



**DECISION ISSUED BY INFOCOMM DEVELOPMENT AUTHORITY OF
SINGAPORE ON THE REVIEW OF NUMBER PORTABILITY IN SINGAPORE**

ISSUED ON 2 AUGUST 2006

PART I: INTRODUCTION

**PART II: OVERVIEW OF COMMENTS RECEIVED ON THE REVIEW OF
NUMBER PORTABILITY IN SINGAPORE**

PART III: IDA'S POLICY OBJECTIVES

**PART IV: IDA'S DECISIONS ON THE REVIEW OF NUMBER PORTABILITY
IN SINGAPORE**

PART V: CONCLUSION AND GOING FORWARD

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PART I: INTRODUCTION

1. On 6 September 2005, IDA issued a public consultation on “Review of Number Portability in Singapore (“Consultation”). The Consultation closed on 7 October 2005. In the Consultation, IDA sought comments on the existing number portability solutions and implementation for the fixed-line and mobile telecommunication services in Singapore, and on IDA’s views that Singapore should adopt a more robust and forward looking centralised database approach and All-Call-Query (“ACQ”) routing number portability solution in the long run.
2. Further to the Consultation, IDA conducted a Consumer Awareness and Satisfaction Survey (“Consumer Survey”) from October to December 2005. The Consumer Survey aimed to measure consumers’ usage and awareness of, and satisfaction with selected telecommunication services in Singapore, including fixed-line and mobile number portability. IDA also conducted a Cost-Benefit Analysis (“CBA”) from April to May 2006 to further assess the potential costs and benefits in implementing a centralised database approach and ACQ routing number portability solution.

**PART II: OVERVIEW OF COMMENTS RECEIVED ON THE REVIEW OF
NUMBER PORTABILITY IN SINGAPORE**

3. At the close of the Consultation, IDA received comments from 10 respondents:
 - i. Accenture Pte Ltd;
 - ii. Alcatel Singapore;
 - iii. Consumers Association of Singapore (CASE);
 - iv. MobileOne Limited;
 - v. NeuStar Inc;
 - vi. Singapore Telecommunications Limited & Singapore Telecom Mobile Pte Ltd;
 - vii. StarHub Group;
 - viii. Syniverse Technologies Inc;
 - ix. T-Systems Singapore Pte Ltd; and
 - x. Telcordia Technologies Inc & Unified Communications Pte Ltd

IDA also received feedback from 36 consumers (at the info@ida.gov.sg email address).

4. IDA wishes to thank all respondents for their inputs. IDA notes that in general, the telecom service providers disagree with IDA's assessment of the shortcomings in the existing number portability solutions and implementation in Singapore, and IDA's views that Singapore should adopt a centralised database approach and ACQ routing number portability solution in the long run. On the other hand, other industry respondents and consumers support IDA's initiative to review the existing number portability solutions and implementation. IDA has given careful and extensive considerations of the views received. The sections below set out IDA's assessments and decisions on the number portability solutions and implementation in Singapore going forward.

PART III: IDA'S POLICY OBJECTIVES

5. IDA aims to promote long term sustainable competition and growth in the infocomm sector, hence benefiting the consumers and businesses in Singapore. Consumers and businesses, who are considering a switch of telecom service providers, will benefit from the availability of number portability service, as it eliminates the inconvenience and disruption arising from the need to change their phone numbers as they switch between telecom service providers. Consumers and businesses will also benefit from further competition, as the threat to telecom service providers arising from the ease of switching will ensure that they will compete with better prices, service quality and innovative services to attract new customers and retain existing ones.
6. IDA's objective then becomes that any barrier that a consumer or business faces to switch his/her telecom service provider must be eliminated. IDA also desires to ensure that Singapore will have number portability solutions and implementation that can support future competition and growth in the infocomm sector. It is important that Singapore adopt a robust and forward looking infocomm infrastructure to ensure that Singapore remains in the forefront and entrenches its infocomm hub status.

PART IV: IDA'S DECISIONS ON THE REVIEW OF NUMBER PORTABILITY IN SINGAPORE

(I) Mobile Number Portability ("MNP") solution

7. IDA disagrees with the mobile operators' submissions that the existing MNP Call Forwarding solution remains relevant, and the shortcomings¹ are not

¹ These are: (1) the Customer Line Identification ("CLI") issue, where the CLI of a ported customer's outgoing call will show a new number instead of the old number; (2) non-porting of MMS and future IP-based services, i.e. ported customers are unable to receive MMS and future IP services through their original number; and (3) inefficient use of number resources, i.e. the Call Forwarding MNP solution uses of 2 numbers to support calls to a ported customer.

significant and would not discourage customer switching. Singapore had introduced MNP using the Call Forwarding solution in 1997, and such solution is no longer relevant now. The general negative public perception of the existing MNP service, supported by the Consumer Survey results, confirms that the shortcomings² associated with the Call Forwarding solution are significant to those who have switched or intended to switch telecom service providers. On the CLI issue due to a ported mobile subscriber having two phone numbers, IDA's position is that the use of two phone numbers confuses consumers and leads to the public perception that Singapore's existing MNP solution is inferior. IDA notes that while there were discussions among the mobile operators to explore technical fixes to the CLI issue since 2004, no consensus has been reached so far. Also, such technical fixes will at best be patchwork solutions that may not be cost effective and efficient, and they could also lead to further problems and future "revisits" of the solution. For MMS and other foreseeable or potential IP services, notwithstanding the existing low traffic volume of these services, IDA's position is that the mobile operators must ensure the seamless porting of such services. The operators must not take a reactive approach, as in the case of SMS porting implementation in 2003 where there were significant consumers' concerns over the inability to receive SMS through the original phone number after porting. On the issue of the use of number resources, IDA's position is that it is prudent to ensure that there is efficient use of our national number resources to ensure the continued availability of numbers for consumers in the long term.

8. IDA also disagrees with the mobile operators' views that high mobile penetration rate, intense competition, and low levels of porting activities would suggest that MNP is not relevant. IDA's position is that MNP is an important consideration when a mobile subscriber wishes to switch telecom service provider³. Mobile operators must put in place a proper switching mechanism to remove switching barriers to mobile subscribers so that they can experience seamless porting and freely choose their telecom service providers. In addition, the prospect of customer switching will ensure that telecom service providers will compete with better prices, service quality and innovative services to attract new customers and retain existing ones. IDA also notes that MNP has not been made available to mobile pre-paid subscribers. IDA's position is that MNP must be extended to mobile pre-paid

² IDA's Consumer Survey shows that subscribers of MNP were least satisfied with two numbers after porting and their inability to receive MMS on their original number. For subscribers who did not subscribe to MNP, the two numbers after porting was one of the top factors that influenced their decision not to do so. For mobile subscribers who did not switch service providers, the hassle of changing number was one of the common reasons for such subscribers to continue with their existing provider.

³ IDA's Consumer Survey shows that about 64% of the people viewed number portability as an important consideration when switching service providers. Out of those who have no intention to switch service providers, about 24% cited that the hassle of changing numbers as one of the reasons. This illustrates that number portability is an important consideration for mobile subscribers.

subscribers, such that these subscribers can also benefit from number portability and competition.

9. Therefore, IDA's decision is that mobile operators must adopt the centralised database and ACQ routing solution for MNP. This is a more robust solution that can resolve the near term shortcomings, remove switching barriers and support future competition and growth in the infocomm sector. In addition, MNP must be made available to all mobile subscribers (post- and pre-paid subscribers).

(II) Fixed-Line Number Portability ("FNP") solution

10. IDA notes that unlike the MNP solution, the existing FNP Query-on-Release ("QoR") solution has no technical shortcomings that would result in an inferior FNP and discourage customer switching. IDA further notes that with telecom operators worldwide considering Next Generation Network ("NGN") developments and implementation, fixed-line operators' migration to NGN platforms could occur in the next few years. In this regard, IDA's decision is that fixed-line operators may retain their existing FNP QoR solution. This will avoid any unnecessary investment by the fixed-line operators in upgrades to their existing legacy networks, and allow them to plan and implement their NGNs. IDA, however, reserves the right to require the fixed-line operators to review the QoR solution in future when market circumstances warrant.
11. Notwithstanding that IDA will not require the fixed-line operators to change their existing QoR solution, IDA's decision is that fixed-line operators must adopt the centralised database implementation. While IDA notes that the number portability technical requirements from potential new entrants (e.g. IP Telephony and WBA service providers)⁴ are still not certain, IDA believes the use of a centralised database approach would facilitate the entry of new entrants and implementation of number portability with existing operators. New entrants can quickly establish the commercial arrangements with an independent party that runs the centralised database, and focus on the technical routing implementation with the existing operators.

(III) Porting timeframes and charges

12. IDA notes that for MNP, the typical porting timeframe can be up to 5 working days. Ported mobile subscribers may be required to pay a one-time administration charge to the new telecom service provider. For FNP, the typical porting timeframe can be up to 5 working days. Ported fixed-line subscribers may be required to pay a one-time administration charge and a recurring monthly charge. IDA's assessment is that the imposition of a one-

⁴ Currently, IP Telephony and WBA service providers who obtain level "3" numbers are not required to implement number portability.

time administration charge is acceptable for the new telecom service provider's recovery of administration costs. IDA is also aware that the imposition of a one-time administration charge is a common practice in overseas jurisdictions. IDA will review the one-time administration charge with the operators to ensure that it is reasonable. In addition, IDA notes that as the new number portability solution would result in better management of the porting functions, there would be potential to enhance consumers' porting experience by reducing the porting timeframes. IDA will therefore work with the operators to reduce the existing porting timeframes⁵.

13. On the recurring monthly charges that are imposed on the FNP ported subscribers, IDA's decision is that the fixed-line operators must remove these charges⁶. IDA's position is that the fixed-line operators must not pass on number portability costs to the ported subscribers. As number portability benefits all consumers, fixed-line operators may recover the costs from all of their subscribers through their service tariffs. IDA's Consumer Survey results also show that the monthly charge is a significant concern among the consumers. IDA's decision is consistent with the MNP approach taken in 2003 where IDA had required the mobile operators to remove the monthly recurring charges for MNP ported subscribers.

(IV) IDA's proposed centralised database approach and ACQ routing solution

A. The pros and cons, and cost of the solution

14. IDA notes that the operators disagree with IDA's views to adopt the centralised database approach and ACQ routing solution in the long run. The operators cited several concerns: high costs, complex implementation, single point of failure, confidentiality of customer information, and lack of economies of scale.
15. IDA believes that the operators' concerns on the new solution are overstated. IDA's assessment is that the centralised database approach provides a common, standardised and efficient mechanism to manage the number porting information and processes between operators. The ACQ routing ensures operator-neutral and technically optimal routing of calls. In the long run, the new solution will be more adaptable, robust and cost effective, and ensure that Singapore is able to cope with future competition and growth in the telecommunications market. In addition, IDA sees the centralised database approach as a potential "catalyst" for the establishment of national

⁵ For MNP, IDA is considering a porting timeframe of about one day.

⁶ The fixed line operators will propose to IDA for review, the appropriate one-time administration charge that they intend to levy on ported customers, and the date to remove the recurring monthly charges.

enabling platforms, new capabilities and services⁷. While the new solution would require some initial set-up costs and works, IDA believes these are not as prohibitive and complex as what the operators have claimed, as such solution is built on mature and established technologies and adopted in many other countries⁸.

16. On remaining concerns raised, IDA believes that they can be addressed by putting in place proper measures and safeguards. Resilient design, security safeguards and proper business continuity processes can be put in place to address the concerns of a single point of failure and unauthorised access to customer information⁹. Therefore, IDA's decision is that the fixed-line and mobile operators must adopt the common centralised database approach, and that the mobile operators must move to the ACQ routing solution.

B: Governance model for the centralised database administration

17. The Consultation submissions examine the option of either forming an operators' consortium or appointing an independent third party to provide and operate the centralised database. In sum, an operators' consortium would have the expertise and incentives to keep costs low. However, an operators' consortium can be more controversial and difficult to implement. An independent third party can be a less controversial option, and ensure clear responsibilities and neutral treatment. However, the main drawbacks to this option are fewer incentives to keep costs down and increased concerns of financial solvency.
18. IDA believes that the role of a centralised database administrator must be operator-neutral and independent with a desire to safeguard market and public interests. This will ensure an open and efficient access by all telecom service providers to the centralised database's information and services and facilitate customers' transfer between the telecom service providers. This will also ensure equal treatment of all telecom service providers and minimise the potential of impropriety or anti-competitive behaviour.
19. Therefore, IDA's decision is to appoint a operator-neutral and independent party to provide and operate the centralised database. A Request-For-Proposal ("RFP") will be called and a centralised database administrator will be selected after careful evaluation of the bidders' business propositions,

⁷ This forms part of the Next Generation National Infocomm Infrastructure, envisioned in the iN2015 Infocomm Masterplan launched on 20 June 2006, to help Singapore realise the potential of infocomm over the next decade.

⁸ Most of the "European Conference of Postal and Telecommunications Administrations – CEPT" countries surveyed have reported the use of a centralised database approach and ACQ in routing calls for MNP. In addition, IDA is aware that the US, Taiwan, Korea, South Africa, and Malaysia is implementing the centralised database solution.

⁹ IDA notes that the centralised database will typically contain telephone numbers and network routing information but not subscribers' information.

expertise, experience and financial standing. IDA will consider issuing a licence to the appointed centralised database administrator for the provision and operation of the centralised database, and institute measures that will safeguard market and public interests. Due to the nature of the setup, it is envisaged that there can only be one centralised database administrator. Interested bidders for the role of centralised database administrator should fulfil the following fundamental criteria:

- (i) *Operator-neutral and independent*: The interested bidder must demonstrate and undertake that it is independent of the telecom operators in the markets it serves;
- (ii) *Non-discriminatory*: The interested bidder must ensure fair and non-discriminatory treatment to all telecom operators during the conduct of its business;
- (iii) *Expertise and experience*: The interested bidder must demonstrate that it has the relevant technical and operational expertise and experience, and possesses sound financial standing; and
- (iv) *Cost Effective*: The interested bidder must ensure that its operation of the centralised database will be robust, efficient and cost effective.

Further details on the appointment, provisioning and administration requirements of the centralised database would be set out in the forthcoming RFP.

- 20. Following the appointment of the centralised database administrator, IDA expects service agreements to be established between the appointed centralised database administrator and the fixed-line and mobile operators, under the regulatory purview of IDA. In addition, IDA will explore the establishment of other national enabling platforms, new capabilities and services which can leverage on this centralised database. IDA may consider incorporating these requirements in the RFP.

C. Cost responsibilities for implementing the new solution

- 21. IDA notes that the implementation of the new solution entails: (i) common industry set-up costs (e.g., the set-up cost of the centralised database); (ii) operator-specific set-up costs (e.g., cost in upgrading operator's network switches and Operation Support Systems); (iii) per line set-up costs (e.g., cost of updating customer data in databases) arising from porting; and (iv) additional call conveyance costs (e.g., originating operator's additional costs in processing and routing of calls). On the allocation of responsibility for such costs, IDA notes that various costs allocation models and the pros and cons associated with each model have been identified in the Consultation

submissions. The models identified include equal allocation of costs, cost allocation based on various market variables (e.g. market share, market revenue) and transaction-based charging.

22. In this regard, IDA's decisions on the cost responsibilities are as follows:

- (i) *Common industry set-up costs*: IDA notes that these costs and the allocation of responsibility for such costs will depend on the business propositions from interested bidders in the RFP process for the provisioning and operation of the centralised database. IDA's position is that the allocation of cost responsibilities must not undermine competition incentives, ensure a level-playing field, and facilitate an open and efficient access by all telecom operators to the common centralised database's information and services. IDA will set out further requirements in the forthcoming RFP and will welcome business propositions from interested bidders in their responses to the RFP. IDA will also work with the centralised database administrator and telecom operators in due course to establish the specific common industry set-up costs and cost responsibilities.
- (ii) *On the operator specific set-up costs, per line set-up costs, and additional call conveyance costs*: For these costs, each telecom operator must bear their own costs incurred in implementing the centralised database approach and ACQ routing solution, as part of their fulfilment of regulatory obligations. However, IDA also notes that a donor network operator may incur some costs, as a result of facilitating a subscriber's switch, and recover them from the recipient network operator.

D. Other impact and implementation issues from implementing the new solution

23. IDA notes that its decision to require the mobile operators to resolve existing shortcomings and implement the new solution can impact the mobile content and application providers. IDA understands that these providers currently use the new phone numbers assigned to the ported subscribers' by the recipient network for routing, authentication and billing purposes. As the mobile operators resolve the CLI issue, IDA expects that mobile content and application providers will have the option to enter into a service agreement with the mobile operators or the centralised database administrator for access to the routing information for ported subscribers. IDA understands that the centralised database administrator, as in some other countries, usually charges these providers a small access fee.
24. IDA also notes that existing ported subscribers may be affected when the new number portability solution comes in effect. IDA will work with the operators to minimise any inconvenience that may arise from migrating existing ported

subscribers to the new number portability solution. On other implementation issues that have been cited in the Consultation submissions (e.g. inter-operator processes and business rules, consumer education and security), IDA will work closely with the operators, relevant authorities and enforcement agencies to address them and ensure successful implementation of the new number portability solution.

(V) Inter-modal number portability

25. IDA notes from the Consultation submissions that there are concerns and issues that need to be addressed when implementing inter-modal porting. One key concern is that inter-modal porting can result in loss of service distinction that has been associated with number levels (i.e. fixed-line and mobile services are associated with number level “6” and number levels “8” and “9” respectively), and therefore cause confusion amongst consumers in relation to the service functionalities and charging arrangements. E.g., a consumer can be misled on the service functionalities and charges when a fixed-line number is used as a mobile number. The implementation of inter-modal porting also necessitates reviews and alignments of regulatory regimes, introduction of consumer education and consumer safeguards.
26. IDA notes that the fixed-line and mobile voice services may ultimately converge into a single market in the future through fixed-mobile substitution and fixed-mobile convergence technologies. However, the Consumer Survey results show that more than half of the respondents are satisfied with the existing segregation between fixed-line and mobile services and the numbers allocated to the respective services. This indicates that the market is not yet ready for inter-modal porting and that the introduction of inter-modal porting now would be premature. Accordingly, IDA’s decision is that IDA will not require inter-modal porting for now, but the appointed centralised database administrator and the operators must ensure that the centralised database solution is able to support inter-modal porting, should this be required in future. IDA will continue monitoring the market developments and convergence trends and the need to require inter-modal porting implementation in future.

(VI) Provision of other common platform services

27. IDA notes that the mobile operators disagree with IDA’s consideration of other services that could be offered using the centralised database platform. Their main arguments are that IDA’s consideration of such services is irrelevant to number portability, that there is no evidence of market failure and basis for regulatory intervention, and there would be increased costs in centralised database platform to provide additional functionalities. The mobile operators also argue that they have their own service platforms and other industry

participants, such as content providers, have their own commercial arrangements in place that effectively deal with each of these issues.

28. As mentioned above, in addition to implementing number portability, IDA believes that the centralised database approach can be a potential catalyst for the establishment of national enabling platforms, new capabilities and services. Nevertheless, IDA will not impose the regulatory requirements on operators to provide these platforms and value-added services at this time, as these should be subject to market forces. Instead, IDA will explore the provisioning of enabling platforms, new capabilities and services with the industry participants.

(VII) Timeframe for implementing the new number portability solution

29. IDA notes that the operators feel that IDA's proposed 9-month timeframe to implement the new solution is unrealistic, and such implementation will require at least 24 months, or several years in other jurisdictions. On the other hand, some telecom vendors believe that the 9-month implementation timeframe is adequate for Singapore, but such implementation cannot begin until the specifications of the centralised database platform, inter-operator processes, business rules and comprehensive test plans between the operators and the centralised database administrator are developed.
30. After careful consideration, IDA's decision is that it will issue the RFP for the appointment of the centralised database administrator by September/October 2006, and appoint the centralised database administrator by December 2006/January 2007. The new number portability solution would be put in place by fourth quarter of 2007. IDA believes that this is a reasonable timeframe to accommodate the development of specifications, inter-operator processes, business rules, deployment and testing of the new solution, so as to ensure that there will be no glitches upon implementation.

(VII) No cost-benefit analysis and risk of stranded investments

31. The operators argue that IDA did not consider a cost-benefit analysis. In line with the principle of evidence based regulation, the operators claim that IDA's review must be supported by a cost-benefit analysis; all best practice regulators have undertaken cost-benefit analysis; and IDA (formerly TAS) had undertaken a cost-benefit analysis in 1996 prior to the introduction of number portability, to ensure that costs were not unnecessarily passed on to consumers. In addition, the operators also state that IDA did not have regard to the fact that operators will begin a process of phasing in IP based networks (i.e. NGN) to replace their existing circuit-switched networks. IDA's decision to require a new number portability solution now will result in stranded investments and constitute an unreasonable burden on the operators.

32. IDA agrees that a cost-benefit analysis will provide a useful aid to a regulatory review and decision, and has been carried out in other jurisdictions. In line with the principle of evidence based regulation, IDA engaged an independent telecom regulatory consultant to carry out a cost-benefit analysis exercise to allow IDA to better understand the likely costs and benefits of moving to a centralised database approach and ACQ routing solution. The results reveal that when compared to the existing number portability environment, there are potential benefits that outweigh the costs of implementing the new number portability solution. Further details of the cost benefit analysis and results thereof are set out in Annex 1.
33. In addition, by only requiring the mobile operators to adopt the new number portability solution based on ACQ routing, IDA believes that the operators' concerns on the risk of stranded investments will be alleviated. IDA notes that the mobile networks, unlike fixed-line networks, are not expected to migrate to NGN in the near future. Furthermore, the new number portability solution will be expected to support both existing circuit-switched and IP networks, and investments in the new solution will not result in broad based obsolescence of their networks. Therefore, IDA's position is that its decisions on FNP and MNP will not result in an unreasonable burden on the operators.

PART V: CONCLUSION AND GOING FORWARD

34. IDA carried out a review on number portability, to resolve existing limitations in number portability solutions and implementation, and ensure that Singapore will have a robust and forward looking number portability solution that support the future competition landscape and market needs in the infocomm sector. The operators are not supportive of IDA's proposal to implement the centralised database approach and ACQ routing solution due to several concerns. Consumers are supportive of IDA's initiative to improve the number portability solutions and implementation.
35. After careful consideration, IDA's decisions are:
- (i) The fixed-line and mobile operators must implement a common centralised database approach for FNP and MNP;
 - (ii) For FNP, the fixed-line operators may retain their existing QoR routing solution;
 - (iii) For MNP, the mobile operators must implement centralised database and ACQ routing solution to resolve existing shortcomings, i.e., to address the CLI issue and support porting for MMS and other possible or foreseeable IP services. MNP must be made available to all mobile subscribers (post- and pre-paid subscribers);
 - (iv) Fixed-line operators must cease the imposition of recurring monthly FNP charge on ported fixed-line customers;

- (v) Fixed-line and mobile operators must review the FNP and MNP porting procedures, timeframes and charges, as they implement the new number portability solution;
 - (vi) A centralised database administrator will be appointed through a forthcoming RFP process. Specific common industry set-up costs and cost responsibilities will be further established with the centralised database administrator and telecom operators;
 - (vii) The common centralised database solution must support inter-modal porting, should this be required in future. IDA will not implement inter-modal porting now but will monitor market developments and convergence trends; and
 - (viii) IDA will issue the RFP by September/October 2006 and appoint the centralised database administrator by December 2006/January 2007. The common centralised database and ACQ routing solution must be implemented by fourth quarter of 2007.
35. Going forward, IDA will form a Number Portability Working Committee, comprising IDA, the appointed centralised database administrator and the telecom operators. IDA will require the Number Portability Working Committee to oversee the development and implementation of the new number probability solution.

DESCRIPTION OF COST-BENEFIT ANALYSIS (CBA)

Approach in CBA

1. The CBA attempts to assess the likely costs and benefits to the Singapore economy (operators and consumers) arising from implementing the new centralised database approach and All-Call-Query (“ACQ”) routing number portability solution¹⁰. The CBA adopted an incremental approach, comparing the net costs or benefits in implementing number portability in 4 different scenarios. These 4 scenarios are:
 - i. Scenario 0: Current FNP and MNP implementation;
 - ii. Scenario 1: Current arrangements with non-technical improvements to FNP and MNP implementation¹¹;
 - iii. Scenario 2: FNP and MNP with Query-on-Release (“QoR”) and ACQ routing solutions; and
 - iv. Scenario 3: FNP and MNP with QoR and ACQ routing solutions and centralised database.

2. The categories of costs considered are the set-up costs and on-going costs that would be incurred in implementing the number portability solutions. In this case, such costs would include the common industry cost (e.g. the Centralised Database), operator-specific costs (e.g. network upgrades) and transaction costs (e.g. administration costs). The categories of benefits are benefits to operators (consumer charges and operational cost savings) and benefits to consumers. For the latter, such benefits are generally classified into:
 - i. Type 1 benefits: Those accrued to consumers who retain their telephone number when switching service provider (e.g. savings in stationery and advertising costs);
 - ii. Type 2 benefits: Those accrued to all consumers arising from increased competition due to number portability (e.g. overall price reduction, greater innovation and choices). These benefits tend to be the most significant. However, they are difficult to estimate and are often not included in CBAs. Therefore, these benefits have been excluded from this CBA; and

¹⁰ This is done over a period of 10 years.

¹¹ Non-technical improvements include removal of monthly FNP charges, marketing programs to improve awareness of FNP and MNP amongst all consumers, and technical fixes to overcome the CLI issue, so that the new number of a ported consumer will not appear as CLI.

- iii. Type 3 benefits: Other consumer savings associated with fewer number changes (e.g., having to make fewer number changes or make calls to directory enquiries).

CBA key results

3. The CBA results show that operators' move to the common centralised database approach and ACQ routing solution (for mobile operators only) can result in potential net economic gains to the market as porting demand increases. When compared to the existing number portability environment (i.e., Scenario 0), the CBA results reveal that a move to the new solution can result in a potential net economic benefit of about S\$34 million to S\$240 million (assuming a 5% and 10% annual MNP porting rate)¹². Further indirect benefits from increase in broad-based competition would further justify that the benefits will outweigh the cost of implementing the new solution.
4. On number portability for fixed-line services, the CBA results show that consumers can similarly enjoy the benefits without the need for fixed-line operators to change their existing routing solution. This is because such routing solution is transparent to the consumers, and unlike in the MNP, there is no technical shortcoming that discourages switching. This will also avoid any unnecessary network investments, as fixed-line operators would be planning for NGN implementation.

Conclusion

5. Overall, the CBA results supports IDA's decision to implement a common centralised database approach (for FNP and MNP) and ACQ routing number portability solution.
6. However, for the routing solution for FNP, the CBA recommends that the existing QoR routing solution between fixed-line operators be retained, given that there is no technical shortcoming, and will avoid any unnecessary network investments, as fixed-line operators would be planning for NGN implementation.

¹² The existing annual MNP porting rate in Singapore is about 1% of total postpaid subscribers. IDA is of the view that with the proposed move to the new solution and improvements in processes, it is not unreasonable to assume that the annual MNP porting rate can increase to 5% or more. IDA notes that the annual MNP porting rate in overseas countries (e.g. United States, Australia and Hong Kong) ranges from about 5% to 16%.