

**TELECOMMUNICATIONS NUMBERING ADVISORY COMMITTEE**

**Review of Number Utilisation and Future Number Demand**

**號碼使用及未來號碼需求的檢討**

**Purpose**

This paper reviews the number utilisation and the life span of the existing 8-digit numbering plan after the implementation of various administrative measures as adopted by the Telecommunications Authority (TA) for improving the efficient use of telecommunications numbers. In light of the emergence of Next Generation Network (NGN), there is a need to take into account whether the existing numbering plan can sustain the growth of number demand arising from the development and implementation of NGN in the market.

**Background**

2. The Hong Kong's numbering plan migrated from a mixture of 7 to 9 digits to a unified 8-digit plan in 1995. Since then, the telephone numbers allocated to fixed, mobile and paging services are 8-digit numbers. At the time of finalising the unified numbering plan, it was expected that the 8-digit plan should be able to meet the future growth and requirements in telecommunications for at least the next 15 years (i.e. up to 2010).

3. The number of operators providing local fixed services has increased from four in 1995 to 14 in June 2010. For mobile services, the subscriber growth rate maintains at a high level and it is noted that the number of mobile

users has increased from 0.7 million in 1995 to over 12 million in 2010 i.e. an increase of more than 17-fold in the past 15 years. With the continued growth of demand for various telecommunications services, it is necessary to ensure that sufficient telecommunications numbers should be made available to meet both the immediate and long term need.

### **Numbering Issues Discussed in 2007**

4. To cater for the rapid growth of the telecommunications services which demand for telecommunications numbers, an NAC Working Group (NAC WG) was set up under the Telecommunications Numbering Advisory Committee (NAC) in 2007 to address the various short and long term numbering issues, including studying and evaluating the long term number demand; the various possible options for future migration to nine or 10 digits; and to project the time frame of number exhaustion of various number categories/levels. A total of seven NAC WG meetings were held in 2007. The migration options for increasing the number supply and recommendations for coping with the immediate and long term demand of numbers put forward by the NAC WG are given in the NAC Paper No. 1/2007 entitled “Number Supply for Telecommunications Services”.

### **Measures for Improving the Efficient Use of Telecommunications Numbers**

#### ***Administrative Measures***

5. The consultation on the creation of a Unified Carrier Licence (UCL) was conducted in December 2007. One of the proposals in the consultation was to introduce an annual fee of \$3 for each subscriber number allocated to a UCL licensee. During the consultation period, many stakeholders expressed that telecommunications numbers were not utilised efficiently. As such, a new Working Group on Numbering Issues (“the Numbering Working Group”) with members from the industry and professional bodies was established under

the NAC in March 2008 to explore feasible administrative measures to improve the efficient use of telecommunications numbers.

6. After six meetings in the period from April to September 2008, the Numbering Working Group came to consensus on introducing a number of measures, which included tightening up the current procedures and introducing some new initiatives to encourage the efficient use of telecommunications numbers. Details of the discussion on the measures are given in the NAC Papers No. 1/2008 and 2/2008. With the full support from NAC, the following administrative measures have been adopted by the TA since December 2008 -

- To conduct periodic review and audit (i.e. no more than once per year) to ensure that inactive ported numbers are returned to the Original Donor Network Operators promptly;
- To stop allocating “8(1-3)X” personal numbers to fixed operators with effect from 1 January 2009;
- To unify the minimum block size for subscriber number allocation as 10,000 (10k) for requests from different types of operators;
- To raise the threshold of the number utilisation level for allocating additional numbers to 70% and to allocate one 10k block or more to an operator with an amount of numbers equal to its 6-month number demand, to be rounded up to the nearest 10k numbers;
- To accept return of non-contiguous numbers from operators on a condition that they accept re-allocation of formerly returned numbers when they have new demand for numbers in future; and
- To deploy a circuit-to-number ratio of 1:6.3 in assigning numbers to

both way circuits of Direct-Dialling-In (DDI) services.

### ***Number fee***

7. With a view to encouraging more efficient use of numbers, the concept of number fee was first introduced in the Service-Based Operator (SBO) licensing regime in January 2006. The number fee is also included in the newly created UCL with effect from August 2008. In addition, the number fee is further extended to paging operators and mobile virtual network operators (MVNO) starting from 1 June 2009. Since the number fee is imposed on each number that has been allocated to the licensees regardless of whether or not the numbers have been assigned to end customers, such a fee should encourage the licensees not to hold idle numbers that are more than necessary. With such financial incentive, licensees would utilise the numbers in a more efficient manner.

### **Number Utilisation**

8. With reference to the NAC Paper No. 1/2008, out of the 36.7 million numbers allocated to operators, there were some 16.5 million of idle numbers (including fixed, mobile, SBO and paging numbers) held by operators in April 2008. The number utilisation rate (i.e. the ratio between the numbers assigned to end customers and the total numbers allocated to operators) for different services in April 2008 was given in the following table.

Type of Services	Fixed	Mobile	SBO	Paging
Number Utilisation Rate	62%	61%	17%	4%

9. Currently, nearly all mobile operators have converted their mobile carrier licences to UCL. Under the number fee regime, it is noted that many operators, including fixed, mobile, SBO and paging operators, have started returning certain portion of their idle numbers to OFTA so as to reduce the total

number fee payable. As at 30 June 2010, some 6.7 million idle numbers have been returned to OFTA for future re-allocation. A summary on the returned numbers is given in Annex 1. In addition, the administrative measures given in paragraph 6 for improving the efficient use of numbers have been put in force and incorporated in the current issue of the Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan for the industry to follow.

10. Based on the number allocation records and the latest statistics, the number allocation and utilisation for different services in June 2010 are given in Annex 2. It is noted that the idle numbers held by operators have decreased from 16.5 million in April 2008 to 10.4 million in June 2010, which implies the numbers are used more efficiently in 2010. The following table gives a comparison on the number utilisation rate for different services in April 2008 and June 2010.

Type of Services	Fixed	Mobile	SBO	Paging
Number Utilisation Rate in April 2008 (A)	62%	61%	17%	4%
Number Utilisation Rate in June 2010 (B)	64%	70%	25%	48%
Improvement of Utilisation Rate (= B - A)	2%	9%	8%	44%

11. Owing to the financial incentive under the number fee regime, it is expected that more numbers may be returned to OFTA in the future. In this connection, it is anticipated that numbers would be further utilised more efficiently.

## Life Span of 8-Digit Numbering Plan

12. In 2007, the NAC reviewed the life span of the 8-digit numbering plan. Based on the number consumption rate at that time (i.e. 1.2 million of mobile numbers and 0.4 million of fixed numbers per annum), it was estimated that migration from the 8-digit numbering plan to longer digits would need to take place in the coming 10 to 20 years. The NAC reviewed the following four number migration options and considered that these options could co-exist and remain valid for some period-

- Option 1 – 9-digit plan with “3&8” as the leading digit for fixed and mobile services respectively (“3&8” Option)
- Option 2 – 9-digit plan with “3&7” as the leading digit for fixed and mobile services respectively (“3&7” Option)
- Option 3 – 9-digit plan with “7” as the leading digit for fixed and mobile services (“7” Option)
- Option 4 – 10-digit plan with “33&88” as the leading digits for fixed and mobile services respectively (“33&88” Option)

13. The details of the above four number migration options and the target implementation schedule can be found from the NAC Paper No. 1/2007. A comparison on the implementation time of the four feasible number migration options is given in the following table.

	<u>“3&amp;8” Option</u>	<u>“3&amp;7” Option</u>	<u>“7” Option</u>	<u>“33&amp;88 Option”</u>
	3 for fixed & 8 for mobile numbers	3 for fixed & 7 for mobile numbers	7 for fixed & mobile numbers	33 for fixed & 88 for mobile numbers
a) Time to implement the migration option	2015	2018	2020	2020
b) Time to implement the migration option (with paging vacation first for other services)	2020	2020	2022	2026

14. To facilitate the review on the time to implement the different migration options, all fixed and mobile network operators were invited to provide their number demand forecast for the coming three years (i.e. from 2010 to 2012) in June 2009. According to the forecast information collected from all fixed and mobile network operators, the average annual number demand for year 2010 to 2012 is 1.55 million (1.07 million for mobile numbers and 0.48 million for fixed numbers), which is close to the historical yearly number demand of 1.6 million.

15. According to the recent new number allocation records, a total of 1.05 million mobile numbers and 140k fixed numbers were allocated to operators from January 2009 to June 2010 i.e. representing an annual number consumption rate of 794k (i.e. 700k mobile numbers and 94k fixed numbers). This figure is much less than the historical number consumption rate of 1.6 million per year and the annual number forecast demand of 1.55 million in the coming three years. The decline of number demand may be caused by the recent introduction of number fee and the administrative measures given in paragraph 6 above. In considering the historical and recent number consumption rate as well as the number demand forecast, it is expected that the number demand would be somewhat between 794k to 1.6 million in the coming few years. In this connection, the average number demand of 1.2 million (i.e. the average of 794k and 1.6 million) could be assumed for evaluating the remaining life span of the existing 8-digit numbering plan.

16. With annual number demand of 1.2 million, the unallocated numbers kept by the TA and the revised number threshold utilisation rate of 70% for allocation of additional numbers, the time to implement the different migration options can be projected again. The revised time schedule for the implementation of different migration options is given in the following table.

	<b><u>“3&amp;8” Option</u></b>	<b><u>“3&amp;7” Option</u></b>	<b><u>“7” Option</u></b>	<b><u>“33&amp;88 Option”</u></b>
	3 for fixed & 8 for mobile numbers	3 for fixed & 7 for mobile numbers	7 for fixed & mobile numbers	33 for fixed & 88 for mobile numbers
a) Time to implement the migration option	2021 (6 years)	2025 (7 years)	2029 (9 years)	2027 (7 years)
b) Time to implement the migration option (with paging vacation first for other services)	2028 (8 years)	2028 (8 years)	2030 (8 years)	2035 (9 years)

Note: the number in the bracket is the postponement time to implement the migration option as compared with the time first estimated in 2007.

17. With the introduction of administrative measures and number fee, it is estimated that the time to implement the number migration to longer digits can be further delayed for around six to nine years. In order to provide sufficient time for the industry to carry out the preparation work and advise their customers of the number migration, the NAC WG had recommended that an advance notice of three years should be given to affected operators prior to the implementation of the actual number migration. In this connection, the earliest date that a decision has to be made on option selection is 2018 and no number migration will start earlier than 2021 (i.e. for “3&8” Option).

### **Number Demand under NGN Era**

18. Currently, some of the operators have started migrating their core network from the traditional circuit switching network to packet-based NGN network. Such migration is expected to be continued for a number of years. Under the NGN environment, new and innovative services can easily be offered to end users in a timely manner.

19. The traditional telecommunications numbers are expected to be kept using within voice communications to identify and connect subscribers, at least

in the short to medium term, under the NGN environment. However, some new numbering and addressing schemes such as Electronic Number Mapping (ENUM<sup>1</sup>) and domain name may become the new schemes for service applications in NGN.

20. In April 2010, the NGN Working Group under the Regulatory Affairs Advisory Committee (RAAC) discussed the numbering, naming and addressing schemes under the NGN environment. Details of the discussion can be referred to the NGN Working Group Paper No. 1/2010<sup>2</sup>. With the migration of the existing circuit switching network to NGN, public ENUM may be one of the possible schemes to facilitate interoperability for a wide range of applications such as voice, video and instant messaging by using telecommunications numbers. At the moment, public ENUM services are not yet available in Hong Kong, however if the demand of public ENUM services is increased rapidly in the future, it may consume a portion of numbering resources.

21. In the past, the NAC WG had addressed the issue on the future demand of numbers, however members of the NAC WG shared the view that it was by no means easy to make accurate forecast of future number demand of new services as service demand might change due to a number of factors such as introduction of innovative services, new marketing strategy, etc. With the potential growth of new services, it is important to ensure that sufficient numbers should be made available to cater for the future demand. As such, the number resources should be reviewed from time to time to ensure that sufficient supply of numbers will be made available on time.

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<sup>1</sup> ENUM is a protocol developed by the Internet Engineering Task Force (IETF) for mapping a telecommunications number into a collection of service specific Uniform Resource Identifiers (URI) which allows users to use a single telecommunications number to access a wide range of terminals and services, such as phone, fax, email, web or any other services available through an Internet addressing scheme in the NGN world.

<sup>2</sup> The NGN Working Group Paper No. 1/2010 can be downloaded from <http://www.ofta.gov.hk/en/ad-comm/raac/ngnwg/ngnwg2010p1.pdf>.

## **Way Forward**

22. The NAC and its Working Group should keep monitoring the number demand trends for various telecommunications services, including new services under the NGN, and to make recommendation to the TA on the deployment of scarce numbering resources. The NAC should also review the life span of 8-digit numbering plan on an annual or biennial basis, or on ad-hoc basis if there is a significant upsurge of number demand, and to make recommendation on the selection and implementation of any migration options.

## **Advice Sought**

23. Members are invited to give views and comments on life span of the existing 8-digit numbering plan and the future demand of numbers.

**Office of the Telecommunications Authority**

**August 2010**

**Numbers Returned by Operators**  
**(As at 30 June 2010)**

Operator	Number of Operators who have returned numbers	Numbers returned (in million)
Fixed	4	2.14
Mobile	4	0.74
SBO	3	0.02
Paging	4	3.83
<b>Total</b>	<b>15</b>	<b>6.73</b>

Annex 2 to NAC Paper No. 2/2010

Allocation of Numbers for Different Services  
(As at 30 June 2010)

Type of Service	Fixed		Mobile	SBO	Paging
Allocation	Fixed Network Operator		Mobile Network Carriers	SBO Class 2 Licensees	Paging Operators
Prefixes	2X, 3X	8X	5X, 6X, 9X	57X, 58X	7X
Total available capacity (A)	15.3	3	24.7	2	9
Capacity allocated to operators (B)	12.0	1	18.1	0.04	0.25
Estimated numbers assigned to customers (C)	8	0.3	12.6	0.01	0.12
Capacity of Unallocated numbers = (A) - (B)	3.3	2	6.6	1.96	8.75
Capacity of idle numbers = (B) - (C)	4.0	0.7	5.5	0.03	0.13
Utilisation rate of numbers assigned to service = (C) / (B)	64%		70%	25%	48%

Note: All figures are in million.