

TELECOMMUNICATIONS NUMBERING ADVISORY COMMITTEE

Numbering Arrangements for IP Telephony Services

Background

In the TNAC meeting held on 25 November 2004, members discussed and gave their views on the TNAC Paper No. 7/2004 entitled “Number Supply for IP Telephony”. Subsequently, the Telecommunications Authority issued a Statement entitled “Regulation of Internet Protocol (IP) Telephony” on 20 June 2005 (the VoIP Statement) setting out his considered views and decisions on the regulation of the IP Telephony.

2. In the VoIP Statement, a two-class licensing approach for IP Telephony services is adopted. Services under Class 1 are those services which have all the attributes of the conventional telephone services and are required to fulfil the relevant licensing conditions of Fixed Telecommunications Network Service (FTNS) / Fixed Carrier (FC) licences relevant to service provision. Class 2 services are those services that do not have all the attributes of the conventional telephone services and are subject to minimal licensing conditions.

3. Decisions made in the VoIP Statement about numbering issues are recapitulated below :

- (a) Class 1 service providers can share the use of the number levels “2” and “3” with FTNS / FC licensees.
- (b) Class 2 services will be allowed to use 8-digit numbers for conventional telephone services pending further decision on the numbering approach to be adopted.
- (c) The TA will allocate numbers direct to Class 1 and 2 services operators.
- (d) The numbers under the numbering plan will only be allocated to local operators to represent addresses or locations on the local networks.

- (e) Class 1 service providers are required to support number portability function but number portability will not be applied to Class 2 services initially.

4. The Statement also suggests conducting further studies on the following issues :

- (a) The numbering approach for Class 2 services i.e. whether 8-digit numbers or numbers with more than 8-digit should be allocated to Class 2 services.
- (b) The criteria for allocation of number blocks to Class 1 and Class 2 services providers.
- (c) Whether the existing FTNS / FC licensees, the Class 1 and Class 2 service providers should be subject to tighter administrative measures or control when they apply for additional subscriber numbers.

Numbering Approach for Class 2 Services

Overseas Experience

5. The Office of Communications (OFCOM) of the United Kingdom decides to make “056” available for Location Independent Electronic Communications Services (e.g. services with no geographic significance, location of the customer premise equipment identified by a telephone number is not permanently associated with the network termination point, etc). “056” numbers will be allocated in blocks of 10,000 and the suggested number layout is “056 XXXX XXXX” (i.e. 11 digits). The Ministry of Internal Affairs and Communications (the MIC) of Japan has allocated the access code “050” for ‘IP Telephone’ and the number layout takes the form of “050 XXXX XXXX” (i.e. 11 digits). The Federal Communications Commission does not designate a specific number range for IP telephony and the IP telephony numbers in the United States have the same format as the traditional fixed network services. The Infocomm Development Authority (the IDA) of Singapore indicates its intention of allocating a new 8-digit number level with leading digit “3” for VoIP service (i.e. 8 digits). If demand warrants, a new 4-digit national destination code “3000” will be allocated and all IP Telephony numbers will be migrated to the new format of “3000 XXXX XXXX” (i.e. 12 digits).

Demand

6. The IP telephony is still in its early stage of development and new applications will likely emerge in future. At this stage it is difficult to estimate accurately the demand on the IP telephony service. Nonetheless, in order that we may have a sustainable regulatory framework, it is necessary for us to plan for sufficient numbering resource in case the demand takes off. Allocation of 100 million numbers for IP Telephony in other countries may serve as a good reference.

10-digit Limit

7. As explained in the TA's VoIP Statement, the longest digit length of calling numbers that may be supported and displayed by the majority of existing telephone terminals is at most up to 10 digits. Moreover, the Calling Number Display (CND) functionality of Police's "999" emergency service centres can now only support up to 10 digits numbers. In this connection, the focus of this paper will be concerned with the feasibility of allocation of 8-digit, 9-digit or 10-digit numbers for Class 2 services. Allocation of numbers with length longer than 10-digit numbers will not be further considered at this stage.

8. The VoIP Statement also indicates that fixed network operators have failed to confirm positively that they are ready, or will be ready in the near future, to support 10-digit numbers proposed for Class 2 services. In this connection, the TA has decided that the Telecommunications Standards Advisory Committee (TSAC) will examine the technical feasibilities and the time frame required by network operators to upgrade and re-configure their networks to support 9 or 10-digit numbers. The two advisory committees, TNAC and TSAC, will work closely together to identify the relevant issues and recommend a long-term and sustainable numbering approach for the consideration of the TA.

Availability of Numbering Resources

9. In the current 8-digit numbering plan, the leading digit conveys service information. For instance, the number levels "2" / "3" and the number levels "6" / "9" are allocated for fixed network services and mobile services

respectively. TA's preliminary views on number supplies for fixed network services and mobile services have been given in the TNAC Papers No. 3/2004 and No. 8/2004 and discussed in the 55th TNAC Meeting. It is envisaged that no additional supply of fixed network numbers is required in the medium terms and "8X" numbers may be deployed to fixed network services in case of sudden upsurge of demand on fixed network numbers. However, additional number supply may have to be made available for mobile services. It has been proposed that (a) "5(1-9)X" numbers may be released to mobile services after the consumption of "6X" and "9X" numbers and (b) "7X" paging numbers would be vacated in a timely manner before the exhaustion of "5(1-9)X", "6X" and "9X" numbers in order to make the "7X" numbers available for mobile services. Based on the current consumption rates, it is estimated that the migration of the 8-digit numbering plan will have to take place in year 2020 and the fixed network numbers and the mobile numbers will be prefixed by "3" and "7" respectively in the new 9-digit numbering plan. If fixed-mobile number portability is adopted before the migration, the number levels "2", "3", "6", "8" and "9" may be shared by fixed network services and mobile services and the migration may be deferred by about one and a half year i.e. till mid-2021 assuming that the current consumption rates remains unchanged.

10. To date, two number groups may be considered for allocation to Class 2 services, namely, some short codes such as "0" / "1" / "304, 308 & 309" or telecommunications number levels such as "37 – 39, 51 – 59, 66 & 69 and 84 – 89" that may be reclassified for Class 2 services.

11. The short codes 01 – 09, 11X (except 112), 13X (except 133 & 135), 148 – 149, and 304, 308 & 309 are now vacant. 01–09 is currently reserved for future trunk access to other places in the region and it is not appropriate to re-allocate these codes for Class 2 services. As for the other access codes (such as 13X), due to lack of sufficient contiguous codes, additional access codes across different levels may need to be allocated further in future. In addition, short code is a scarce numbering resource. The supply of short codes is limited and, unlike telecommunications numbers, the supply of short codes cannot be increased by migration of the numbering plan to longer digits unless a new level is designated for short codes in the new numbering plan. As such, allocation of the above short codes for Class 2 services is not recommended.

12. The number levels 37 – 39, 51 – 59, 66 & 69 and 84 – 89 are allocated for various services but have not yet been opened for balloting. These number levels may be considered for re-allocation to Class 2 services.

Three Options

13. The following 3 options of allocation of subscriber numbers to Class 2 services are proposed for the consideration of the TNAC.

Option A – 8-digit Numbers for Class 2 Services

14. This option incurs minimal modifications to the existing networks. The customers may welcome this option as they are already familiar with 8-digit numbers. However, this option may impose a significant burden on the supply of 8-digit numbers if there is an upsurge of demand on Class 2 services.

15. Besides 51-59, other levels mentioned in paragraph 12 do not offer sufficient contiguous number levels for new services and do not therefore provide a sustainable arrangement in case demand for Class 2 services takes off. Moreover, the level 51-59 is a new number range and allocation of a sub-level in this range to Class 2 services has the least impact on the existing numbering plan.

16. If Option A is adopted, it is proposed that, to begin with, the sub-level “5(7-9)” should be allocated for Class 2 service.

Option B – 9-digit or 10-digit Numbers for Class 2 Services

17. This option offers a larger amount of subscriber numbers for Class 2 services. Obviously, 10-digit number is a better choice as it can significantly increase the supply. For instance, allocation of 10-digit numbers with a prefix of 2-digit to Class 2 services will provide a total of 100 million numbers, which should be capable of meeting the demand on Class 2 services in the foreseeable future.

18. However, some operators anticipate that they may encounter

problems when their networks are upgraded to support telecommunication numbers with more than 8 digits. Some also doubts about the need for significant network enhancements to support longer digits for Class 2 services while the demand of the services is still unknown at present. Furthermore, consumer education on the use of telephone numbers with variable lengths (i.e. Class 2 numbers are longer than the current 8-digit subscriber numbers) will be required.

19. If the network upgrading problems can be overcome within a reasonable period of time and Option B is adopted, it is proposed that the sub-level “59” be allocated to Class 2 services. The number format for Class 2 numbers will be in form of “59 XXXX XXXX”.

Option C – Option A with Migration Path to Option B.

20. This option offers a scalable and sustainable long-term solution if there is popular demand for Class 2 services. The network operators will also have more time to prepare for network enhancement to support longer digits if the demand does materialize.

21. The number levels 5(7-8) i.e. 5(7-8)XX XXXX are proposed to be allocated to Class 2 service initially if Option C is adopted. Eventually, the Class 2 numbers may be prefixed by the access code “59” when the need arises. The number format will again take the form of “59 XXXX XXXX”.

Criteria for Allocation of Numbers to Class 1 and Class 2 Licensees

Eligibility

22. Based on the existing application criteria for MVNO licensees, it is proposed that licensed Class 1 and Class 2 service providers may apply for telephone numbers if they meet the following requirements:-

- (a) Provide, or intend to provide, IP Telephony services to the general public and any local customer.
- (b) Provide their own service platforms, including the IP infrastructure and media gateway for interfacing with the hosting FTNS / FC

licensees.

- (c) Provide their own business support systems, including the billing and customer care systems.

The TA may inspect the applicant's installed equipment or ask the applicant to furnish the relevant information in order that he may verify that the applicant fulfils the requirement given in (a) – (c) at all time.

Size of Number Block

24. At present, FTNS / FC licensees, Mobile Network Operators, and MVNOs are entitled to apply for subscriber number blocks of 100k each. This arrangement works well in the past when the number of operators eligible for subscriber numbers is limited.

25. Class 1 and 2 are new type of services. The demand and the number of potential service providers are not yet known. If 100k 8-digit subscriber numbers are allocated to each IP Telephony service provider and there is an upsurge of service providers in particular at the early stage of service launch, the subscriber numbers for IP Telephony may not be used efficiently. One possible way to alleviate this potential problem is to reduce the size of subscriber number block allocated for each application.

26. However, in order to reduce the block size, finer digit analysis for numbers allocated to IP Telephony is required. For example, if the block size for IP Telephony is 10k, the originating networks have to analyse down to the fourth digit for calls to Class 1 or Class 2 subscribers in order to determine the termination network. It is anticipated that reduction of block size to 10k is technically feasible and the impact is manageable because routing analysis of 4 or more digits is not uncommon within a network.

27. The TA's preliminary view is that any Class 1 and Class 2 service provider whose application for subscriber numbers has been approved will be allocated with a small amount of subscriber numbers, say 10k.

Criteria for Application of Additional Numbers

28. According to the current practice, an FTNS / FC licensee is entitled to apply for an additional subscriber number block when it has used up half of the subscriber numbers allocated to it. This arrangement ensure that the FNTS / FC licensees have sufficient buffer of subscriber numbers for future planning and other network uses such as pre-activation.

29. After the introduction of IP Telephony services, it is anticipated that the demand on the telecommunications numbers will increase and the 8-digit numbers may be exhausted earlier than the original plan. As the VoIP Statement has recognized, migration of the numbering plan will incur a huge social cost which will have to be borne by the community. As such, it is the intention of the TA to defer the migration as far as possible.

30. Having considered the current utilisation rate adopted for mobile numbers, it is suggested that both FTNS / FC licensees and Class 1 / Class 2 service providers will have to achieve a minimum utilisation rate of 60% (the current rate is 50%) with the number blocks already allocated to them before their applications for additional subscriber number blocks will be considered.

Other numbering issues

31. ETS licensees are entitled to apply for different types of numbering resources, including short codes, signalling point codes and international signalling point codes. As Class 1 and Class 2 service providers will be allowed to provide ETS under their licences, Class 1 and Class 2 service providers should also be entitled to use these numbering resources if they have demonstrated such a need. In this connection, it is proposed that Class 1 and Class 2 service providers are eligible to apply for all types of the numbering resources which are assigned to the ETS licensees. In addition, as Class 1 service providers are required to support number portability, they will also be allocated network numbers with the prefix "4".

Advice Sought

32. Members are invited to give their views and comments on the numbering arrangements for IP Telephony service, in particular,

- (a) whether 8-digit or more than 8-digit numbers should be allocated for Class 2 services;
- (b) the number range such as 5(7-8)XX XXXX to be allocated to Class 2 services;
- (c) the criteria to be met before Class 1 and Class 2 service providers are eligible to apply for subscriber numbers;
- (d) the appropriate size of subscriber number block to be allocated to Class 1 and Class 2 service providers;
- (e) whether the utilisation rate of 60% should be applicable to FTNS / FC licensees and Class 1 / Class 2 service providers; and
- (f) whether Class 1 and Class 2 service providers are eligible to apply all types of numbering resources which are made available to the ETS operators and whether Class 1 service providers are eligible to be allocated network numbers.

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