effective manner.

Questions :

1. *What problems do you foresee in managing the current National Numbering Plan that may necessitate the modifications?*
2. *If a ported number is permanently disconnected, what should be the mechanism to notify the number range owner operator.*

6. Financial Issues

Implementation of Number Portability has a financial aspect in addition to the technical part of it. Both one-time and recurring costs are associated with the provision of Number Portability. Charges for interconnection related to the provisioning of number portability must be cost oriented and any direct charges to subscribers must not become a disincentive for using this facility.

6.1 Cost Types

Main cost types associated with Number Portability can be listed as given below.

1. General system set-up costs:
These are one-off costs mainly that have to be incurred by the operators in modifying their network elements and other support systems to enable Number Portability. These costs include all the capital costs of network upgrading and system development, as well as those involved in setting up an agreed porting procedure, determining commercial terms and procedures.
2. Transaction costs:
These are mainly administrative costs incurred in implementing Number Portability for individual customer lines. These include the cost of complying with the agreed porting procedures, activating ported numbers, testing, and communicating the necessary call routing information to other operators.
3. Additional conveyance costs:
These are additional costs involved in routing a call to a subscriber with a ported number, compared to the costs involved in routing a call to a subscriber with a non-ported number.
4. Administration costs:
These are costs associated with customer transfer or porting. They include the costs incurred by service providers in closing an existing account, setting-up a new account and coordinating the network operators in the switching over of the number and routing of the calls; costs of new handsets or SIM cards; and caller costs (the additional delay in setting up a call to a ported number).

6.2 Principles of Cost Apportionment

Cost apportionment methods used in determining Number Portability cost allocations by the entities in other countries are given below.

1. Cost causation : the party responsible for causing costs should help to bear the costs

2. Distribution of benefits: the party(ies) benefiting from the process should help to bear the costs
3. Effective competition: the cost allocation mechanism should inherently encourage competition
4. Cost minimization : the cost allocation mechanism should encourage operators to minimize costs and in particular to adopt technically efficient solutions
5. Reciprocity : charges between operators should be equal for the same service
6. Practicability : the allocation mechanism should be practical to implement
7. Relevance : charges should represent the costs of an efficient operator using a least cost approach

6.3 Tariff Matters

Before implementing NP, Subscribers are able to identify whether the dialing number (called number) is within the same network or not. They find it desirable to be able to predict the price of calls, and porting numbers should not undermine this capability. The issue of Tariff transparency is especially important given that tariff plans have been designed in such a way that those depend on the destination of the call. For example, according to some plans, charge is less for calls within their network, and more for calls to phones in other networks. Once Number Portability is implemented, it may not be possible for a caller to determine what the tariff for a particular call might be. This could lead to a confusion for the calling subscriber which can be solved by way of playing a recorded announcement at the start of a call.

Questions :

1. *Should the interconnection charge of 50 cents per minute be revised?*
2. *What measures do you suggest to ensure tariff transparency?*

7. Implementation of Number Portability in other Countries

Number Portability of various types has been implemented in a range of countries around the globe over the past decades. Table No. 1 given below provides information about countries that have implemented both Mobile Number Portability (MNP) and Fixed Number Portability in their telecom markets. The experience and evolution of number portability implementation in each country is unique, but the countries did implementations later had the advantage of taking into the account of the good and bad experiences of previous implementations.

Some countries had interventions of the regulator for adjusting porting process or the technical solution. The approaches of NP implementations are still evolving.

Economy	FNP	MNP
Hong Kong , SAR	1996	1999
United Kingdom	1996	1999
Australia	1997	2001
United States	1997	2003
Germany	1998	2002
France	1998	2003
Netherlands	1999	1999
Singapore	2001	1997

Table No. 1 - FNP and MNP implementations around the globe
Source: Ovum Consulting Report

In addition to the above many countries have implemented at least Mobile Number Portability. Summary of the countries and respective year of implementation is given in Table No. 2.

Year	Country
1997	Singapore
1998	
1999	U.K., Hong Kong, Netherlands
2000	Spain, Switzerland
2001	Australia, Sweden, Denmark, Macau, Norway
2002	Belgium, Italy, Portugal, Germany
2003	U.S., Ireland, France, Finland, Luxembourg, Greece, Iceland
2004	Austria, South Korea, Hungary, Cyprus, Iceland, Lithuania, Slovakia
2005	Taiwan, Estonia, Malta, Slovenia,

2006	Czech Republic, Croatia, Guam, Poland, Japan, Oman, Saudi Arabia, Slovakia, South Africa
2007	Latvia, Canada, Pakistan, Israel, Morocco, Nigeria, New Zealand
2008	Egypt, Mexico, Malaysia, Bulgaria, Macedonia, Romania, Turkey
2009	Brazil, Congo, Dominican Republic, Ecuador
2010	Peru, Thailand, Albania, Jordan, Kuwait
2011	Albania, Baharain, Columbia, India, Georgia, Ghana, Kenya, Panama, Serbia, Vietnam, UAE
2012	Argentina, Beluras, Chile, Gibraltar, Jamaica, Montengro, Paraguay, Sudan
2013	Azerbaijan, Bosnia, Cape Verde, Cayman Islands, Costa Rica, Kuwait, Moldova, Nigeria, Qatar, Russia, Trinidad & Tobago
2014	Armenia, Bermuda, Honduras
2015	Senegal
2016	Iran, Iraq, Kazakhstan, Maldives, Tunisia
2017	Tanzania
2018	Bangladesh, Benin, Bolivia, Ivory Coast
2019	Dominica, Grenada, Philippines, Saint Kitts & Nevis, Saint Lucia, Saint Vincent & Grenadines, Ukraine

Sources: Yankee Group, 2012, . & [https://www.xconnect.net/countries with mobile number portability](https://www.xconnect.net/countries-with-mobile-number-portability)

Table No. 2 – Implementation of MNP around the globe

General Questions :

1. *Timeline required for the implementation of NP for operators with justifications?*
2. *What will be the most effective way to aware the subscribers ?*
3. *Who will bear the cost of awareness ?*
4. *Please state any other issues/comments you may think it is necessary to consider on implementation of NP*

8. Responses to the Public Consultation Paper

TRCSL would like to invite responses in writing from all interested parties in relation to the questions raised in this Consultation Paper by **12th February 2021**.

All submissions will be processed and considered as non-confidential unless confidential treatment of all or parts of a response has been specifically mentioned. In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website www.trc.gov.lk.

In order to claim confidentiality for information in submissions that any party regard as business secrets or otherwise confidential, they must provide a non-confidential version of such documents in which the information considered confidential is taken out. To understand where removals have been made, it is requested to indicate as “business secret”, “confidential” or “confidential information”.

Please submit your responses by post to the following address and by email to ***nw@trc.gov.lk***.

Director General
Telecommunications Regulatory Commission of Sri Lanka
No. 276,
Elvitigala Mawatha,
Colombo 08.

9. References

- I. *Consultation Paper on Mobile Number Portability by Pakistan Telecommunications Authority*
- II. *Consultation Paper on Mobile Number Portability (Consultation Paper No. 7/2005) by Telecom Regulatory Authority of India*
- III. *Introducing Number Portability in Malta, Consultative Paper October 2003 by Malta Communications Authority*
- IV. *Implementation of Number Portability in CEPT Countries (ECC Report 31) updated in October 2005*
- V. *Number Portability through Global lens, July 2012 by Jeniffer Pigg, Brian Partridge, yankee group*