Telecom Regulatory Authority of India

Recommendations

on

Efficient Utilization of Numbering Resources

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Preface

Numbers have always played a central role in telecommunications and their importance is well recognized. A well designed numbering plan would ensure a structured approach to allocation and assignment of numbers that is consistent with the best international practices. The plan must ensure that the defined range of numbers allows for expansion of existing services and introduction of wide range of new services without facing premature exhaust during the planned period. It needs to take into account the increased demand that developments like convergent services, smart devices, machine to machine communication and premium services are likely to make on the numbering resources.

In India, the last major review of the numbering plan was carried out by the Government in 2003 with the formulation of National Numbering Plan 2003. This plan created a numbering space for 750 million telephone connections – 450 million cellular mobile and 300 million basic. Just 7 years into the numbering plan, adequate availability of numbering resources is threatened because of increase in the range of services, presence of large number of competitive service providers for many services and massive growth in number of connections specially in mobile segment. Given that telecommunications in India is still in the high growth phase, the need for a review of the numbering resources is evident.

In January this year, TRAI initiated a consultation on several important issues relating to numbering resources. We are thankful to the stakeholders who have participated in the consultation process and helped TRAI in framing these recommendations. I hope that these recommendations will pave the way for a long term suitability of and efficiency in the numbering plan.

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INTRODUCTION

1. With liberalization and rise of competition in telecommunications services, numbering resources and its administration has acquired important social, economic and commercial dimensions. A well designed and fairly administered numbering plan can facilitate competition in service provision and thus bring benefits to users by reducing tariffs and by increasing the quality of service. Continuous development in telecommunications technologies is opening opportunities for more number demanding applications like Internet Protocol (IP) voice and video services, man to machine and machine to machine communication, intelligent network services and value added services.

2. The primary function of the numbering plan is to define the numbering space, its allocation among telecommunication services and assignment among service providers. A well designed Numbering Plan would ensure a structured approach to allocation and assignment of numbers that is consistent with the best international practices. The plan must ensure that the range of numbers so defined allows for introduction of a wide range of new services and caters to the expansion of both existing and new telecommunication services without facing premature exhaust during the planned period.

3. Even the most carefully drawn up numbering plan may require revisions due to unprecedented growth in the number of subscribers or introduction of new services not anticipated before. This has been a common phenomenon across countries that have experienced high growth at some point of time. However, the mean time between major modifications would depend on how well the modifications are carried out, how effectively the plan is administered and how efficiently the numbering space is utilized. One has to bear in mind that substantial revisions of the numbering plan is not only a complex, time consuming and expensive exercise but it also results in subscriber inconvenience. It therefore makes sense to use the resources sensibly in a

managed and controlled manner without compromising growth and development.

4. In India adequate availability of numbering resources is threatened because of increase in the range of services, presence of large number of competitive service providers for many services and massive growth in number of connections specially for mobile. The need for review is evident. Rather than trying to sail through with patchy modifications and subsistence level operation, it has become necessary to tackle the situation in a way that would work for 30-40 years with minimal disruption.

CHAPTER I

NECESSITY FOR REVIEWING THE NUMBERING PLAN

A - Regulatory responsibility

1.1 Numbers have always played a central role in telecommunications and their importance is well recognized. Nevertheless, the importance of numbering as a regulatory instrument has lately increased significantly with adequate, fair and transparent access to numbers becoming an essential part of ensuring a competitive telecommunications market. The TRAI Act of 1997 (as amended in the year 2000) puts the onus on the Authority to take measures to facilitate competition and promote efficiency in the operation of telecommunications services so as to facilitate growth in such services. In doing so the Authority needs to set the rules governing diverse competitive issues with numbering implications. Services like intelligent network services, selection of long distance operators through calling cards, emergency services, number portability and special services have numbering implications inter-woven with inter-operability and charging issues. It is also important to see that the allocation and assignment criteria do not provide commercial advantage to one service against other competing services.

B - Impending scarcity of numbers

1.2 The last major review of the numbering plan was carried out by the Government in 2003 with the formulation of National Numbering Plan 2003 (NNP 2003). This plan was designed for 50% tele-density by 2030 and created numbering space for 750 million telephone connections – 450 million cellular mobile and 300 million basic. To quote from the plan document: "… it was felt to review the existing Numbering Plan and to formulate a plan, which will be futuristic, flexible and could cater to the numbering needs for about next 30 years in respect of the existing and likely new services. Keeping this in view, the new Numbering Plan has been formulated for a projected forecast of 50%

tele-density by the year 2030 and thus making numbering space available for 75 crore telephone connections in the country comprising of 30 crore basic & 45 crore cellular mobile connections."

1.3 The scenario that has emerged since the plan was released is different from what was anticipated. The number of fixed lines stagnated and then dwindled from the April 2003 figure of 42 million to 36.83 million in April 2010. The growth of mobile connections has proved to be grossly underestimated. The anticipated 450 million connections by 2030 were achieved in 2009 and it is expected that the 1 billion mark would be crossed before the end of 2014. Considering that some of the assumptions made in drawing up the NNP 2003 are no longer applicable, the plan falls short of meeting the developments even for the next few years and calls for urgent review to facilitate continued availability of numbers with minimum disruption of any service.

C - The consultation process

1.4 TRAI has gone through an extended process of identification of issues, deliberations within the Authority and with stakeholders and has finally formed these recommendations to enable the Numbering Plan Administrator to review the existing numbering plan in order to create numbering space for long term and to take steps for efficient utilization of numbering resources.

1.5 A research paper covering many aspects of the numbering plan was published by the Authority on their website in March 2009 for the comments of the stakeholders. This research paper included, among others, issues relating to numbering scheme, allocation and pricing of numbers. The research paper brought into focus the problem areas of the numbering plan. To carry the work forward the Authority decided to have a consultation through a consultation paper with all stakeholders so that all the issues could be analyzed further and recommendations can be formed wherever required. The consultation paper titled "Efficient Utilization of Numbering Resources" (2 of 2010) was put on the TRAI website on 20.01.2010 and

comments were requested by 19.02.2010 and counter comments by 05.03.2010. On request of the stakeholders the last date for comments was extended to 26.02.2010 and for counter comments to 15.03.2010. Comments were received from a total of 24 stakeholders including 11 service providers, 3 telecommunication services providers' associations and 10 consulting firms/consumer associations/individuals. Counter comments were received from 1 telecommunication services providers' association and 3 telecom service providers. These comments and counter-comments are available on the TRAI website www.trai.gov.in. The open house discussions were held on 14.5.2010.

D - Scope of the consultation

1.6 All the issues that were opened up for consultation could be grouped into three broad areas:

- Long term suitability of the numbering plan
- Allocation criteria for numbers for fixed line and mobile services and annual numbering return
- Pricing of numbers

1. Long term suitability of the numbering plan

1.7 The discussions under long term suitability explored the methods for meeting the demand on the long term basis. Ways of continuing with the 10 digit [including the Short Distance Charging Area (SDCA) code] numbering plan for fixed and mobile and desirability of migrating to 11-digit numbering plan were discussed. One of the important issues under examination was migration to integrated numbering plan which would give the advantage of uniform and common numbering space for fixed, mobile and any other services that may be introduced in future.

2. Allocation criteria

1.8 Inclusion of allocation criteria sought to open up for discussion the issue of larger and quicker allocation of numbers that some service providers had raised from time to time. Also in question was the issue of proper management of the numbering resources through a numbering return that would not only include parameters to see how the numbers have been used but also forecast of requirement that would help the Numbering Plan Administrator to plan for numbering resources well in time.

3. Pricing of numbers

1.9 The issue of pricing was included in the consultation paper to initiate a discussion on whether pricing of numbers leads to efficient utilization of the held by the service providers.

E- Analysis and recommendations

1.10 The Authority has taken into account the written comments of the stakeholders in response to the consultation paper, deliberations during the open house discussions, and responses of the stakeholders to the research paper and inputs on the subject received from the stakeholders from time to time. TRAI has also researched information available from a number of countries on these aspects. The analysis and accompanying recommendations are given in Chapters II to IV.

CHAPTER II

LONG TERM SUITABILITY OF NUMBERING PLAN

A - Numbering standards

2.1 The Department of Telecommunications administers numbers for fixed and the mobile networks based on the International Telecommunication Union (ITU)-T E.164 recommendations. The Series E of ITU-T recommendations deal with "Overall network operation, telephone service, service operation and human factors". Specifically the Recommendation E.164, approved on 24 February 2005, describes "The international public telecommunication numbering plan". This Recommendation provides the number structure and functionality of numbers used for international public telecommunication. It details the components of the numbering structure and the digit analysis required to successfully route the calls.

2.2 The ITU-T recommends that the maximum number of digits for the international geographic, global services, network and groups of Countries applications should be 15 (excluding the international prefix). Administrations are invited to do their utmost to limit the digits to be dialled to the degree possible consistent with the service needs. National (significant) number [N(S)N] is that portion of the international E.164-number that follows the country code for geographic areas. The function and format of the N(S)N is nationally determined. The leading digits of the [N(S)N] indicate services/or geographical area. The plan should be designed to allow generous provision for future growth in the number of subscribers and types of services and also in a way so that subscribers would always be called by either the same N(S)N or Subscriber Number (SN) depending, based on the country's choice, regardless of where the call originated from within the national numbering plan. Where multiple operators serve the called party's geographical area, the national numbering plan in the country of destination shall provide for discrimination between these operators. Prefixes and other information concerned with identifying selection procedures or Network Service

parameters (such as Quality of Service or transit delay) do not form part of the number. An integrated numbering plan shall include an unambiguous identification of a particular country.

B - Indian numbering adaptation

2.3 It was mentioned in the consultation paper that India follows ITU-T E.164 recommendations with open numbering plan which was designed to have a capacity of 450 million mobile and 300 million fixed numbers. Department of Telecommunications(DOT), the Numbering Plan Administrator, has been allocating numbers for mobile connections from level '9' which has a theoretical capacity of 1000 million numbers and with a 60% utilization factor a practical limit of 600 million numbers to be allocated. As the connections neared this limit and allocation of blocks of numbers became difficult in level '9', DoT started allocating numbers from spare codes and free sub-levels of level '8'. A list of spare codes is available in the National Numbering Plan 2003(NNP2003). Free sublevels are the SDCA codes followed by '0', '1', '8' and '9' as these will not conflict with fixed line numbers. DOT has allocated some sub-levels of '7' for fixed and now they have started allocating spare codes and some sub-levels of this level to mobile services. These steps have been taken to tide over the immediate number crunch and do not afford smooth administration of numbering resources.

C - To continue with 10-digit or migrate to 11-digit scheme?

2.4 The consultation paper asked the stakeholders to give their opinion on whether 10 digit numbering scheme can continue and if so how adequate resources could be garnered for both up to 2014 and beyond.

2.5 An overwhelming majority of stakeholders supported continuation of 10 digit numbering scheme with various measures to enhance availability of numbering resources. Migrating to 11 digit numbering scheme has been cited to have a number of disadvantages. From the customers' viewpoint the

change of numbers would be a big inconvenience if 11 digit numbering scheme is introduced. This change would affect all existing and new subscribers. Change of numbers would require Subscriber Identity Module (SIM) cards to be changed thus introducing an extra cost which may eventually have to be borne by the customers. If mobile numbers become 11-digit long and fixed numbers remain 10 digit then number portability between fixed and mobile cannot be implemented. From the service providers' view point the task of amending all the International roaming arrangements and testing with the new scheme would be challenging and time consuming. Logistics of distributing SIMs to the existing customers would be no less formidable. Some switches do not support 11 digit numbers and would have to be upgraded or changed. Increased number length would lead to increased storage requirement and processor load and may require enhancement in resources. Upgradation of Operation Support System (OSS) and Customer Relationship Management (CRM) may become necessary. Provisioning, mediation and billing would have to be updated. In some cases the Calling Line Identification (CLI) would not be correctly displayed raising security issues. Even the few service providers who favoured migration to 11 digit numbering scheme did so for long term agreeing that for short term it is best to institute optimization measures for the 10 digit scheme.

2.6 International experience, given in the consultation paper, also suggests that very few countries have chosen to implement 11-digit numbering scheme. One stakeholder has said that in the US, Federal Communication Commission (FCC) found that avoiding adding digits, via number optimization, would result in a cost benefit to the US industry of between 19 and 33 billion US dollars. They moved the exhaust date from 2006 to 2039 with number resource optimization.

2.7 Based on the points raised by the stakeholders and information available from other countries, TRAI does not wish to suggest migration to 11 digit numbering scheme. There are methods of creating a large numbering space with a 10-digit numbering scheme which make all the cost and disruption of

migration to 11-digit scheme avoidable. In a later section we discuss how it would be appropriate to continue with the 10-digit numbering scheme with a smooth transition path to the integrated numbering scheme.

2.8 **The Authority recommends that 10-digit numbering scheme should be continued with the modification suggested in recommendations below.**

D - Creating larger numbering space

2.9 Methods of creating numbering space while retaining 10-digit numbering scheme evoked innovative suggestions from the stakeholders. Various methods suggested could be grouped under the following:

- Using spare sub-levels of levels '7' and '8'
- Vacating levels '7' and '8' of Subscriber Trunk Dial (STD) codes
- Withdrawing level '7' allotted to service providers for fixed line numbers
- Withdrawing sparsely used levels out of 2,3,4,5 and 6
- Having lesser levels for fixed line numbers
- Prefixing '0' to calls from fixed to mobile within the same service area
- Removing '0' from inter-circle mobile to mobile calls

2.10 All these suggestions were analyzed to zero in on a method that would create the largest numbering space with least disruption to give sufficient quantity of numbers for the period till use of integrated numbering scheme is commenced as a long term solution.

1. Creating more capacity in levels '7' and '8'

2.11 Using just level '9' and spare sub-levels of level '7' and '8', as is being done today, would not take us far. Creating more capacity in levels '7' and '8' would require shifting of existing SDCA codes from these levels to other levels. Any move to shift these SDCA codes would result in changing SDCA codes of the states of Madhya Pradesh, Maharashtra, Rajasthan, Gujarat, Karnataka and

Andhra Pradesh causing all round customer discontent. This would be another blow to the already struggling fixed line market. Besides, level '7' has also been allocated for fixed line numbers and vacating these would affect subscriber numbers in these levels.

2. Dropping prefix '0' from inter-service area mobile calls

2.12 Some of the service providers suggested dropping prefix '0' from inter-service area mobile calls so that levels '7' and '8' can be allocated for mobile numbers without any conflict with the existing codes. The idea being that STD calls to SDCAs having codes starting with '7' and '8' would be dialing with a '0' while mobile to mobile calls would be dialed without a '0' avoiding conflict. This method, however, gives rise to some routing issues both in domestic and international calls. For instance, an incoming call from a Bangalore fixed number 23178696 to a mobile number would be recorded in the mobile in the format (country code)+N(S)N i.e. +918023178696. Now when the recipient uses this stored number to make a call there is a routing deadlock if the number 8023178696 is used for a mobile connection as well. Also all the levels of 7 that have been allotted for fixed numbers cannot be used for mobile. In the case international calls the format used is 00+Country Code+ N(S)N. For example, the mobile number 7126534466 and the fixed number 6534466 of SDCA with code 712 would become same international number 00917126534466 giving rise to conflict in routing.

3. Prefixing '0' for intra-service area fixed to mobile calls

2.13 A method of enhancing the numbering space while retaining 10 digit numbering scheme that found general support with the stakeholders is to require that intra service area fixed to mobile calls be dialled with prefix '0'. According to ITU-T E.164 prefixes are not part of the number length thus prefixing a '0' to certain kind of calls, for appropriate identification and routing, is different from making the number length 11 for processing in the switches. Currently levels '2','3','4','5' and '6' are used for fixed numbers

making use for mobile impossible in the existing dialing plan. On the other hand, if fixed line subscribers continue to dial fixed line local numbers without a '0' and mobile numbers with a '0' within an SDCA then there would be no difficulty in resolving called network and all free spare codes and free sub-levels of levels '2' to '6' will become available for mobile connections as well. Leaving level '5' which is used for short codes remaining levels can be used for mobile numbers. We can form numbers using these level that would not conflict with existing SDCA codes e.g. if a number 2234567890 is given to mobile in Delhi then if a fixed subscriber of Delhi dials 02234567890 the call may land on the fixed number 34567890 of Mumbai. On the other hand, if we use only levels '0','1', '8', '9' after the SDCA code then a mobile number like 2212345678 would be easy to identify and route. All SDCA codes followed by 0, 1, 8 and 9 would provide an additional capacity of around 1 billion mobile numbers.

2.14 A comparison between the two methods for increasing the numbering space describe above viz. (1) removing '0' for inter-service area mobile calls and (2) adding a '0' for fixed to mobile intra-service area calls, it is seen that the numbering space generated is lesser and the constraints are more if method (1) is adopted.

4. Integrated numbering scheme

2.15 The stakeholders were asked to comment on the possibility of implementation of an integrated numbering scheme for fixed and mobile connections as a long term measure for retaining 10-digit numbering scheme. Projections using 2001 census figures show that by 2050 Indian population would grow to about 1.66 billion. Considering the growth of mobile telephony and possibility of other services like VoIP and requirement of numbers for non-telephony services like Internet Protocol Television (IPTV), a 200% density of 'services with numbers' is a distinct possibility. This would require 3.32 billion allocated numbers and a numbering space of about 5.5 billion as per present allocation criteria. Integrated scheme gives the advantage of a large

uniform numbering space of about 8 billion from which numbers can be allotted for fixed, mobile, VoIP and any other future services. It would obviate the need for keeping levels and SDCA codes reserved for fixed network or levels for mobile network making allocation flexible. This method would be customer friendly as in case of fixed line numbers N[S]N (National Significant Number) would become [S]N (Subscriber Number) and in case of mobile there would be no change in subscriber numbers. Also uniformity in fixed and mobile numbers is necessary for implementing number portability between fixed and mobile networks. Inter SDCA and inter service area would become easier no SDCA code or '0' would need to be prefixed.

2.16 Reservations expressed by the service providers, insofar as the integrated numbering scheme is concerned, are summarized below:

- There would be technical feasibility issues because of legacy network and distributed architecture based on SDCA based linked numbering plan.
- There may be issues related to tariff
- Transition plan should be formulated such that migration to integrated scheme is done in the year 2020.
- With the type of regulatory levies that we have it would be difficult to implement this scheme and it would be difficult to cross-check the payment made for licence fee and spectrum fee.
- Fixed line subscriber will have to dial 10 digits instead of 6 to 8 for local numbers.
- Any disruption in the numbering system at this stage is not desirable
- Local call advantage to fixed line would be lost
- It will require change in Point of Interconnection (POI) and POI investment would be lost

2.17 As we shall see some of the misgivings expressed by the stakeholders are just minor irritants while others can be managed with proper planning. Analysis carried out by the Authority brings to light the fact that integrated service area based scheme would enable the entire numbering space to be used for

fixed and mobile services releasing the numbers locked up for fixed line services and would also normalize any advantage that separate numbering levels may bestow on one service or the other.

2.18 These views are analyzed below:

The issue of technical feasibility may mainly involve conversion from SDCA based switch architecture to service area based architecture, change of interconnection levels from SDCA to service area based, database modification and routing of calls. None of these problems are intractable. Fear on the tariff front is also unfounded as distinction can be made among different types of calls and local call advantage available to wireline or Fixed Wireless Phone (FWP) or any other category of customers can continue.

2.19 Regarding the contention of the service providers that they have invested heavily in SDCA based POI infrastructure which would become redundant if numbering system is changed to integrated service area based numbering, one has to look at the situation holistically. Whenever a country's telecom network undergoes a major modification like migration to Next Generation Network or change in switching plan, POIs may have to be rearranged and some of them cannot be immediately reused. In many cases, however, they could be reused for expansion of their own network. One has to look at it as a POI rearrangement that leads to immense simplification and ease of future augmentation.

2.20 There may be apprehension that in the integrated scheme National Long Distance Operator (NLDO) will have to hand over the calls at service area level rather than taking to the SDCA and consequently will be liable to pay carriage charge. In this regard such suitable measures could be taken in consultation with the stakeholders regarding rules for handing over and carriage of calls taking care of the interest of the customers and various categories of service providers.

2.21 There could be a feeling that today the level denotes whether it is a fixed number or a mobile number and also which operator it belongs to but this identification would not be there in the integrated plan. However, as the number of levels of mobile services increase and part of 7 and 8 are allocated to mobile this distinction has already been blurred. Also with mobile number portability in place identifying operator from the number would be a thing of the past.

(a) Planning integrated numbering scheme

2.22 There are broadly two ways to migrate to an integrated numbering scheme, one would be to merge the SDCA code with the subscriber number and form a 10-digit number for fixed line and the second would be to identify one or more unique codes for each service area/circle and fill up the remaining digits to make a 10 digit number.

2.23 The first method offers the advantage of keeping the subscriber number unchanged. There would be no change in the digits dialled for calls to any subscriber in another SDCA or another service area (national long distance calls). The method would give a uniform 10 digit numbering scheme for fixed and mobile and all 10 digits would always be dialed whether the subscriber dials a local number of a long digit number. Short Distance Charging Area(SDCA) codes of 2, 3 and 4 digits would be merged with the fixed line subscriber numbers which are correspondingly of 8, 7 and 6 digits to form a unique 10 digit subscriber number. For example, a Jodhpur number 2474567 becomes 2912474567 as the SDCA code of Jodhpur is 291. No change would be required in the existing mobile numbers. The initial digits may still have geographical significance and with some discipline in allocation geographical significance can be maintained for future allocations. Number portability would become possible between fixed and mobile systems. Emergency number caller localization may need to be worked out.

2.24 The second method involves allocating new codes to service areas e.g. 12 and13 for UP, 14, 15 for Rajasthan etc and take the remaining 8 digits from the existing number (3rd to 10th digits from SDCA code+number). This method requires subscriber numbers to be altered substantially for the advantage of geographical identification of the service area from the numbers. Another advantage is that for local calls only 8 digits would need to be dialed. This method also gives uniform 10 digit numbering scheme for fixed and mobile and allows number portability between fixed and mobile systems to be implemented. Emergency number caller localization may needs to be worked out.

2.25 The main difference between the two methods is that in method no 2 the service area could be uniquely identified by the first two digits at the cost of large scale change of subscriber numbers. Considering all the aspects it is felt that the first method would be easier and more consumer friendly to implement. The service providers need time to restructure the network, re-arrange POIs, and change the routing and billing information. The service providers with legacy fixed network may take a little more time in this restructuring and upgradation process. TRAI has examined the activities required in preparation to migrate to integrated numbering scheme. Discussion with experts revealed that the subscriber data, routing, billing system and other support systems could be modified in 2-3 months. The physical work related to point of interconnection, enhancement of exchange equipment for terminating more trunks and other similar tasks may require 6-8 months. Testing and migration thereafter could be allowed 2-3 months more. A number of activities would be possible in parallel and not all the activities would be required by all operators. When it is decided by the Numbering Plan Administrator to implement the integrated scheme, a more detailed consultation will be carried out by the Authority to work out the modalities of implementation. Keeping these in view the Authority makes the recommendations given below:

2.26 **The Authority recommends that the country should migrate to an integrated 10-digit numbering scheme at the earliest. All preparations should be complete by 30th September 2011 and actual migration to the integrated scheme be completed by 31st December, 2011.**

2.27 **Detailed integrated numbering, routing plans and interconnection architecture would be worked out by TRAI after acceptance of recommendations by DoT. If required, a separate consultation would be carried out.**

E - Implementation in the interregnum

2.28 While the service providers prepare for and then implement integrated numbering scheme by 1st of January 2012 the numbering plan administrator would need a foolproof method of obtaining sufficient numbering capacity within 10-digit scheme with minimal disruption in the scheme. The method described in 4.1.4 (c) is promising and is described in more detail here.

2.29 It has been suggested in 4.1.4(c) that more capacity can be generated by making use of levels 2, 3, 4 and 6 for mobile services. The reason why levels 2, 3, 4 and 6 cannot be used for mobile services in the existing scheme is that these would conflict with fixed line numbers when dialed from a fixed phone within an SDCA. Level 5 is, anyway, being used for short codes and therefore cannot be used for subscriber numbers.

2.30 For inter-circle calls from fixed phones, mobile numbers are already dialled with '0' prefixed for all fixed to mobile inter-circle calls. If this is extended to fixed to mobile intra-circle calls as well then levels 2, 3, 4 and 6 can be used for mobile numbers also. This does not affect other calls as intra SDCA fixed to fixed would be dialed without a '0', inter SDCA and inter circle fixed to fixed with SDCA code, intra-circle mobile to mobile without a '0' and inter circle mobile to mobile calls with a '0'. Once it is made possible to use 2,3,4 and 6 it only remains to decide the spare levels that can be used without any

conflict with other numbers. It can be seen that levels formed by SDCA codes followed by '0', '1', '8' and '9' for mobile networks will not conflict with fixed line numbers e.g. mobile numbers starting with 220, 221, 228 and 229 will not conflict with Mumbai (SDCA code 22) fixed numbers as no local fixed line number would start with 0, 1, 8 and 9. This will make available about 1 billion numbers without disruptions and conflict. This method has been supported by a large number of stakeholders including BSNL and MTNL. BSNL feel's that the proposed method is most easy to implement without causing inconvenience to majority of the customers however, it would require all fixed line customers to have '0' dialing facility. No subscriber numbers are affected nor are any SDCA code changed.

2.31 Implementing this should not be a difficult proposition as the subscribers already need to use '0' for calling adjacent SDCAs and also for mobile numbers in other service areas. Also dynamic locking facility is available which can be used to lock or unlock '0' as required. International dialing with prefix '00' can still be barred separately. Even the '0' dialing will be under dynamic locking facility for most subscribers. The fact that no subscriber numbers or SDCA codes are changed is quite appealing. The minimal nature of the impact of this scheme can be seen from the table below:

From	**To**	**Existing dialing plan**	**Recommended**
Fixed Line	Intra SDCA Fixed	Subscriber Number	No Change
	Intra Service Area Mobile	**NSN (**10 digit mobile No.)	**Prefix '0'**
	Inter SDCA Fixed	0+Area Code+ SN	No Change
	Inter Service Area Mobile	0+NSN	No Change
Mobile	Intra Service Area Fixed	0+Area Code+ SN	No Change
	Intra Service Area Mobile	NSN	No Change
	Inter Service Area Fixed	0+Area Code+ SN	No Change
	Inter Service Area Mobile	0+NSN	No Change

2.32 The method suggested above does not conflict with analysis and routing of any other type of calls and is also amenable to migration to integrated scheme. The scheme is a simple non-disruptive method of creating numbering space that could be implemented easily in a short time. However, subsequent migration to the integrated numbering scheme needs careful planning. The plan for introducing integrated numbering scheme should be able to ensure that the range of numbers defined allows for introduction of a wide range of services and caters to the expansion efficiently during the planned period and premature exhaust is avoided. Therefore to give full flexibility to the planners of integrated scheme in working the most suitable long term plan that would be able to take care of all existing and future services, it is suggested that the spare codes as defined in the NNP2003 may not be used in the intervening period. It would be advisable for the numbering plan administrator to follow such discipline in allocating numbers so that geographical significance is maintained e.g. Priority may be given to Mumbai for allocation of levels like 220 and 221.

2.33 **The Authority recommends that in the intervening period, till integrated numbering scheme is implemented, the following scheme should be adopted to create sufficient numbering space:**

a. **No change in dialling plan of fixed to fixed, inter-circle fixed to mobile and mobile to mobile calls.**
b. **Dial intra circle fixed to mobile calls with prefix '0'**
c. **Existing SDCA codes starting with 2, 3, 4 and 6 may be used for mobile services by suffixing with 0, 1, 8 and 9.**

2.34 **The Authority recommends that codes defined as spare in the NNP 2003 should be kept spare till the new numbering plan consisting of integrated numbering scheme is notified.**

Chapter III

ALLOCATION AND PRICING OF NUMBERS

A - Allocation of numbers

3.1 Stakeholders were asked whether the present criteria for allocation of numbers ensure efficient utilization of numbering resources and whether it will be useful to file a numbering return to the Numbering Plan Administrator for monitoring and ensuring efficient utilization of the numbers.

3.2 On this issue most of the service providers responded that the present criteria for allocation of new block of fixed service numbers after 80% utilization and mobile numbers after 60% utilization to ensure efficient utilization of numbering resource is working and there is no need to review them. A few of the service providers are in favour of lowering utilization factor to 50% for new service providers and continuation of the present 60% for existing service providers. One service provider said that 50% utilization criteria may be adopted for both existing and new operators, another said that the percentage should be increased to 70%. Another service provider felt that a reserve of 25 lakh numbers should be the guideline. There was also a comment that allocation should be for a fixed period of time and unused numbers should revert back to DOT according to one service provider.

3.3 According to the present criteria an operator can apply for new blocks of numbers after demonstrating 80% utilization of numbers for fixed and 60% for mobile. With 60% criteria for mobile and allocation of a block of 1 million numbers on each occasion, the new operators who were allocated 1 million numbers initially can have only 0.4 million numbers in distribution channel when application is made for a new block of numbers. In contrast, an established operator, who has been cumulatively allocated, say, 20 million numbers in the same service area, may have accumulated 8 million unutilized numbers (i.e 40% of their allocated 20 million).

3.4 The Authority is of the opinion that allocation criteria should be such that sufficient buffer is maintained with the service provider to ensure smooth commercial operation. At the same time the service provider should not get the opportunity to hoard numbering resources. Considering the fact that service providers need to keep stock in the distribution channel and time needed for administrative processing for issue of new block of numbers, the Authority is of the opinion that for smooth commercial operations it would be appropriate to have 3 months buffer when new block of numbers is requested.

3.5 Taking into account the highest number of connections given per month, 3 months buffer requirement and administrative processing time a total of 3 million numbers should be sufficient for numbers in distribution channels and actual connections provided. For the new service providers who have less than 3 million unutilized numbers, new block would be sought after 60% utilization.

3.6 **The Authority recommends that the present arrangement for allocation of new blocks of numbers after demonstrating 80% utilization for fixed and 60% for mobile should be continued. However, in case of mobile numbers, service provider should not have more than 3 million unutilized numbers in a service area at the time of requesting for new block of numbers.**

B - Numbering Return

3.7 On the question of filing annual return though there was support from some quarters, the general opinion was that details of number usage are already filed with the licensor to get allocation of new blocks of numbers so a new return is not called for. The return proposed in the consultation paper was not only meant to show the usage, as is currently done, but also SIMs in distribution, forecast of demand, utilization of short codes and Service Control Point (SCP) codes, ported numbers etc. This kind of return should give licensor a fair idea of utilization and requirement in future years and also

assess whether the numbers are being utilized efficiently. Based on these the numbering plan administrator could also choose to carry out a numbering audit when considered necessary. After analyzing comments of all the service providers and noting the reservations of the service providers regarding a new return and duplication of effort, the Authority is of the opinion that instead of instituting a new return, the format of the present return may be altered to include the information mentioned above. This information can be used for allocation, accounting and future planning of numbers.

3.8 **The Authority recommends that the details given by the mobile service providers for allocation of fresh block of numbers should be converted into an annual return consisting of the details already included and in addition details of numbers ported in and out, utilization of short codes and other codes and annual forecast for 3 years. In addition to annual submission, this return should be submitted every time the service providers make a request for fresh block of numbers.**

C - Automating allocation of numbers

3.9 During the open house discussions some stakeholders suggested that the process of allocation of numbers should be automated as sometimes the manual process becomes quite time consuming. The information on availability of resources, data from the returns filed and the rules for allocation could be built into an application which could dispense free block of numbers according to the present rules. If a service provider has failed to submit return in time then it would have to approach the administrator for manual allocation of numbers.

3.10 Automated system would bring in transparency of allocation, maintain up-to-date record of numbers allocated and available and reduce the administrative processing time and cost for allocation of numbers.

3.11 **The Authority recommends that automated allocation of numbering resources should be introduced along with proper checks and balances.**

3.12 **All allocated short codes, Mobile Switching Center (MSC) codes, Service Control Point (SCP) codes and exchange levels should be put on website to maintain transparency.**

D - Pricing of numbers

3.13 One of the issues discussed in the consultation paper was whether a small charge on numbers would encourage efficient utilization of this resource by the service providers. The service providers have given a number of reasons why numbers should not be priced:

- Numbering resources are the most basic need for accessing telecom services
- Service providers are already paying licence fee
- Operators are already following a stringent criteria for allocation of numbers so it is unfair to say number series are not efficiently utilized
- Service providers are paying high levies and duties
- Capacity of numbering resources can be increased by adopting longer number lengths and proper allocation of numbering resources
- Charges will be passed on to the customers
- The tariffs are very low
- Sale of numbers may give ownership right to numbers
- Sale may lead to hoarding
- Because of MNP pricing will be difficult to implement
- Discriminate between wireline and mobile operators
- It will disincentivise operators from connecting subscribers with lower revenues which will impact rural rollout
- It will require number trading to be allowed

3.14 The numbers are a national resource and ownership at no time passes on to the service providers or the customers. Despite the measures in place and

whatever internal discipline they may have, effective usage has not been at a desirable level. A view is that a charge should inculcate better discipline and lead to higher efficiency in utilization of numbers. However, charging for numbers may have its own advantages and disadvantages. Though many countries today charge for numbers, pricing is a difficult decision to take the first time it is instituted. Also while reviewing the criteria of allocation, the Authority has recommended above that the service providers should not have more than 3 million unutilized numbers in a service area at the time of requesting for new block of numbers. The Authority expects that the revised criteria should lead to better utilization of numbers. Therefore, the Authority is of the opinion that the efficiency of utilization of numbering resources by the service providers be watched and the issue of pricing may be revisited if considered necessary.

E - Numbering plan administration

3.15 Importance of numbering as a regulatory instrument has lately increased significantly with adequate, fair and transparent access to numbers becoming an essential part of ensuring a competitive telecommunications market. Clause 11(1)(a)(iv) of the TRAI Act of 1997 (as amended in the year 2000) puts the onus on the Authority to take measures to facilitate competition and promote efficiency in the operation of telecommunications services so as to facilitate growth in such services. In doing so the Authority needs to set the rules governing diverse competitive issues with numbering implications. Services like intelligent network services, selection of long distance operators through calling cards, emergency services, number portability and special services have numbering implications inter-woven with inter-operability and charging issues. It is also important to see that the allocation and assignment criteria do not provide commercial advantage to one service against other competing services. The function of the Authority inter-alia include laying down the standards of quality of services to be provided by the service providers and ensure the quality of service and conduct the periodical survey

of such services provided by the service providers. In view of the above the Authority is of the view that administration of numbering plan is necessary to carry out the provisions of the TRAI Act. 11(d) of the TRAI Act, 1997 provides that "perform such other functions including such administrative and financial functions as maybe entrusted to it by the Central Government or as may be necessary to carry out the provisions of this Act"

3.16 **TRAI should be entrusted with the task of administering numbering plan to enable it to carry out all works relating to formulation of and amendments to numbering plan, allocation of numbers and ensuring effective utilization of numbers.**

CHAPTER IV

SUMMARY OF RECOMMENDATIONS

1. The Authority recommends that 10-digit numbering scheme should be continued with the modification suggested in recommendations below. (Para 2.8)

2. The Authority recommends that the country should migrate to an integrated 10-digit numbering scheme at the earliest. All preparations should be complete by 30th September 2011 and actual migration to the integrated scheme be completed by 31st December 2011. (Para 2.26)

3. Detailed integrated numbering, routing plans and interconnection architecture would be worked out by TRAI after acceptance of recommendations by DoT. If required, a separate consultation would be carried out. (Para 2.27)

4. The Authority recommends that in the intervening period, till integrated numbering scheme is implemented, the following scheme should be adopted to create sufficient numbering space:

- **a. No change in dialing plan of fixed to fixed, inter-circle fixed to mobile and mobile to mobile calls.**
- **b. Dial intra circle fixed to mobile calls with prefix '0'**
- **c. Existing SDCA codes starting with 2, 3, 4 and 6 may be used for mobile services by suffixing with 0, 1, 8 and 9. (Para 2.33)**

5. The Authority recommends that codes defined as spare in the National Numbering Plan 2003 should be kept spare till the new numbering plan consisting of integrated numbering scheme is notified. (Para 2.34)

6. The Authority recommends that the present arrangement for allocation of new blocks of numbers after demonstrating 80% utilization for fixed and 60% for mobile should be continued. However, in case of mobile

numbers, service provider should not have more than 3 million unutilized numbers in a service area at the time of requesting for new block of numbers. (Para 3.6)

7. **The Authority recommends that the details given by the mobile service providers for allocation of fresh block of numbers should be converted into an annual return consisting of the details already included and in addition details of numbers ported in and out, utilization of short codes and other codes and annual forecast for 3 years. In addition to annual submission, this return should be submitted every time the service providers make a request for fresh block of numbers. (Para 3.8)**

8. **The Authority recommends that automated allocation of numbering resources should be introduced along with proper checks and balances. (Para 3.11)**

9. **All allocated short codes, Mobile Switching Center (MSC) codes, Service Control Point (SCP) codes and exchange levels should be put on website to maintain transparency. (Para 3.12)**

10. **TRAI should be entrusted with the task of administering numbering plan to enable it to carry out all works relating to formulation of and amendments to numbering plan, allocation of numbers and ensuring effective utilization of numbers. (Para 3.16)**

LIST OF ACRONYMS

Acronym	Expanded Form
AGR	Adjusted Gross Revenue
CLI	Caller Line Identification
CRM	Customer Relationship Management
DOT	Department of Telecommunications
FCC	Federal Communication Commission
FWP	Fixed Wireless Phone
IPTV	Internet Protocol Television
ITU	International Telecommunication Union
MNP	Mobile Number Portability
MSC	Mobile Switching Center
N(S)N	National (Significant) Number
NLDO	National Long Distance Operator
NNP	National Numbering Plan
OSS	Operation Support System
POI	Point of Interconnection
SCP	Service Control Point
SDCA	Short Distance Charging Area
SIM	Subscriber Identity Module
SN	Subscriber Number
STD	Subscriber Trunk Dialing
TRAI	Telecom Regulatory Authority of India