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**Response to**  
**Info-comm Development Authority**  
**of Singapore**  
**For**  
**Public Consultation on the review**  
**of Number Portability in Singapore**

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## Response to IDA Singapore

### Question 1

The current call forwarding solution, whilst effective when introduced, is now becoming less effective as the market penetration increases. This in turn requires more directory numbers to meet demand. The current system requires the use of two numbers when ported and therefore does not allow for the efficient use of numbers. Since a call does not go directly to the recipient operator's switch serving the ported number, routing is neither optimised or efficient, additional transit/interconnection charges become necessary and call set-up time increases.

### Question 2

We believe that IDA has adequately covered the shortcomings of the current implementation. An additional shortcoming is that if the donor operator goes out of business, the ported subscribers will be out of service, even if they had ported their numbers years ago or multiple times.

### Question 3

Provided the numbers allocated to IP Telephony services and WBA players are portable, then it will allow for greater competition among the fixed line players. If a central database system with an all call query (ACQ) solution is introduced, then the new system would be able to handle these telephone numbers.

### Question 4

- i. A centralized clearinghouse has several benefits some of which are:
  - Ensures uniform and fair processing and provisioning of port requests.
  - Minimizes the number of communication links with service providers, thereby reducing operator network costs.
  - Eliminates reliance on the donor operator, thereby providing the ability to maintain portability when service providers fail and exit the market.
  - Enables an NRA to audit and monitor porting activities for compliance and enforce such rules.
  - Infrastructure is expandable to accommodate other services such as fixed number portability, SMS and MMS.

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The benefits of a centralized database approach outweigh the need to establish a new infrastructure that includes the database with many countries opting for this method. Countries such as the United Kingdom that initially implemented a call forwarding solution have stated their intention to evolve to a centralized database approach.

- ii. To ensure transparency and ensure fair competition, it is preferable to have the centralised database operated by an independent neutral third party. It is critical that the administration and operation of the centralized database solution be provided by a party that is not directly affiliated with the provision of telecommunications or with any operator in the country. In no case should the operator and administrator of the database be one of the service providers that is subject to number portability rules and regulations.

- iii. The likely cost components of implementing a centralised database are:

Establishment/start-up costs

Network costs (e.g. switch upgrades, software upgrades, signalling)

Operations and administration costs (changes to operations systems, e.g., service provisioning, customer care, billing, fault management)

Per line administrative costs

Call conveyance costs

It is difficult to give a cost estimate as the total cost will largely depend on the networks of each individual operator and the amount of upgrades required for their networks. Input from each operator would be required to give an estimated cost for this.

- iv. The primary advantages of the ACQ approach are:

National tracking of porting

Simplest conceptual administration.

Places burden of determining how to route the call on the network originating the call. Depending on billing arrangements, this may be either a positive or a negative consideration. Represents an added burden for networks that do not have any ported numbers.

Integrates well with N-1 query implementations. Can be positioned as a long-

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term goal with N-1 query (or query at the originating network outgoing gateway or the incoming gateway of the first network with ported numbers)

Simplest migration. No required implementation at any switch that does not have any ported numbers. (Switch always routes on the Called Party Number and a non-capable switch will ignore and pass the indication that the number has been queried.)

The primary disadvantages of this approach are:

- Most extensive implementation; ideally, queries at originating switch.
- May impact routing if the Called Party Number pre-pends or concatenates the Routing Number to the Directory Number (DN). (Could double the size of the Called Party Number field and require either 1) changes to routing tables, or 2) changes to call processing to ignore the Directory Number portion of the Called Party Number. (Not a concern if the DN is carried in the Called Directory Number parameter.)

On balance, the advantages of the All Call Query routing method are generally thought to outweigh the disadvantages, with many countries opting for this method instead of indirect routing (call forwarding).

- v. If mobile and content providers rely on the prefixes of phone numbers for proper authentication and billing purposes, they would need access to the centralized database to perform these functions accurately. The content of the database may provide new value-added services opportunities for mobile and content providers.
- vi. The central database approach will afford additional opportunities for software and hardware vendors.
- vii. Some services, including SMS, Calling Name Delivery, and some voicemail implementations, which depend on SS7 signaling to the exchange serving the customer or to a database associated with that exchange. Prior to Number Portability, such messages are routed through the SS7 network based on the global title translation of the SCCP Called Party Address, which typically uses a directory number as a convenient descriptor of which particular database or exchange should receive the message. With the introduction of Number Portability, there is a need to adjust the routing of the SS7 message to reach a destination in the recipient network instead of the corresponding database in the donor network.

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### **Question 5**

The major issue here maybe tariff transparency. Tariff transparency refers to the ability of a user to know the price of a call in advance of making it. Number portability takes away the users' ability to distinguish between calls to specific operator networks via the prefix of the called number. If there are different charges for calling a mobile number from a fixed line or fixed line from a mobile number then it may be important to be able to distinguish between different types of service.

The issue of tariff transparency is recognized in many of the countries in which number portability is implemented or planned for implementation. Many countries have provided a "telephone information service" to promote tariff transparency on calls to ported numbers by ensuring that mobile users have access to information that enables them to predict the cost of a call to another mobile number. This information may be provided via a recorded or live telephone information service or an SMS information service, which provides the correct tariff information on input by the user of the number which will be called. An alternative approach is to provide an audible warning at the beginning of a call that indicates it will be charged at an off-net rate.

### **Question 6**

Implementing a centralised database infrastructure would allow for easier integration of SMS and MMS messages as well as potential future developments such as ENUM. Such an infrastructure could also be extended to route VoIP calls directly over IP facilities. Today, such calls are typically routed through the PSTN, an approach that is both inefficient and expensive. As VoIP traffic increases, operators will want to route calls using IP directly to the correct terminating service provider. The centralized database could be used to store each operator's telephone number (TN) based routing codes and their associated IP address. When a call is originated with only the telephone TN for routing, queries to the database would enable the IP address of the network entry point of the called party's service provider to be determined.

### **Question 7**

- i. Current best practice throughout the world for number portability is to implement a centralised database/clearinghouse approach.
- ii. This approach would meet the requirements of the IDA as set out in Annex 3.
- iii. The suggested timeframe of 9 months for implementation is reasonable and adequate.

Key issues for achieving this timeframe include:

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- Industry agreement and NRA approval of business processes and inter-operator information flows.
  - Completion of requirements definition for system and switch upgrades for all related support systems and all switches.
  - Development and completion of a comprehensive test plan between operators and between operators and the clearinghouse database provider.

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