



Malaysian Communications and Multimedia Commission
Suruhanjaya Komunikasi dan Multimedia Malaysia

**A REPORT ON A PUBLIC INQUIRY
UNDER SECTION 55(2), 55(4) AND 61 OF
THE COMMUNICATIONS AND MULTIMEDIA ACT 1998
ON IMPLEMENTATION OF MOBILE NUMBER PORTABILITY
(MNP) IN MALAYSIA**

28 December 2005

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ABBREVIATIONS AND GLOSSARY

ACQ	All Call Query
BSS	Business Support Systems
CELCOM	Celcom (Malaysia) Berhad
CLI	Caller Line Identification
CMA	Communications and Multimedia Act 1998
DiGi	DIGI Telecommunications Sdn. Bhd.
DN	Directory Number
EVOLVING	Evolving Systems Inc
FP	First Principles Sdn Bhd
ICP	Inter-carrier Communication Process
IN	Intelligent Network
ISUP	ISDN User Part
LNP	Local Number Portability
MAXIS	Maxis Communications Berhad
MCMC	The Malaysian Communications and Multimedia Commission
ML	Mobile Lifestyle Bhd
MNP	Mobile Number Portability
MVNO	Mobile Virtual Network Operator
NEUSTAR	NeuStar Inc.
NP	Number Portability
NPDB	Number Portability Database
OR-1	Onward routing call flow described by TM in their response whereby the recipient mobile network forwards a call from a ported mobile number to the fixed network.
OR-2	Onward routing call flow described by TM in their response whereby the donor mobile network forwards the call to the fixed network.
OSS	Operations Support Systems
PAC	Porting Authorization Code
PSTN	Public Switched Telephone Network
REDTONE	REDtone Telecommunications Sdn Bhd
RN	Routing Number
SS7	Signaling System 7
SYNIVERSE	Syniverse Technologies Inc
TIME	TIME dotCom Berhad
TM	Telekom Malaysia Berhad

SECTION 1: SUMMARY

1.1 Introduction

1.1.1 Pursuant to the Ministerial Direction on Number Portability (Direction No. 2 of 2004) issued on the 10th Sept 2004, the Malaysian Communications and Multimedia Commission (MCMC) has initiated efforts to ensure the effective implementation of number portability for public cellular services in Malaysia ("Mobile Number Portability" or "MNP"). As part of our efforts, MCMC is undertaking a program to study the implementation of MNP in Malaysia and its implications and impacts to the industry, the service providers and the consumers. According to the program, the MCMC's goals include enhancing competition, deployment of advanced technologies, lowering of costs to users and stimulating economic development in Malaysia. Key to ensuring the development of competitive markets and expanding customer choice is the provision of MNP.

1.2 Public Inquiry

1.2.1 In accordance with the Ministerial Direction, the MCMC has conducted a Public Inquiry on the "Implementation of Mobile Number Portability in Malaysia".

1.2.2 The Public Inquiry commenced on 1st September 2005, with the release of a Public Inquiry Paper on the MCMC website and the written submissions was ended on 29th November 2005. The comments submitted pursuant to this Public Inquiry will assist the MCMC in determining a variety of issues relating to the implementation of mobile number portability in Malaysia.

1.2.3 A clarification session was held on the 22nd September 2005 at MCMC headquarters in Cyberjaya. At the clarification session, an overview of the Public Inquiry Paper was presented, and attendees were provided with the opportunity to put forward questions to the MCMC.

1.2.4 Following the end of the written submission period, the MCMC received written submissions from the following parties:

No	Submitting Party	Documents
1	MAXIS	1 confidential Submission (23 pages)
2	CELCOM	1 Submission (22 pages)
3	DIGI	1 confidential Submission (21 pages)
4	TM	1 public Submission (19 pages) 1 confidential Submission (19 pages)
5	TIME	1 Submission (4 pages)
6	REDTONE	1 Submission (5 pages)
7	NEUSTAR	1 Submission (27 pages)
8	SYNIVERSE	1 Submission (35 pages)
9	Evolving Systems	1 Submission (17 pages)
10	First Principles	1 Submission (7 pages)
11	Mobile Lifestyle	1 public Submission (9 pages) 1 confidential Submission (6 pages)

1.2.5 This Public Inquiry Report has been prepared in fulfillment of the MCMC's obligations under Sections 55(2), 55(4) and 61 of the Communications and Multimedia Act 1998 (CMA).

1.3 Structure of the Report

- 1.3.1 The remainder of this Report is structured as follows:
- 1.3.2 Section 2 provides some background on MNP.
- 1.3.3 Section 3 summarises the responses to the questions identified by the MCMC in the Public Inquiry Paper, and the MCMC's responses to those submissions.
- 1.3.4 Section 4 sets out acknowledgements.

SECTION 2: BACKGROUND

2.1 This Public Inquiry is the first step to address the best method of implementing MNP and establishing rules and guidelines for its implementation framework and timeline. It is part of the successful program the Malaysia Government has embarked to liberalize the mobile telecommunications services in Malaysia. Over the last few years this program has brought about change in the market with more services and lower prices becoming available. MNP is being introduced in order to establish market conditions that provide maximum choice, so that consumers will be able to switch service providers in order to take advantage of cheaper rates, attractive service offerings and better quality.

2.2 A major drawback to switching mobile service providers is that, at present, customers need to change their mobile telephone numbers if they change service providers. Each of the mobile service providers in Malaysia is assigned a prefix - 013/019 for Celcom, 016 for Digi and 012/017 for Maxis. Mobile subscribers are uniquely identified by the first 3 digits of the network code (01X-zzzzzz) of their mobile phone number. The recent introduction of the common prefix 014 for mobile operators requires use of the 4th digit to identify the current service provider therefore this prefix has less significance than prefix mobile prefixes. Currently, any mobile subscriber who wishes to migrate to another service provider network will have no choice but to change their mobile phone number. MNP ensures that mobile phone customers can keep their current mobile number, when switching from one mobile service provider to another.

2.3 The list of questions for comment in this Public Inquiry Paper is summarized in the table below.

	Question No.	Questions
1	4.4	MCMC seek feedback on how the regulator should be involved in promoting awareness of MNP.
2	4.5.1	The MCMC seeks comment on the proposed porting process times.
3	4.5.2	The MCMC seeks comment on the following: a. The porting process. b. Whether or not the donor service provider should be allowed to contact the customer to try and retain the customer once the porting process has commenced.
4	4.6	MCMC seeks comments on the following issues: a. MCMC is considering implementing a porting fee payable by

	Question No.	Questions
		<p>the customer of RM10 each time they port from one service provider to another.</p> <p>b. MCMC seeks views on whether or not operators should be allowed to offer incentives to potential customers for porting from one service provider to another.</p> <p>c. MCMC seeks views on whether a minimum contact duration should be applied by service providers for new customers. If a minimum contract period should be applied MCMC are considering a maximum period for the contract period of 12 months.</p>
5	5.5	MCMC seeks comment on a centralized clearinghouse approach that utilizes a centralized national number portability database to respond to queries from any network.
6	5.5.1	The MCMC seeks comment on the establishment of a third party clearinghouse to facilitate efficient implementation of mobile number portability in Malaysia.
7	5.6.6	MCMC seeks comment on the All Call Query approach for call routing.
8	5.7.1	MCMC seeks comment on this approach of populating the ISUP Called Party Address.
9	6.2	The MCMC seeks comment on what, if any, additional impacts the loss of identifier will have on mobile service provider operations.
10	6.3.2	The MCMC seeks comment on ways of achieving tariff transparency with respect to calls made to/from mobile numbers.
11	6.4	MCMC seeks feedback on whether fixed line service providers are to be compensated and if so how they should be compensated for cost associated with MNP.
12	6.5	MCMC seek to understand what are the impacts of MNP to the mobile service providers' branding and promotion strategies and activities.
13	7.1.5	MCMC seeks cost estimates for the necessary modifications to OSSs for an all call query and centralized database approach to MNP from both mobile service providers / fixed line service providers.
14	8.1	MCMC seeks cost estimates for the necessary modifications to the network for an all call query and centralized database approach to MNP from both mobile service providers / fixed line service providers.
15	8.2	MCMC seeks estimated per line administrative costs (exclusive of the clearinghouse fixed fee and per transaction fee) for an all call query and centralized clearinghouse centralized database approach to MNP from both mobile service providers / fixed line service providers.
16	8.2.1	The MCMC seeks comment on the proposed clearinghouse charging mechanism.
17	8.3	MCMC seeks estimated call conveyance costs for an all call query and centralized database approach to MNP from both mobile service providers / fixed line service providers.
18	8.4	The MCMC seeks comment on the general principles which will guide cost recovery for mobile number portability.
19	8.5	The MCMC seeks comment as to the costs involved by the donor

	Question No.	Questions
		operator and if they should be compensated for these costs by the recipient operator. If they should be compensated should the recipient pay all or part of the costs.
20	9.1	The MCMC seeks comment on the proposed technical solution implementation timeframe.
21	9.2	The MCMC seeks comment on the proposed deployment timeframe.

SECTION 3: COMMENTS RECEIVED IN RESPONSE TO PUBLIC INQUIRY PAPER ISSUED

Summary of responses

A total of 41 responses were received in respect of the Public Inquiry paper.

The breakdown of responses received is as follows:

Public	Industry		Other	Total
	Telecommunications Service Provider	Other		
29	6	5	1	41

Of the 29 responses from the public 24 responses supported the introduction of Mobile Number Portability. None of these responses directly addressed the questions raised in the PI paper. The remaining 5 contained no comments regarding the implementation of MNP.

The other response received was an academic response.

The 11 industry responses were received from the following organisations:

Celcom (Malaysia) Bhd
DiGi Telecommunications Sdn Bhd
Evolving Systems Inc
First Principles Bhd
Maxis Communications Bhd
Mobile Lifestyle Bhd
NeuStar Inc
REDtone Telecommunications Sdn Bhd
Syniverse Inc/Telshine Sdn Bhd
Telecom Malaysia Bhd
TIME dotcom Bhd

Overview of Submissions Received - General Comments

In addition to specific comments received on the questions raised in the PI, there some general comments raised which require highlighting and a response.

Maxis General Comments:

Maxis is prepared to support MNP, provided that the MCMC puts a framework in place that safeguards the industry's ability to continue to invest in future service improvements.

Maxis is concerned about the introduction of MNP in Malaysia. While benefits are often seen in concept, actual experiences in other countries do not seem to have resulted in major benefits to consumers, with typically not more than 5-10% of customers porting within 3 years of MNP introduction. Instead, MNP has often, and severely, affected industry economics in several countries (e.g., Hong Kong, South Korea, US).

Specifically, Maxis has five concerns about MNP implementation in Malaysia:

1. Unlikely that MNP will lead to significant porting levels.
2. Some, but no drastic improvements in overall customer service can be expected.
3. Costs of MNP implementation are high, with significant foreign exchange outflow.
4. Very high risk of intense tariff and incentive competition, affecting the industry's ability to reinvest in service improvements.
5. Time consuming and complex implementation that diverts resources from other critical national projects.

In the event of MNP implementation, Maxis requests that the following four elements are included in the MNP framework:

1. Ban on handset subsidies and overly aggressive incentives.
2. Cost to be borne by the Government.
3. Inclusion of fixed-to-mobile porting.
4. Postponement of MNP until early 2008.

MCMC Response

Concerns:

1. No evidence was provided to support the claim that “it is not obvious that Malaysian mobile subscribers will indeed value number portability – or that operators can gain significant market shares”. In Ireland, pre-paid and post-paid subscribers account for 75% and 25% respectively of the 3.8 million mobile subscribers. As of January 2005, some 6.2% of mobile subscribers had ported their numbers.
2. There is no claim that MNP will create a drastic, new impetus for operator improvements. MNP will be an added incentive for customers to switch providers if they are not satisfied with prices, geographic coverage and customer care associated with their mobile service. To retain their customers, mobile operators will need to ensure that these service attributes are improved.
3. The response contained confidential information. The MCMC has noted the estimated cost provided and will consider them in the final report. In view of the confidential nature of the information provided, no other views will be published.
4. Handset subsidies are an issue that can impact porting rates. Finland has experienced high porting levels - over 20% of subscribers had ported after one year of introducing MNP. Finnish service providers are not allowed to subsidise handset and subscription lock-in periods are nonexistent. Markets with handset subsidies, such as Sweden, have had a slower take-up of number portability as lock-in periods limits subscribers’ ability to change service provider.
5. The MCMC believes that introducing MNP along with 3G, broadband, T2 and USP will be key for Malaysia’s progress as an ICT nation.

Framework:

1. Governments in other countries do not bear the costs of MNP implementation.
2. Fixed-to-mobile porting is certainly feasible. However, it is outside the scope of this inquiry

DiGi General Comments:

DiGi fully supports MCMC's efforts to ensure the effective implementation of Mobile Number Portability (MNP) in Malaysia with the view to enhance competition, deploy advanced technologies, lower costs to users and stimulating economic development in the country.

TM (Response to MCMC Proposal):

The format of the TM response prevented the content of the response from being presented.

MCMC Response

Assume that MNP is not extended to fixed networks in the near future. Then calls entering the TM network (destined for fixed numbers) will not be impacted by MNP. Only calls originated in the TM network and destined for mobile networks are impacted.

The method proposed in the Public Inquiry paper leave significant flexibility in implementing MNP, especially for a fixed network. At a minimum, calls originated in the TM network could determine whether the called number is ported (and derive the necessary routing number):

1. At the originating exchange. This would imply an upgrade at every originating exchange so that the MNP query could be performed for every call to a mobile number. However, since the appropriate routing number would be determined at the originating exchange, optimal routing (following the current routing arrangements) could be followed. This appears to be the choice selected by TM in estimating its costs.
2. At a tandem exchange in the TM network (or some new node introduced at or near the POI). This would imply that all calls destined for mobile networks route through an MNP-query-capable tandem, but could avoid deploying the query capability in every exchange.
3. At a tandem exchange in the donor mobile network. This would imply inefficient routing of some calls and additional processing at the mobile tandem exchange, but could avoid all development in the TM network.
4. At the donor terminating exchange. This appears to be the option recommended by TM. It is the most inefficient in terms of

trunking, mobile network processing, and call setup time. (See other responses detailing the disadvantages of the Call Forwarding and Onward Routing methods.)

Among methods 1, 2, and 3 above, there are some tradeoffs that individual networks should consider when planning for the introduction of MNP in Malaysia. Without purporting to provide an exhaustive list here, it a sample of some of the tradeoffs may be described (in terms of the costs associated with each option) as follows:

1. Querying at the originating exchange involves upgrading each end office to accommodate MNP and upgrading signaling and processing capacity to support the MNP query.
2. Querying at a tandem involves potentially bypassing current efficient direct trunking arrangements and redirecting all mobile traffic through the tandem. Therefore, the total amount of traffic transiting the tandem will increase. This could lead to additional upgrades to or replacement of the tandem and the trunking network.
3. Querying at a tandem also involves upgrading signaling and processing capacity to support the MNP query for more queries than are required at a single end office exchange.

Comparative analysis of these factors is most readily accomplished by experts within the respective networks. Without the details on a wide variety of network-specific (and potentially network-proprietary) information, including factors such as:

1. Current network traffic patterns,
2. Current processor capabilities and loading, and
3. Anticipated costs for upgrading or replacing specific exchanges.

It is not possible to demonstrate which one of these models will be the least expensive for a given network. It is even likely that different networks will find either option 1 or option 2 more attractive.

Further, in the case of option 3 (passing the call into the donor network for all MNP processing), the details of how the mobile network would recover its costs for deploying sufficient capability to query the MNP database on behalf of the fixed network could influence whether this is an attractive option to TM or not. In this scenario, a call from the fixed network to a ported number will be delivered to the "wrong" destination network, which will not only have to determine the routing

number, but will have to then have to deliver the call to the recipient network. Care would be needed to ensure that calls to ported numbers did not end up being more expensive to the network (or worse, to the calling party) than calls to non-ported numbers.

TM (Proposal for MNP in Malaysia):

The format of the TM response prevented the content of the response from being presented.

MCMC Response

TM has proposed that its network would face a significant hardship in supporting MNP, based on an inability to upgrade nearly half of its existing switches. TM presents two call routing scenarios to illustrate how an Onward Routing methodology would remove the necessity to upgrade these switches. The two scenarios, Onward Routing – 1 and Onward Routing – 2, are illustrated in Figures 2-2 and 2-4, respectively.

For the purposes of this analysis, assume:

1. Fixed network numbers are not portable.
2. The recommended method of ACQ is adopted. In particular, the Routing Number is used to populate the SS7 ISUP Called Party Address parameter and the dialed number is carried in the SS7 ISUP Called Directory Number parameter if the number is ported.
3. Existing TM switches conform to standard SS7 ISUP. In particular, unrecognized parameters are passed unchanged and the destination switch should ignore the presence of the “new” Number Portability Forward Information parameter in an incoming IAM. If this assumption is not supported in the TM switches, it may be possible for the first TM switch that processes the IAM to automatically remove any incoming Number Portability Forward Information parameter as part of message screening. This would remove the possible need for any change at the destination switch. It might, however, require that all calls from mobile subscribers be routed through a gateway switch capable of this screening and that could lead to some routing inefficiencies.

Onward Routing – 2 represents a call from a ported mobile subscriber to a fixed number. Consider first how such a call would be processed using the ACQ mechanism:

1. The originating mobile network determines that the called number is not ported (since it is in the fixed network.) Therefore, the outgoing IAM does not include a Called Directory Number parameter. It does include a Number Portability Forward Information parameter, with the indication that the Called Party Address has been checked to see if the dialed number was ported.
2. The remaining switches in the mobile network and in the fixed network route the call to the destination switch based on the Called Party Address parameter. Switches in the mobile network will process the Number Portability Forward Information parameter and, therefore, will not query the NP database. Switches in the fixed network will not process the Number Portability Forward Information parameter, since they are not MNP-capable.
3. The destination switch in the fixed network will deliver the call based on the Called Party Address parameter. Since the concatenated addressing scheme has not been used, the number in the Called Party Address parameter has the same format and content as in today's network. Since the number in the fixed network has not changed, there are no changes to processing to deliver the call to the appropriate subscriber.

Based on this call flow, there is no need to route the call through the donor switch, as proposed by TM in OR – 2. The only possible rationale for routing an incoming call through the donor switch would be to allow that switch to recognize the destination as the fixed network and to progress the call without the Number Portability Forward Information parameter. However, if this additional capability can be added to the donor switch, it can also be added to the originating mobile switch (in which case there is still no need to route through the donor switch.) It is difficult to justify requiring non-standard specialized treatment of call in the mobile network to identify the destination network as non-MNP-capable, when the destination network should be expected to deliver the incoming call using its current implementation.

The issue is more involved for TM's OR – 1 case, a call from the fixed network to a portable mobile number. In this case, TM proposes that

the donor switch be responsible for determining whether the number is ported and populate the SS7 IAM as necessary. The TM paper does not clarify whether the proposal is to use traditional call forwarding (with the attendant disadvantages of requiring assignment of a second dialable number for each ported subscriber) or to use the Number Portability protocol (populating the Called Party Address, Called Directory Number, and Number Portability Forward Information parameters, just as if the call had originated on the donor switch.) In either case, the further disadvantages of onward routing (longer call setup times, inefficient trunk utilization, etc.) have already been discussed. At a minimum, a non-MNP-capable switch in the fixed network could follow the TM proposal as far as routing toward the donor network, as long as another switch in the TM network provides the required MNP processing. This could require some rerouting of traffic in the TM network (i.e., if today's routing delivers the call directly from the originating switch in the TM network into the mobile network, the routing table in the originating switch would need to change to direct the call to the appropriate tandem switch in the TM network), but this is similar to the requirement to route to a tandem switch to obtain any other service capability that is not deployed in the originating switch.

Finally, it would be technically possible for TM to route the call to a tandem switch in the mobile network, where the MNP query could be performed. This is a version of the 'hybrid' solution. This would minimize the inefficient use of trunks. However,

1. The mobile network would then deploy the MNP capability in its end switches and in its tandems. The increased cost may or may not be readily justifiable.
2. The fixed network would presumably be required to pay the donor network for providing the routing function that the fixed network has not provided. The implications for various tariffs should be carefully considered before the OR - 1 option is considered.

In conclusion, the limitations and consequences of endorsing the OR - 1 solution should not be understated and should be quantified before the solution is endorsed, and the OR - 2 solution does not appear to have any technical justification.

Celcom General Comments:

Celcom highlighted the need for a rigorous cost versus benefit analysis with regards to the implementation of MNP and the solution adopted.

Celcom understands that precedents from other national jurisdictions do not provide a solid basis which indicates that the public really wants or needs MNP. Further to Figure 1, as at December 2004, only 4.5 percent of the 555 million cellular subscribers in jurisdictions where MNP has been introduced have actually elected to port their number.

The markets listed in Figure 1 that have successfully deployed MNP can be characterised as post-paid environments. In comparison with these predominantly OECD economies Malaysia has a comparatively high level of pre-paid users as a proportion of the total installed base of customers.

MCMC Response

MCMC recognises the issues of costs and benefits. This has been addressed in the initial report received from the consultants and will be further examined in their final report based on comments received from this exercise.

MCMC recognises the comment about porting in other jurisdictions but does not believe that the number of people porting should be the only criteria for deciding if MNP has been a success. In fact, high numbers of people porting may indicate that it has not been a success. MCMC believes that other factors have to be taken into account when deciding if MNP has been a success. Other factors that need to be taken into account include:

- Is there now better mobile coverage?
- Has the cost of mobile calls decreased?
- Have new entrants emerged?
- Has customer service improved?

In Figure 1: International precedents do not represent a viable context for the introduction of MNP in Malaysia, incorrect data was provided for France, Ireland, South Korea and USA. The revised data is as follows:

Country	Launch	As of	Months	Ports (M)	As of	Subs (M)	% of Nos Ported
France	Jun-03	Jun-04	12	0.453	Jun-04	42.20	1.1%
Ireland	Jul-03	Jan-05	18	0.236	Dec-04	3.78	6.2%

South							
Korea	Jan-04	Dec-04	12	2.89	Dec-04	36.4	7.94%
USA	Nov-03	Dec-04	13	10.6	Dec-04	181.10	5.9%

Ireland is a predominantly pre-paid environment in which MNP has been moderately successful. The relevant characteristics are:

- As of December 2004, there were 3.78 million mobile subscribers
- 75% pre-paid, 25% postpaid
- As of January 2005, 236,000 mobile subscribers had ported their numbers (6.2%)
- During the 3Q 2005, 6% of mobile subscribers switched providers.
- In 3Q 2005, 14% of subscribers considered switching their mobile phone provider
- Meteor is the fastest growing mobile provider with a 12% market share
- Virtually all of Meteor's customers are pre-paid.
- A November 2004 press release from Meteor stated that "Number portability figures are also strong with Meteor gaining customers at a four to one ratio from the other operators".

The experience shows that nominal porting levels can occur in a predominantly pre-paid environment.

Celcom General Comments:

Given consideration to the arguments raised above, if MNP is to be implemented in accordance with the Ministerial Direction¹, then it should first be established using a call forwarding methodology, subject to any technical issues.

MCMC Response

Call forwarding or onward routing is often regarded as the simplest routing method to implement. This is also reflected in the costs of establishment, with onward routing regarded as cheaper to establish than the all call query method. By contrast, the ongoing costs associated with the all call query method are usually regarded as less

¹ Minister for Energy, Communications and Water, *Ministerial Direction on Number Portability*, Kuala Lumpur 10 September 2004

than those of the onward routing method. Additional major disadvantages of this approach include:

1. Additional call setup time for ported numbers. Although the additional setup time is no longer than that experienced for traditional Call Forwarding Service, it will take approximately twice as long to set up a call to a ported number than to a non-ported number.
2. Unnecessary trunking; two trunks required at the number owner switch for the duration of each call to a ported number.
3. Normal forwarded call is billed to the forwarding party; compensation mechanism will need to change.
4. Assumes "number owner" network (ported-from exchange) is notified if the number ports again. Requires that three networks cooperate for subsequent porting (instead of two).
5. No national tracking of porting; identification/resolution of errors more difficult.
6. If the porting information in the ported-to network is not updated in a timely fashion, circular routing is possible (donor network to first-ported network, back to donor network) or inefficient routing (donor network to first-ported network to the correct, second-ported network). This may have compensation implications since the original call has been forwarded.

The majority of MNP implementations worldwide have adopted the ACQ approach.

Country	How calls are routed from a fixed network to a mobile network	How calls are routed from a mobile network to another mobile network
Austria	Onward routing or all call query	All call query
Belgium	All call query ¹	All call query & query on release ¹
Croatia	All call query	All call query
Cyprus	All call query ²	All call query
Denmark	All call query	All call query
Estonia	All call query	All call query
Finland	All call query (1.10.05-)	All call query
France	Phase 1: onward routing Phase 2: all call query	Phase 1: onward routing Phase 2: all call query
Germany	Onward routing & all call query	All call query
Hungary	All call query & query on release	Phase 1: all call query & query on release
Iceland	All call query	All call query
Ireland	Onward routing	All call query
Italy	All call query ²	All call query
Lithuania	All call query	All call query
Luxembourg	Onward routing	All call query
Malta	Onward routing but ACQ may also be used	All call query
Netherlands	All call query ³	All call query ²
Norway	All call query	All call query
Poland	All call query	All call query
Portugal	All call query & query on release	All call query & query on release
Slovenia	All call query	All call query
Spain	Onward routing	Onward routing
Sweden	Onward routing & all call query	Onward routing & all call query
Switzerland	Onward routing	Onward routing
United Kingdom	Onward routing	Onward routing

Table 3: Methods of routing calls to ported mobile numbers

1. The minimum legal requirement is for onward routing.
2. Queries could be outsourced to other operator.
3. Queries are outsourced by one operator to the incumbent operator.

Source: Implementation Of Mobile Number Portability In CEPT Countries, Electronic Communications Committee (ECC) Within The European Conference Of Postal And Telecommunications Administrations (CEPT), Updated: October 2005.

Redtone General Comments:

MNP not only affects the mobile and fixed line operators but also the second tier application service providers that provide VoIP services.

MCMC Response

The MCMC acknowledges that the views of VoIP operators about implementing MNP need to be taken into account.

FP General Comments:

The PI paper had taken a simplistic approach in presenting all the required information and that MCMC had not evaluated international experience when reaching its conclusions and that there was insufficient data for a full evaluation of the recommendations put forth by the consultants.

Section 3 raises the following questions:

- a. With MNP, will all the services currently offered by the Donor Operator continue to be available after porting, such as MMS, SMS?
- b. How will MNP affect CLI after the porting process is completed?
- c. Will there be any effect on international roaming functions after a number is ported, and if so will there be a risk of additional cost being incurred?
- d. With regard to pre-paid services, MNP has to address issues associated with pre-paid components of the services, such as residual monetary value on their pre-paid cards.

MCMC Response

The MCMC commissioned the consultant to carry out a full study into the local market conditions and the international experiences of other countries who had implemented number portability solutions. The recommendations put forward in the PI paper were fully researched and evaluated.

- a. The PI paper notes that, "With the introduction of number portability, there is a need to adjust the routing of the SS7 message so that the combination of Translation Type and Global Title Address (TT, GTA) references a database in the Recipient network instead of the corresponding database in the Donor network." The changes to the SS7 network that are required to support the services currently offered by the Donor Operator are well-known and standardized. However, it should be noted that if the Recipient Operator does not offer a particular service, that service will not be available to the customer after porting.
- b. One of the advantages of using separate SS7 ISUP parameters for the DN and the RN is that services like CLI are readily accommodated after porting.
- c. One of the advantages of using separate SS7 ISUP parameters for the DN and the RN is that all current functions that depend on the ISUP Called Party Address parameter operate exactly as before the introduction of MNP.
- d. MCMC is of a similar view expressed by FP.

ML General Comments:

1. Recommendation 1: Mandate two (2) different porting processes and porting times, one each for postpaid and prepaid.
2. Recommendation 2: The prepaid porting process should be initiated by the subscriber to the current (donor) mobile network by an automated means e.g. Short Message System (SMS). Upon receiving a Porting Authorisation Code (PAC), the subscriber merely approaches any outlet or dealer of the new (recipient) mobile network for a new Subscriber Identity Module (SIM) to be provisioned with the original mobile number. The PAC is presented in this provisioning process for authentication and in place of potentially complicated, time-consuming inter-operator verification procedures.

MCMC Response

The implementation of both pre and post paid MNP must be implemented at the same time as they use the same technical solution for managing the ported number and its routing methodologies. Although MCMC notes the comments about having different administrative solutions it believes that this would not be feasible as it

would require additional staff training and impose additional unnecessary costs on the operators.

3.1 Overview of the submissions received – Specific Responses

3.1.1 This section 3 identifies the specific issues raised in the Public Inquiry Paper, and summarizes responses provided in submissions.

3.1.2 The MCMC has given detailed consideration to all submissions received. Comments received in submissions have been abbreviated in this Public Inquiry Report. The MCMC wishes to emphasize that the abbreviation of comments contained submissions does not imply that only limited aspects of submissions were considered as part of this Public Inquiry.

3.2 Comments on the Subscriber Awareness

Subscriber awareness of MNP plays an essential role. Awareness is not only the responsibility of the mobile service providers. The regulator must also play an important role by making the subscriber not only aware of the service, but also their rights and safeguards. Many regulators publish consumer information about MNP in the form of frequently asked questions and answers. Apart from serving educational purposes, they complement the service descriptions that service providers typically publish.

The Public Inquiry Paper sought views on:

Question 4.4 in the Public Inquiry Paper

MCMC seek feedback on how the regulator should be involved in promoting awareness of MNP.

3.2.1 Comments received

Summarized below are comments received on the issue regarding the Subscriber Awareness:

(a) (**MAXIS**) – original comment

Maxis believes that MCMC will need to take an active role in promoting public awareness of MNP. Any long-term customer benefits can only be achieved, if consumers are well educated and understand the benefits

– and limitations – of MNP. While operators will have their own interest in promoting MNP, the role of the regulator will be to provide balanced facts and perspectives. For example, MCMC should conduct consumer forums and road shows and even broadly advertise MNP, especially upon launch.

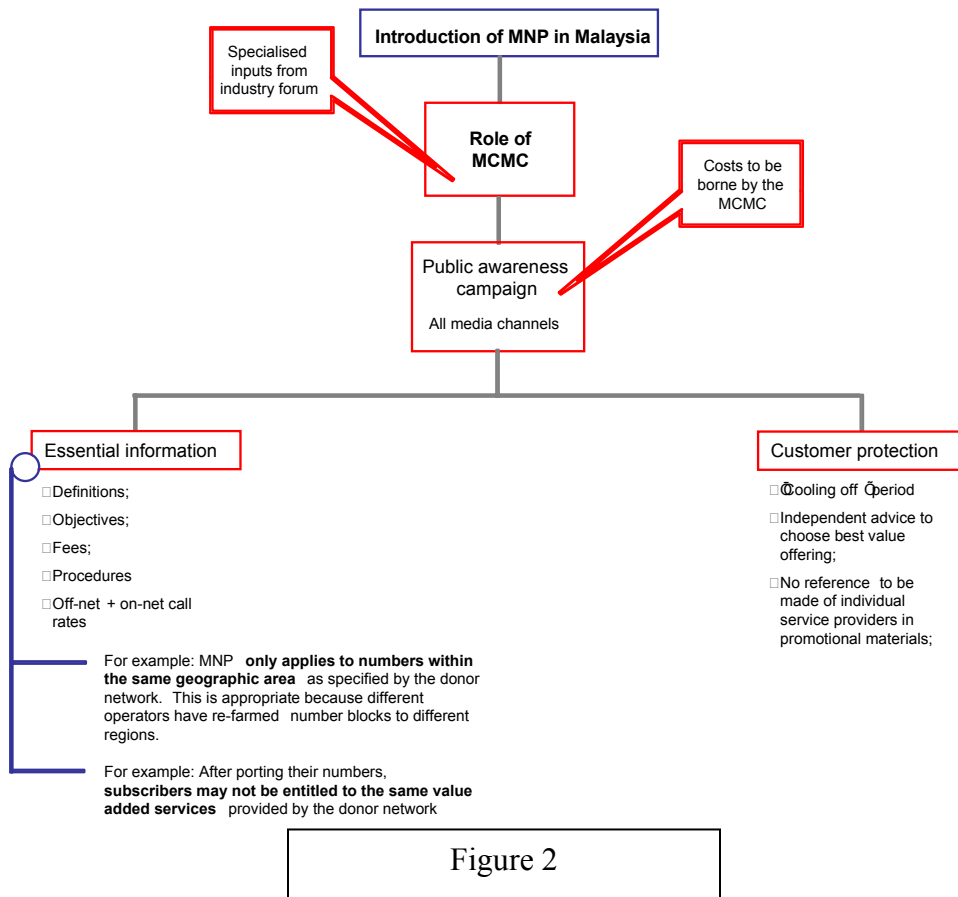
(b) (**CELCOM**) – original comment

In line with its broader statutory obligations, Celcom considers that the MCMC will need to play a central and impartial role in the education of consumer markets with respect to MNP. We note that there are already published consumer guides to MNP from other markets that the MCMC could use as a basis for its own public awareness campaign. Given that the introduction of MNP is generally accompanied by a substantial increase in marketing activity, the MCMC will need to provide additional protection and redress from bad and misleading advertising practices. With an additional layer of technical complexity there might be an issue in ensuring compliance with the Commission's Determination on Mandatory Standards for Quality of Service. For example, a failed call due to the recipient network failure may be wrongly perceived by the customer as a service quality issue with the donor network. Consumers must be aware of this situation. It is expected that any industry codes will be developed in conjunction with sector participants. This practice is consistent with the Communications and Multimedia Act 1998 and in line with emerging models in other markets. In particular, recent developments in other countries such as Australia and Singapore provide effective regional precedents that can be customised to Malaysia's unique industry circumstances. Industry codes should represent a practical outcome from a consultative and co-operative process.

As one example, the ACIF Mobile Number Portability Industry Code in Australia incorporates a number of provisions such as 'cooling off' rules that apply when operators use telemarketing to encourage subscribers to switch cellular providers. Such codes of practice promote informed decision making by consumers and the establishment new rules give subscribers greater time to consider their purchasing decisions. If the consumer is not satisfied with the services offered by their new provider, they have the standing option of having their old services restored without penalty during the cooling-off period. As indicated in Figure 2 Celcom would recommend the following approach as the basis for developing the MCMC's role for establishing MNP in Malaysia.

Figure 2: Celcom believes that the MCMC will need to play a central role in informing and protecting consumers after the introduction of MNP

The essential information required by the market may also be in the form of frequently asked questions and answers.



(c) (**DIGI**) – original comment

It is imperative that MCMC is involved in promoting the awareness of MNP. The public must be made aware of the benefits that can be derived from its implementation, as well as their rights and safeguards. We propose that public education should commence immediately and that MCMC should drive this public awareness campaign in collaboration with the Celcos similar to those conducted for the implementation of prepaid registration or MyKad. Key campaign messages should encompass:

- The concept - mobile prefixes are no longer associated to service providers, mobile numbers no longer indicate locations they are registered
- Benefits and availability of MNP to the public
- Basic steps for a customer to utilize MNP
- Customers rights and safeguards
- Impact on pricing (if any)

(d) (**TM**) – no comment

(e) (**TIME**) – original comment

The regulators currently informed the public and consumers on any new services available or introduced and also in making the public and consumers aware of their rights and safeguards. In order to promote awareness of Mobile Number Portability (MNP) to the consumer and the public, it would be more effective (given that this is a contentious issue) if the regulator is the body responsible for promoting MNP to the consumer and the public. MCMC should be given the responsibility to publish information on MNP as they are the regulating body. Information in the form of frequently asked questions and answers can be a favorable means of promoting awareness to the consumers and public. Frequent publishing of information regarding the MNP on the mass media will also serve as one of the options to promote public awareness.

(f) (**REDTONE**) – original comment

The importance of educating the public cannot be understated as it involves making an informed decision that will involve an element of cost. The regulator together with the operators needs to coordinate their efforts in promoting awareness of MNP. Part of the activities that can be through:

- Embarking in road shows on a nationwide basis to promote awareness;
- Making it compulsory for operators to distribute leaflets and other material to mobile users, posting FAQs on website and making sure that call centre services are sufficiently trained to handle queries from users;
- Co-ordinate certain activities with the Consumer Forum; and
- Advertise in local newspapers.

(g) (**NEUSTAR**) – original comment

As noted in the MCMC Public Inquiry Paper, regulators play a key role in promoting public awareness of MNP. Through consumer informational publications, internet websites, and other public media outlets, regulators can greatly raise public awareness as to their ability to switch service providers, thus allowing the consumer to take advantage of better network coverage and customer services, new technologies, and more attractive service offerings, as well as educating them as to the processes involved in MNP. Also, as noted in the Public Inquiry Paper, regulators may also publish consumer information about MNP in the form of frequently asked questions and answers, as well as information concerning the subscribers' rights and safeguards. In addition, the regulator could also play critical roles in explaining and promoting the additional benefits of NP to the public and the operators. For the operators, such benefits include ease of technology migration (e.g.: 2G to 3G), network reconfiguration and load balancing, and maintenance and disaster recovery planning for the operators. To the industry and the whole country, NP could help facilitate ubiquity of service, centralize number plan management and conservation, and ultimately increase the economic efficiency.

(h) (**SYNIVERSE**) – original comment

As MCMC evaluates its statutory role in implementing Number Portability, it must ensure the regulation is both effective and efficient in attaining the overall objective of increased competition. A critical task in this endeavor is to make subscribers aware regarding availability of the service, their rights, the fundamental steps in the porting of a number, the costs if any, and the overall benefits derived.

The MCMC must play an active role in this regard to ensure that subscribers make use of this new service if they so desire. Additionally, Malaysia's communication must be delivered to the subscribers with sufficient reach, lead-time and in an unbiased manner. With Number Portability implemented in many different countries, Malaysia can draw upon this experience as it prepares the launch within Malaysia. Examples of various media that can be utilized to communicate the elements of Number Portability to its constituents include:

- Public Service Announcements
- MCMC Press Releases
- MCMC Internet Website
- Paper Handouts
- Other Electronic Media including Television and Radio

Examples of Number Portability subscriber awareness campaigns from regulators of Singapore, the United Kingdom and the United States are enclosed for reference.

www.ida.gov.sg/idaweb/pnr/infopage.jsp?infopagecategory=factsheet:pnr&versionid=1&infopageid=I2433

www.ofcom.org.uk/telecoms/ioi/numbers/num_port_info/mob_num_p_ortab/

<http://ftp.fcc.gov/cgb/NumberPortability/>

(i) (**EVOLVING**) – original comment

MCMC is in a unique position to exert leadership in building MNP awareness. This awareness is two-fold: industry awareness and consumer awareness. A proven model of how this can be done effectively includes:

- The regulator chartering an industry technical forum with a mix of operator and vendor participants, to build consensus on technical and operational details associated with the MNP roll-out
- Provide clear direction for the implementation process, through either direct involvement in the contracting process or through chartering an appropriate organization to handle the necessary contracting issues
- Ensuring that industry forums and workshops are held at least at the 12-month prior, 6-month prior, and 3-month prior milestones to discuss required preparation activities.
- Provide clarity to operators on the expected consequences for delayed or intermittent compliance
- Publish FAQ, consumer rights on MCMC and KTAK websites, and as public notice through major print media channels

(j) (**FP**) – original comment

We agree with MCMC's approach that it should play an active role in disseminating information about the MNP service. As rightly pointed, this role should extend to protecting consumer rights and also spell out their obligations clearly. MCMC should also monitor the implementation and execution of the MNP service by the various operators. We propose MCMC may consider the following options to efficiently implement MNP:

- Publish a Industry Code¹ on MNP, which will contains:
 - rights of consumers in seeking to port ;

- obligations of operators to provide porting ;
 - exceptions where porting may be refused or deferred ;
 - the process of porting, and
 - the timelines for the various processes in porting
 - identification of all cost risks associated with porting ;
 - sanctions against operators for not complying with the Guidelines.
 - Complaints handling procedure for consumer complaints against operators.
- Additionally MCMC should also publish guidelines in the form of an *FAQ*, which will address operational issues as they arise in the course of implementation of MNP.
 - Issue *directions* to Operators to publish their respective MNP service description in compliance with the MCMC Code on MNP.

(k) **(ML)** – original comment

ML believes that the MCMC has to play an active role in creating public awareness about MNP. It has also to be instructional e.g. how to port a number. Various media should be used to reach out to the public consistently during the first year of implementation. Suitable media will include television, billboards, posters at shopping complexes and distributed to mobile phone dealers.

3.2.2 The MCMC's views

The MCMC welcomes the comments made by individual parties and the broad consensus of opinion that the MCMC must play a primary role in the promotion of MNP awareness.

3.3 Comments on the Simplicity and Speed

MCMC recommends a 5 days porting process time for the first 12 months of MNP service rollout and subsequently reduced to 2 days after 12 months period. Such a phase-in approach is taken recognizing that in the early stages when mobile number portability is implemented, porting delays may occur.

The Public Inquiry Paper sought views on:

Question 4.5.1 in the Public Inquiry Paper

The MCMC seeks comment on the proposed porting process times.

3.3.1 Comments received

Summarized below are comments received on the issue regarding the porting process times:

(a) (**MAXIS**) – original comment

MCMC proposes a 5-day porting time for the first 12 months, subsequently reduced to 2 days. We respect the MCMC’s intention to balance between customer expectations and costs to operators by staying clear of a costly real-life system.

Maxis is appreciative of this perspective and the fact that the porting upon introduction is targeted to be longer to provide time for the expected initial implementation problems. Nevertheless, we believe that the porting times are not sufficiently demanding for several reasons:

- ¶ 5 days is a fairly long process and will allow operators to accommodate porting with significant manual activities for quite a long time – which could jeopardize the ultimately needed automization across all operators.
- ¶ Customers are likely to expect porting within 24 hours, in line with mobile service activations in Malaysia.
- ¶ Donor operators have ample opportunity to contact customers during the porting process to win them back, potentially leading to a destructive cycle of counter-offers between the donor and the recipient operators.
- ¶ Does not push the manager of the clearinghouse and database to achieve best-in-class performance, which will be critical to make MNP a success.

The examples of Australia (2-3 hours), Hong Kong (24 hours), Ireland (2 hours), South Korea (1 hour) and US (2.5 hours) demonstrate that porting times can be as low as just a few hours.

Therefore, we recommend establishing a more demanding target already upon introduction. As we expect some fallout problems at the beginning (in other countries >50% of portings in first few months), we suggest a pragmatic target of 3 days for the first 6 months, subsequently reduced to 24 hours. We believe operating a batch-based system on a 24 hour basis has the same cost structure as a 2-day porting time. Moreover, the MCMC should consider differentiated timings for consumers and enterprise customers. Porting an entire group of staff requires more administration and checking. Hence we suggest stipulating a porting time for corporate customer groups of 10 days.

(b) (**CELCOM**) – original comment

The proposed porting process time set out in Section 4.5 of the Public Inquiry Paper is considered technically feasible by Celcom. It is assumed that the 5 days for the first 12 months of MNP service rollout and the subsequent reduction to 2 days refers to 'working days'. In addition, it is expected that this framework should only apply if the customer who requests for MNP service does not have outstanding bills and is not subject to any contract or whatsoever with the donor operator. Concerns relating to donor network closure processes which may impact and further delay processing by the recipient network will need to be adequately addressed by the Commission.

Further assessment of the process between the donor network and recipient network should be carried out by the MCMC to ensure that all operators in the market can effectively collaborate to ensure that the timing allocations can be met. Against this background, the time taken for the following processes must be taken into account:

- verification of ported-in customer to ensure that the number has been registered under the said customer;
- informing the donor network who will verify and terminate the ported customer; and
- verification of ported-out customer and settlement of outstanding bills.

Subject to the clarification of the above, Celcom supports the porting times proposed by the MCMC.

(c) (**DIGI**) – original comment

A porting process that requires many days or weeks to port a number can seem very lengthy when compared with the few minutes or hours it may take for a user to initiate a new mobile service. A lengthy porting period may create extra costs for users in porting, or simply discourage them from porting all together. A short porting period, however, may allow insufficient time for proper checks at all stages of the porting process to avoid fraud and ensure proper completion of a port. We recognise that it is necessary for the Recipient Network operator to carry out credit checks on the potential customers from the Donor Network operator and the credit bureaus. In the case of a prepaid customer porting to a new network, any balance of credit will not be transferred to the new network and would not require any significant amount of time. DiGi submits that porting process times should be kept to the minimum and propose that it be between 3 to 5 working days would be sufficient. This is reasonable compared to other countries which have implemented MNP, apart from those in our opinion that have failed to meet the objectives of MNP.

(d) (**TM**) – no comment

(e) (**TIME**) – original comment

MCMC has recommended a five-days porting process for the first 12 months of MNP service rollout and subsequently reduced to two-days after 12 months period. The porting process is one of the main concerns that we have with the implementation of MNP. We are agreeable to the five-day porting process, as there will be ample time to make adjustments on physical implementation and billing adjustments. However, we are not in favor of reducing the process to two days as we have concerns regarding whether we can cope up with the duration. The main concern is whether the billing adjustments can be made in time so that calls made from numbers that has been ported will be able to be billed to the correct mobile service provider.

(f) (**REDTONE**) – original comment

For purposes of the porting process timelines, we suggest the Commission implement a 5 days processing time for the first 6 months of implementation and subsequently 2 days after the 6 month period. However we would also like to highlight the importance of the need for simplicity that we believe is critical to the overall success of the MNP programme. A lengthy process has the potential of being used as a

ruse for the Donor Operator to stop potential subscribers from porting. The potential of this happening cannot be underestimated. Hence it is important that the procedure used should be no more than what is required and necessary to facilitate the porting process.

(g) (**NEUSTAR**) – original comment

Successful introduction of MNP, from the subscriber's viewpoint, should be a straightforward uncomplicated process, which ensures speedy porting of the subscriber's service from one MNP carrier to another MNP carrier, with minimal paperwork and porting delay. Consideration, however, is being given to a phased-in-approach, with respect to the porting process time. It is noted that the MCMC recommends a five (5) day porting process time for the first twelve (12) months of MNP service rollout, which is subsequently reduced to two (2) days after the initial twelve (12) month period of the rollout ends.

While it is recognized that the MCMC wishes to minimize porting delays during the early stages of MNP roll-out, there are certain carrier and operational considerations that must be taken into account for a successful implementation of MNP with phased-in port timers. Leveraging what NeuStar has learned from our extensive involvement in number portability, we would like to offer the following observations, which are by no means exhaustive, but seeks to identify certain industry observations with respect to port times.

Industry Consensus—The industry must come to consensus as to what constitutes a five (5) day port time, and in the second phase of MNP rollout, a two (2) day port time.

Common Definition of "Day"—There must be a common definition of what represents a port time "day". Industry must reach a common definition of a "day" and whether it is a twenty-four (24) hour calendar day, or a business day, which represents some unique agreed upon period of time. In addition, does a port timer start any time during the port "day" or is there a timer associated with the port that must expire after a given number of hours have elapsed.

Time Zones and Porting Impacts—In the case of carrier operations and possibly with geographic porting, time references with respect to port time can also be confusing. Another consideration is whether to base the port day on the local time zone or base the port day on a common time definition, such as the universal time zone (UTC/GMT), which can be used as a standard measure of time for the port day.

Holidays and Maintenance Schedules—The MNP carriers may also want to consider development of a porting schedule that takes into consideration certain national holidays as well as carrier and number portability administration center maintenance windows.

(h) (**SYNIVERSE**) – original comment

In determining the time to port, many variables and trade-offs between implementation costs and customers' satisfaction levels must be considered. A porting process that requires many days or weeks to port a number can seem like a long time for a subscriber when they are used to the hours or even minutes it takes to provision many new mobile services. A long porting period may discourage subscribers from porting their numbers. However, a short porting period can be insufficient time for proper checks at all stages of the porting process in ensuring the successful completion of a port. This may require more sophisticated modifications to operators' Operational Support Systems (OSS) and processes which increase costs. Another consideration is the actual time that porting can take place. Many countries have restrictions on days or even hours that porting can take place. This can ensure resources are focused on the porting process during that time, or to avoid changes to operational systems during high-traffic periods. The selection of an optimal porting time is a crucial element in the business rules of Number Portability which balances both operator costs and levels of customer satisfaction.

Syniverse agrees with the approach of starting with an initial benchmark of 5 days to process the port and compressing the elapsed time to 2 days after 12 months. As with any new service, the first months are the most susceptible to errors and those in which the majority of problems occur. This is coupled with the complexity of a service in which its success depends on competitors communicating and agreeing on every port.

With respect to Number Portability, these issues can result in ports failing to process correctly – commonly called “fallout.” Should these occurrences of fallout not be remedied in the time that the subscriber expects service, the result is obvious dissatisfaction. By employing more time in the initial stages, operators will have adequate time to address fallout and react to other systemic issues. Additionally, in the initial stage of Number Portability, large volumes caused by pent-up demand can have an adverse effect on initial processing. This system load can be potentially alleviated with additional time.

As Malaysia considers the implementation of Number Portability within Malaysia, one issue to consider as referenced above, is the effective management of fallout. The selection of the port process time frame will have a significant impact on the ability to fix and manage fallout. However, the process will not always go smoothly. In many cases, a port request will go from the Recipient Network Operator (RNO) to the Donor Network Operator (DNO), but the DNO may not be able to respond right away, or may find that there is something about the port request that requires manual intervention. Any interruption to the normal porting flow is referred to as fallout (the normal process is often referred to as a "sunny day" scenario).

For instance, the old provider may find a different last name on the port request than what is in its database for the requested number. For example, the DNO may have 813-555-1234 = "Li" in its subscriber account database, but the port request might specify 813-555-1234 with the last name of "Ng". The DNO won't really know for sure if the RNO is trying to port in a subscriber named "Ng" and typed the phone number incorrectly, or is trying to port in 813-555-1234 but under a different last name (maybe the subscriber was recently married or changed last name after a divorce). In this case, the DNO may not be sure if the last name or the telephone number is correct and since it does not want to port out a subscriber that didn't request a port, it will request resolution. In other words, the port request will "fallout" of the normal porting process and will require manual intervention.

What is Fallout?

Fallout can happen in several ways:

- The network connection or systems that connect the two carriers may be temporarily unavailable.
- The information submitted to the DNO may not match what the DNO has in its databases for the number being ported (e.g. billing address is different, last name is different, etc.)
- Subscriber gives different information to the new carrier than what the old carrier has on file
- Data entry errors – e.g., typing a zip code incorrectly
- Alternate spellings of last names, street names, etc.
- The Port request or port order is not formatted correctly (e.g. a mandatory field is blank, or a numeric field contains alpha characters)
- The volume of ports may be temporarily too high to confirm all pending port requests in the time allowed by the standard.
- The complexity of the port request may require additional time to confirm – a port request is considered complex if it involves:

- · A reseller
- · More than one telephone number
- · Intermodal

No matter what the cause, the process for resolving the fallout is the same: the port request must be handled in a less automated fashion. In many cases the port request will require extensive manual handling to resolve the fallout. For example, in the case of the last name in the Port Order not matching the last name in the DNO records, it could be that the subscriber recently changed her last name because of a marriage and hadn't gotten around to notifying her old carrier of the name change. On the other hand it could be because the number was typed incorrectly at the point of sale. To get to the bottom of this it may be necessary for the RNO to call the DNO to find the exact cause of the fallout, or perhaps even call the subscriber to obtain additional or correct information.

Validating Port Requests

When a DNO receives a port out request it will check the format and content of the request to ensure the request is properly formatted. It will also check the request against its account database to ensure the request is accurate and requests a number that can be ported. Each carrier may select which fields of the port request it will check against its own database. It is expected that the most useful fields will include telephone number, account number, and another specific identification ID such as a social security number in the US.

What are Fallout Centers?

Most operators will either setup specialized call centers to handle fallout resolution or outsource to the 3rd party.

These call centers are sometimes called fallout centers, port centers or resolution centers. A fallout center will need access to the Number Portability central system and billing systems and must be able to make and receive calls from the trading partners, its vendors, and other pertinent parties. A fallout center will usually consist of a number of people divided into groups each of which will be responsible for resolving a certain kind of porting fallout. For instance, one group might handle all fixed ports in and another group handles ports out to wireless carriers. Or they might handle simple vs. complex ports in different groups, have a group designated for subscriber contact, a group for a particular trading partner or any other setup that makes sense. This approach allows different levels of training and specialization which decreases training costs and improves fallout

resolution times and costs. One of the critical tools a port center will rely on is a tool to get information from the porting systems and into the various queues assigned to a particular group. This system should also allow these fallout incidents to be sorted, grouped, tracked and provide tools for resolving them. In short, this tool should allow work to flow into the port center and help it flow out in a corrected fashion. For this reason, these systems are typically called workflow systems. A few minutes on the Internet or a few calls to consultants, current vendors or industry groups should help a carrier find a vendor that can help them determine potential port center and workflow management solutions.

(i) (**EVOLVING**) – original comment

Porting process time should be typically the same as if a new subscriber is being sign-up to a mobile operator. Currently the time taken for new subscriber activation is in the region of 20-60 minutes depending on the load of the OSS systems. This will ensure seamless porting & virtually zero interruption on the availability of service to the end-user. In the US, FCC regulates the porting time to a maximum 2.5 hours for MNP, with systems established to provide near-real time activation. Performance of the both the donor & recipient operators' MNP & OSS systems are also crucial. A shorter porting time contributes to a better consumer experience and should increase porting volume. With the appropriate tools now readily available, we suggest a near-real time process with a maximum porting time of 1 day or lower.

(j) (**FP**) – original comment

We agree with MCMC that the porting process should be simple and speedy. A long porting time will certainly defeat the benefit of implementing MNP. Again the PI paper does not give a comparison on how other countries have treated porting times. In the circumstance, the suggested times of 5 days for effecting a port may be reasonable for the 1st 6 months, but MCMC has to monitor and assess the performance of the whole porting process from the perspective of the operators as well as the 3rd party clearing house. The 2 day porting time should be introduced as quickly as possible, maybe after 6 months from launch.

(k) **(ML)** – original comment

ML believes that the porting times should be much shorter. Taiwan's regulator (Directorate General of Telecom) has reduced the initial 5-day porting process to 4-day even before the launch of service for both mobile and fixed porting with further improvement for mobile in discussion. It was further pointed out that the longest time spent is on inter-operator verifications. ML has recommended that a separate porting process with significantly porting time be considered by the MCMC for the prepaid segment. ML believes that porting of prepaid mobile numbers can technically be achieved in a matter of hours, instead of days. This is achievable by primarily having the subscriber obtaining a Porting Authorisation Code (PAC) via an automated means from his current mobile operator and presenting it to the recipient mobile operator or its dealer during the purchase of the new SIM.

3.3.2 The MCMC's views

The MCMC is grateful for the views expressed by all parties with regards to porting process times, including the detailed issues such as fallout, time zone, holidays and maintenance schedule. The detailed issues will be separately considered during the implementation stage.

Having considered all the views we remain of the opinion that the 5 day period for the first 12 months being reduced to a 2 day period thereafter is correct. However, the MCMC may subsequently review the porting time to ensure competitiveness of the market.

With regards to the definition of days the MCMC views this as working days at the present time.

3.4 Comments on the porting process

The MCMC recommends the following summarized porting process:

- The customer goes to the recipient operator for MNP service.
- The recipient operator checks whether this new customer is acceptable (bad debt scoring or black listing review, etc.).
- The recipient operator makes the notification that the number should be ported.
- The donor operator and all other operators are notified by the new directory.
- On confirmation of the port, the recipient operator activates this number as one of its customers.

The Public Inquiry Paper sought views on:

Question 4.5.2 in the Public Inquiry Paper

The MCMC seeks comment on the following:

- a. The porting process.
- b. Whether or not the donor service provider should be allowed to contact the customer to try and retain the customer once the porting process has commenced.

3.4.1 Comments received

Summarized below are comments received on the issue regarding the porting process:

(a) (**MAXIS**) – original comment

Question 4.5.2a: Maxis is in agreement with the proposed process of customers contacting the recipient operator, who will coordinate the porting and customer provisioning process. This will allow a speedy processing, as the recipient operator has every interest in porting the number quickly. However, it provides some room for subscription fraud, which needs to be managed centrally – and is in line with the centralized database approach proposed by MCMC.

Question 4.5.2b: We do not believe it is in the best interest of customers and operators, if the donor operator can contact customers during the porting process to win them back. This can lead to a destructive cycle of counter-offers between the donor and the recipient operators. Such a situation will not encourage operators to make their best offer available to all customers irrespective of whether they plan to port or not. This can be pre-empted by minimizing the porting time to a limited time frame, e.g., 24 hours. It will, however, be necessary to allow the donor operator to contact the customer to settle any outstanding bills or contracts before the number can be ported. MCMC will need to establish an industry code and rules for porting to ensure smooth processing and settling of any outstandings (e.g., roaming charges that arrive well after the porting) as well as bad debt.

(b) (**CELCOM**) – original comment

Celcom notes that the porting process stated Section 4.5.2 of the Public Inquiry Paper has been summarised on general terms. In

principle, the process that has been illustrated here is acceptable and is consistent with international practice for the implementation of MNP. However, in order to ensure that the MNP process is customised for the Malaysian market, it is important to highlight that a more detailed process will need include the following provisions:

- ensuring that the porting request by the customer is genuine. This means - it should not be processed by the recipient network if there is no official request from the customer. This means recipient network shall only attend to an 'in person' request;
- payment of outstanding bills and contractual terms before allowing the number to be ported-out;
- deactivation process at donor network which must be done before activation at recipient network to prevent double service provisioning; and
- a process to return dormant or inactive ported number to the network that owns the number.

Celcom believes that Donor Service Providers should be allowed to contact the customer at any time including once the porting process has commenced. The principal reasons for this include:

- To verify whether the customer has made a formal request for MNP service; and
- From a legal perspective Celcom certainly reserves the right to contact its customers while they continue to have a contractual arrangement with the company.

(c) (**DIGI**) – original comment

a) In general, the porting process should be carried out based on the following principles:

- Porting process should be initiated by the Recipient Network
- Porting should occur at point in time agreed with customer
- Porting process should ensure minimal interruption to customer's access to existing services
- Process of porting should be seamless and transparent to the customer
- Information to be exchanged automatically through the central clearinghouse (CCH)
- All porting customers (prepaid and postpaid) should be registered with the Recipient Network operator

Standard porting procedures should be made mandatory via the MNP regulations and be complied with by all operators. We suggest the porting process as follows:

Part 1	Application (By Recipient Network)
	<ol style="list-style-type: none"> 1. Customer completes MNP application form with Recipient Network together with evidence of payment of the latest monthly bill from the Donor Network (no bill for prepaid customer) 2. Recipient Network operator performs necessary checks on credit. The process should be similar with any new customers
Part 2	Credit Evaluation Criteria (By Recipient Network)
	<ol style="list-style-type: none"> 3. Applicant should not have amount due for more than 1 month with the existing operator 4. Applicant is not blacklisted with the standard credit bureau 5. The Recipient Network operator send request via CCH for Donor Network operator's clearance
Part 3	Clearance (By Donor Network)
	<ol style="list-style-type: none"> 6. Donor Network operator accepts request and acknowledges (operators to clear requests on daily basis) 7. Any amounts outstanding but not shown on the latest bill paid should be settled with the Donor Network separately (should not be grounds for refusal) 8. On confirmation of port, Recipient Network operator activates the number as his customer, Donor network terminates the customer 9. The Donor Network operator and all other operators are updated via the CCH

It is permissible for a Donor Network operator to refuse a porting request e.g. when the request itself is incomplete, if the requesting party cannot be authenticated or there are duplicate porting requests, or when the number is not associated with the Donor Network. Other grounds for refusal include:

- breach of contractual period
- outstanding debt (latest bill not paid)
- stolen SIM card
- national security reasons, and

- technical obstacles
- b) We recommend that the Donor Network should be prohibited from contacting the customers during the porting process. The decision to port must be left solely to the customers. Operators should also be prohibited to offer additional incentives to encourage porting, or contacting ported subscribers.

Other aspects that are required to be addressed by the MNP regulations include:

- A porting subscriber has to register with the Recipient Network operator. The subscriber is considered as a new registration
 - Customers should be aware of the consequences of the termination of their existing service prior to porting. Operators to provide public access to information relating to any costs or obligations associated with terminating their service
- (d) (**TM**) – no comment
- (e) (**TIME**) – no comment
- (f) (**REDTONE**) – original comment

Porting Process - The key observation to make is that the whole process should be made easy for the subscriber. Any issues arising as a result of any technicality or operations should be resolved between the Donor Operator and Recipient Operator and should not involve or inconvenience the subscriber in any way. Where necessary, the subscriber should also be notified of the status of the process, perhaps through SMS to manage the subscriber's expectations.

Allowing the Donor Operator to contact the subscriber - We are of the firm opinion that this should not be allowed as it might be open to abuse by the Donor Operator. This issue has arisen in similar situations relating to Equal Access. We believe that operators should compete based on quality of its services and also to have a customer retention or loyalty scheme in place to keep its subscribers from porting. Note that the initial reason that the subscriber wants to change operator in the first place is that he is dissatisfied with the service or product offered by the Donor Operator. Therefore from a policy perspective, encouraging a high level service offering from operators (therefore the need for porting would not arise in the first

place) should be supported as a preventive measure as opposed to an active intervention or purely targeting subscribers who want to leave the network. The former has the effect of raising the overall quality of service on a broader scale whereas the latter has a limited focus and is capable of being abused by the Donor Operator.

(g) (**NEUSTAR**) – original comment

Question 4.5.2.a:

Proposed MNP Porting Process—The successful implementation of NP certainly has its challenges. Leveraging what NeuStar has learned from our extensive involvement, where we worked hand-in-hand with industry participants in the design, implementation, and general day-to-day operations experience, we would like to offer the following observations, which are by no means exhaustive, but seeks to identify certain major industry challenges previously encountered in NP implementations:

Industry Consensus—Achieving industry consensus in the competitive telecommunications industry is critical in order to bring diverse trading partners and varied constituents to a common porting process solution that best satisfies the needs of Malaysia’s carriers and customers. The ability to facilitate common solutions, acceptable to diverse and varied telecom stakeholders, has been key to the success of US, Canadian NP, and now in Taiwan, where NP service was successfully launched on 13th October of 2005.

Consumer Services—NP impacts normal consumer services and will need to be further reviewed for MNP porting. Specific consumer services to be considered include:

- Directory Listings;
- Emergency Services (medical, police, fire, etc.);
- Do Not Call Listings;
 - Repair Services; and
 - Operator Services.

Porting Business Rules—Agreement will need to be achieved on the business rules that will dictate issues such as time intervals, dispute resolution, porting in error, and any number of other operational process that need to be governed by business rules. Also worth noting, if applicable, will be the need for reseller and pre-pay specific business rules, as these situations warrant special handling in porting situations.

Inter-carrier Communications Processes (ICP)—Industry consensus will need to re-evaluate on how “new” and “old” service providers will exchange customer information, validate the subscriber’s agreement and determine the subscriber’s ability to port. The inter-carrier response time expectations and the degree to which the process will be automated will also need to be decided.

Employee Education—Carrier employee education and training is extremely critical and a rigorous training program must cover all functional areas of the porting process. For example, the point-of-sale (POS) employees must be trained to handle new customers who want to port their mobile phone numbers. Training material will need to be produced and training performed prior to MNP rollout.

Consumer Education —It should not be overlooked that a key success factor is the need to educate the general population as to the opportunities and processes involved in MNP in order to set their expectations and instill confidence in the porting process.

Question 4.5.2.b: Whether or not the donor service provider is allowed to contact the customer to try and retain the customer once the porting process has commenced is a business decision that industry and regulators need to address. Based on our observations of the MNP processes in the U.S., efforts by the donor service provider to try to dissuade a customer during the porting process appears to be counter-intuitive to the stated goal of fostering greater competition in the wireless markets and an impediment to the simplicity and speed of the porting process, which could lead to subscriber confusion and frustration.

(h) (**SYNIVERSE**) – original comment

Fundamentally, the porting process consists of three primary steps that must be in place in any successful implementation. Variations to these will be in response to the unique business requirements of Malaysia. For example, the subscriber must initiate the port. This can be either Recipient Operator initiated or Donor Operator initiated. Secondly, the operators must communicate aspects of the port among each other. Again, specific Business rules must apply regarding the length of time operators have to respond to each other, reasons for rejection, information needed and a host of others. Lastly, the change of routing information must be disseminated from the system to all interested parties to ensure the call or data is directed correctly to the ported subscriber. The diagram below depicts these essential steps in the process.

It is noted however, that in the consulting paper the process recommends a Recipient Initiated process. The operators must be aware that if business rules incorporate this method, time must be allowed to have a "cool-down" period that the subscriber can change their decision to port. The Donor at any time in the porting elapsed time (or in a time mutually specified by MCMC/operators in business rules) will be required to send a port response message to the Recipient indicating subscriber has elected not to port. This can impact proposed porting time as outlined in question 4.5.1 and any partial provisioning conducted by the Recipient Operator. Additionally this rule can have a detrimental impact on the number of subscribers who port. For example in the UK where a Donor initiated porting process is in place, the Donor operators are allowed to contact subscribers. This typically occurs at the time of and soon after the Porting Authorization Code (PAC) is issued. There is a significant percent PAC's that expire without the port taking place. The inference is that with the retention marketing activities of the Donor, the subscriber is electing to not proceed with the actual porting. As a general reference, please find an overall depiction of the porting process.

Three Steps to Porting a Number--Different countries have implemented NP differently. These differences are primarily because of the disparities among regulatory agency philosophies, existing infrastructure and methods employed by operators to meet the mandate.

Although there is a variety of ways to implement these steps, in all cases, there are three basic steps to porting a number from the "old" service provider or Donor Operator (DO) to the "new" service provider or Recipient Operator (RO):

1. Port Initiation: The subscriber has to initiate the port by letting an operator know of his/her intent.
2. Exchange of Porting Information: The DO and RO must communicate with each other specifics about the port, including the subscriber information, exact date and time, and of course, the phone number.
3. Network Routing Schemes: Once the number has been ported, calls made to that phone number must be "re-routed" to the RO.

Step One: Port Initiation--To start the porting process, a subscriber needs to contact an operator to request the port.

There are two basic approaches for this process used around the world, both methods have been implemented with varying degrees of success, and each method has its tradeoffs:

1. Donor Initiated: The subscriber goes to his/her current operator or DO to request to port "out".
2. Recipient Initiated: The subscriber goes to the RO to request to port "in" his/her number.

Donor Initiated--In this model the donor operator or DO starts the porting process. The subscriber contacts their current service provider and indicates their desire to change service providers and port their number. The DO then initiates the administrative process with the RO. In some places, the subscriber is given an authorization code or document showing they are eligible for porting (note: eligibility is determined by fulfillment of the contract or ability to break the contract). The subscriber has a set period of time (e.g. up to 30 days in the U.K.) to determine a desired service provider and present the written authorization. The RO then coordinates the port with the DO, using contact information provided in the written authorization form. In other cases, the DO contacts the RO directly upon initiation by the subscriber. This assumes that the subscriber has already selected a new service provider. In both of these cases, the net result is that the subscriber must initiate the porting process through the current service provider.

Advantages:

- _ Since subscriber initiates the port with the DO, the subscriber information does not need to be validated by the RO
- _ Allows for DO to possibly "save" the subscriber, collect outstanding debt, or avoid contract breakage

Disadvantages:

- _ Requires involvement by subscriber with both DO and RO
- _ Is typically a more lengthy process
- _ May unfairly advantage the DO because it could delay the port or "hassle" the subscriber to win-back offers
- _ May require subscriber to settle bill prior to porting – even if a legitimate billing dispute exists.

Recipient Operator Initiated--In this model the porting process starts when the subscriber contacts a desired new service provider (RO) (recipient operator) to initiate the porting process. The subscriber contacts a retail point of sale (a kiosk, a Web site, a retail center, an authorized agent, etc.) and provides information regarding his/her current operator (DO), such as account number. The RO then begins

the administrative process and must validate the subscriber-provided-information with the DO. At this point, the DO still has the ability to reject the port, based upon agreed valid reasons, such as incorrect subscriber information.

_Advantages:

- _ Subscriber only deals with the RO – less burdensome for the subscriber
- _ Is typically a shorter process – RO has the most incentive to port the number quickly

_Disadvantages:

- _ Requires validation of subscriber information between RO and DO

Step Two: Exchange of Porting Information--Regardless of the method chosen for port initiation, the DO and RO must exchange information for validation and port coordination. This information exchange is commonly referred to as inter-carrier communications or inter-operator communications (IOC).

IOC Messaging--In the case of fixed-to-fixed porting, the amount of information in the IOC can be several pages, including circuit and trunk information, physical locations of various network elements, as well as subscriber information. In the case of mobile-to-mobile porting, the data in this exchange can be as simple as: subscriber name and billing address, account number, the phone number to be ported and the date and time of port. There are several different methodologies used around the world to accomplish IOC. One such example is a fully automated exchange through a single central clearinghouse. This method uses a predetermined format for the data and can be completed in minutes. This fully automated exchange is “kicked-off” by one operator’s back-office system (e.g. a billing system or a customized gateway) and is responded to automatically by the other operator’s back-office system. Another automated approach involves entering the porting information into a GUI.

The information is then exchanged through a centralized clearinghouse with the other operator. In both of these cases, software systems play a major role in validating the port, expediting the changeover in service providers, and tracking the porting process end- to- end. In some countries, a manual approach is used, often using facsimile or e-mail to exchange information. There are trade-offs to both approaches. The automated solution results in less errors and a much faster overall porting experience for the subscriber. This automation comes at a cost – software systems need to be developed, and modifications to operators’ existing back-office systems need to be

made to exchange the information. The manual approach can be troublesome – faxes can be lost, e-mails can be deleted, and in both cases, humans need to interpret and input the information into various systems. In addition, a manual approach results in a much longer port process.

Port Timing--The time it takes to complete a port varies as widely as the differences in the implementation of the process – from as little as two and a half hours to as lengthy as 30 days, with extreme examples of four months. How long should the process take? There is no right or wrong answer; but generally from a subscriber's perspective, a shorter timeframe is better. The answer to this question, in part, needs to be determined by the regulatory agency and in part, by the operators.

Customer Expectation--In countries where subscribers are accustomed to getting new service within hours of the request, the length of time to port should be in line with these expectations. Conversely, in places where initiating new service takes months, consumer expectations for the port to take place rapidly may not be that high.

Level of Automation and System Integration--As discussed above, the method used for port initiation together with the methodology for IOC, are the two biggest factors in determining the time it takes to complete a port. The more automation put in place to make the port happen quickly, the more cost is involved with up-front implementation. A side effect of making the port happen quickly is a long-term decrease in manual support costs and an increase in the ability to make each port happen in the same amount of time, i.e. reliability.

Reliability of Processes--Some considerations need to be given to the concept of "best time" versus "average time". Even if it is possible to complete a single port within hours, one must consider if it is possible to complete nearly every port within hours of each port's initiation – i.e. is the process repeatable and reliable? Many things must be factored in the equation; including the level of automation at each operator, subscriber expectation, the validity of information presented by the subscriber to the operator, and the degree to which the operators agree to cooperate.

Cooperation between Operators--Typically competitors do not communicate, never mind cooperate. In the case of number portability, competitors need to cooperate to accomplish the porting

process. The degree to which the operators cooperate has a direct correlation to the reliability and overall porting speeds. Although two operators may be competitors, there is incentive to cooperate – the DO assisting the RO in porting a subscriber will benefit next time the roles are reversed. Furthermore, two cooperating competitors can decrease the cost of porting for both operators. This cooperation includes agreement on the forms to be exchanged, the method and protocol to be used for the exchange, timeframes for acknowledgement of the requests and responses, information to be used to validate the port request, valid reasons for rejection, hours / days of the week and holiday schedule to be observed in the porting process, etc. The need for cooperation is obvious – the degree to which competing operators agree to cooperate varies greatly by country, and even among operators within a single country. However, we have observed that those operators most willing to cooperate find that their ports go through quickly and reliably, resulting in a better porting experience for the subscriber.

Step Three: Network Routing Schemes--After the IOC process has been completed and the port is in effect, calls made to the ported number must be re-routed – i.e. an incoming call must find its way to the RO. The routing information used prior to the implementation of porting would route the call to where it always went – the DO. Although there are many variations and hybrids, routing of incoming calls in a ported environment can be categorized into three basic methodologies or schemes:

- Onward Routing (OR)
- Query on Release (QoR)
- All Call Query (ACQ)

(i) (**EVOLVING**) – original comment

a. *The porting process.*

1) Requesting to port a number - When a consumer contacts a new service provider and makes a request for phone service, the consumer can indicate that they are switching phone service from a current provider and that they want to keep the same telephone number. Transferring the phone number between the service providers requires a string of complex events and coordination to take place between the old service provider, the new service provider, the centralized clearinghouse, and all fixed, mobile, and regional or long-distance network operators that need to route calls to the ported phone number. Requesting the port is as simple as a consumer telling the new service provider that he/she wants to keep your same phone

number, and then providing basic customer information that allows the old service provider to verify that the requestor is the customer assigned to that phone number. The consumer should be asked to provide identifying information such as the name that appears on the old account, the old account number, and the address associated with the old account. The new service provider will need the identity and billing information normally required to set up a new account.

2) Verifying the ability to port - The new and old service providers involved in the number port first communicate to perform an "approval process" on the customer information and the capability to port the telephone number. In the US, although the wireless porting standard requires the entire porting process to be completed in 2.5 hours, only the first 30 minutes of that time is allocated to the approval phase. If all of the information is correct, the old service provider must allow the port to occur. However, if some of the information in the port request does not match their information for the customer, then the old service provider can indicate that there is a complication, and that the information needs to be corrected or the discrepancy resolved before the port can occur.

3) Implementing the port - After the port has been approved, the new and old service providers electronically communicate with the Central Clearinghouse to synchronize when the calls will stop being routed to the old service provider and will start being routed to the new service provider. The Central Clearinghouse also sends out the new routing information to all service providers that may need to route a call to the phone number. This is generally all of the local service providers in the area where the new service provider resides, all long-distance service providers, and all wireless service providers. The service providers have guidelines for how long they can take to set up their telephone network to route the calls to the new provider. However, the change in call routing can occur any time within the maximum time period specified by MCMC.

4) Cross-over period - After the port has been communicated between the old and new service providers, the Central Clearinghouse broadcasts a message to all service providers with the new call routing information. Each service provider is then responsible for updating their network to route the calls to the new phone. The reconfiguration of the network equipment by all of the service providers does not occur at exactly the same time. This leads to a crossover period, with the possibility that calls to the phone number may be sent to the old phone or to the new phone while the phone network is being

reconfigured. For example, a long distance call may go to the new phone, while a call from a different location or from a different network may get delivered to the old phone. For wireless to wireless number ports, the cross over period should last no more than a few hours under typical conditions. It is important to note that the cross-over period only has the potential to impact incoming calls. Once the new phone has been set up to initiate a call it will still be able to make outgoing calls during the cross-over period.

5) Porting previously disconnected phone numbers - Many service providers will put a hold on a phone number after a customer cancels the service associated with that number. During the hold period, the service provider does not assign the phone number to a different customer. The reasons for doing this include:

- Preventing a new customer from being given a phone number that is still getting calls for a prior owner
- Enabling a customer to change his or her mind and re-establish service
- Allowing the service provider to have an automated message associated with the phone number that states the number has been disconnected or changed to a different number.

Consumers should be aware that they lose control of the number when they cancel their service, and that they will not be able to port a number they have previously cancelled.

There are two basic approaches that exist:

One Stop - Subscriber approaches the new Service Provider to request the port. Advantages are: (i) subscriber needs to deal with the new Service Provider and (ii) Shorter Process. Disadvantages are (i) Requires validation of subscriber information between old and new Service Providers

Two Stop - Subscriber approaches the old Service Provider to get authorization for the port and then the subscriber approaches the new Service Provider with the authorization. Advantages are (i) Subscriber information does not need to be validated by the new Service Provider. Disadvantages are (i) Lengthy process and (ii) Old Service Provider may hassle the subscriber or delay the port process.

b. A very short porting process time would make this impractical.

(j) **(FP)** – original comment

(a) The porting process appears over simplified. Needs to be expanded in the MCMC Guidelines on MNP, so that there is uniformity in the application of the process by all operators including the 3rd party clearing houses.

(b) The Donor operator should be allowed to coax its customers to remain on its network until such time the porting process is completed. Having it any other way will defeat the right of the customer to change his mind provided that the agreed porting fee is paid by the customer when he orders a port. Indeed this porting fee may well be rebated by the Donor operator as an inducement to stay apart other incentives.

(k) (**ML**) – original comment

(a) ML believes that the outlined porting process is acceptable for postpaid subscribers as their portability status e.g. payment status etc, has to be determined by their current mobile operator. However, this would be clearly unnecessary for prepaid mobile subscribers, thus ML's recommendation of a simpler and shorter porting process which is more in the hands of the subscribers.

(b) ML believes that it is better NOT to have the current mobile operator of a subscriber who has initiate a porting request to contact the subscriber until AFTER the port has been completed. This is to avoid any potential unpleasant experience by consumers.

3.4.2 The MCMC's views

The MCMC welcomes the comments made to these two questions.

The MCMC acknowledges that the porting process details will be finalized in conjunction with the industry. This will be carried out as one of the processes during the implementation phase.

We note the comments made especially in relation to perceived legal positions but the MCMC is of the opinion that no contact should be made with the customer after they have decided to port in an attempt to retain them as a customer during the porting process.

3.5 Comments on the Porting Cost

There are several cost-related elements that can act as disincentives to subscriber porting:

- Port fees imposed on subscribers
- Length of contract (postpaid)
- Retailers discouraging consumers for reasons of commissions

The Public Inquiry Paper sought views on:

Question 4.6 in the Public Inquiry Paper

MCMC seeks comments on the following issues:

- a. MCMC is considering implementing a porting fee payable by the customer of RM10 each time they port from one service provider to another.
- b. MCMC seeks views on whether or not operators should be allowed to offer incentives to potential customers for porting from one service provider to another.
- c. MCMC seeks views on whether a minimum contact duration should be applied by service providers for new customers. If a minimum contract period should be applied MCMC are considering a maximum period for the contract period of 12 months.

3.5.1 Comments received

Summarized below are comments received on the issue regarding the porting cost:

(a) (**MAXIS**) – original comment

Question 4.6a: We agree that any porting fee should be reasonable – and RM 10 sounds reasonable on the surface. However, we cannot yet assess whether this amount and charging mechanism are appropriate. We believe the porting fees should cover, to a large extent, the cost of operating the industry-wide MNP system and the administrative per-line set-up costs to ensure self-sustainability of MNP operations. Hence, further economic analysis should be done to determine an economic framework and required fee structure (see response to question 8.2.1 below).

Moreover, if this charging model was to be pursued, we suggest differentiated charges for the first and subsequent porting. The first

porting should cost a reasonable/nominal amount and any subsequent porting should be charged at a higher amount to pre-empt continuous cycling of customers to take advantage of just any new operator offer. Maxis believes that an amount of up to RM 20-30 for the first porting will be seen by customers as reasonable. Subsequent porting should be charged at RM 50. However, we also recommend that customers can 'return' to their original operator within 15 days at no charge, if they discover that the new operator does not meet their needs.

Preferably, we recommend that the MCMC considers both a nominal porting fee (e.g., RM 10) and a monthly "MNP fee" that is levied on all subscribers, e.g., RM 1 per month. This model recovers both some of the operating cost of the central clearinghouse and the operators' administrative costs associated with porting. Most importantly, it recognizes that all customers benefit from MNP (i.e., through better network quality and customer service across the operators). The "MNP fee" model has been successfully applied in the UK and the US. We believe an amount of RM 1-3 per month would be acceptable to Malaysian consumers (including prepaid) – and ensure both alignment of cost with consumer benefits and self-sustainability of MNP. Maxis prefers the application of such a model over the currently proposed approach.

Question 4.6b: Incentives are in the interest of customers and should, as a matter of principle, not be discouraged and left to the self-regulation of the industry. However, as outlined above, we are asking MCMC to provide a framework with the objective of pre-empting overly aggressive tactics by operators. For example, Korea and Finland have prohibited handset subsidies as a means to attract customers. This has safeguarded industry profitability and ensured sufficient cash flows to fund other long-term investments (such as 3G, broadband, and USP). Moreover, as Finland demonstrates, it has not halted the level of porting.

Given the already intense price competition in the Malaysian market – and the fact that MNP (and the potential entry of a 4th 3G operator and MVNOs) will further heighten this price war, it is critical for MCMC to develop a framework of industry health and sustainability. Otherwise, there is a risk that the industry goes back to the relatively poor service levels and innovation rates before consolidation.

The potential EBITDA impact of handset subsidies underscores the seriousness of this issue: assuming subsidies of RM 500 (25-40% of phone value used by high value customers) to 20% of Maxis' customer

base (50% of post-paid and 15% of prepaid base), would result in an EBITDA erosion for Maxis by 12-15 percentage points. We believe this is conservative and, in reality, much higher handset subsidies will be offered.² Hence, we anticipate a potential EBITDA erosion of up to 20-25 percentage points. This would severely impact the industry's ability to reinvest in the improvement of customer service and the rollout of future products and services. Therefore, we urge the MCMC to follow the examples of other countries and implement such a framework.³

Question 4.6c: To answer this question, one needs to consider the overall framework and economic impact of incentives provided by the operators. A contract period suggests that operators are providing special incentives that are economical only if customers stay for a certain period. If operators are not allowed to provide incentives to customers for porting, then obviously any contract period is counterproductive to the government's MNP objectives. If incentives are allowed, then the contract period should permit operators to recover the provided incentives.

For example, if operators were to introduce very high handset subsidies (e.g., >60/70% of handset prices), then a limitation of a contract period could seriously affect the operators' economics (e.g., if an operator subsidizes 75% of a RM 2,000 handset, customer needs to generate a minimum ARPU of RM 125 to just break-even within 12 months, not counting any other porting incentives or costs). Hence, stipulating any maximum contract period is only advisable once the framework for handset subsidies and incentives is crystallized. As argued above, Maxis' suggestion is to consider limiting handset subsidies in the interest of safeguarding overall industry economics during MNP introduction. If this was the case, a contract period of 12 months seems sufficient to recover any other incentives provided.⁴

² For example, the initial handset subsidies of RM 400 for 3G were not seen as sufficient by customers to drive up early migration.

³ It will be important to distinguish between incentives for consumers and enterprise customers. For enterprise customers, operators are typically selling bundled offers (across fixed, mobile and data), where it would be impractical to forestall any type of incentives. Moreover, limited handset subsidies might be acceptable for special promotions upon introduction of device dependent services such as 3G, Blackberry or push-to-talk.

⁴ In any case, contract periods for prepaid customers, which are the bulk of the market, are difficult to create and enforce. Prepaid registration will make it easier, but we only foresee contracts emerging for prepaid, if major handset subsidies will be introduced and allowed.

(b) (**CELCOM**) – original comment

Celcom notes the indicative list of sample countries and their related porting charges set out in Section 4.6 of the Public Inquiry Paper. This list is disproportionately weighted to Scandinavian markets that are characterised by industry dynamics than is the case in Malaysia. A more comprehensive range of porting costs is provided in Figure 3 on next page. Recognising the substantial costs for establishing MNP systems and In line with the broader international benchmarks and the set out below, Celcom proposes a porting fee of RM75 to be paid by the customer to the recipient operator. The porting fee should be mandated as an upfront customer cash cost rather than allowing operators to fund or subsidise this component. This approach would assist in preventing unsuitable customer switching practices that would distort industry churn.

Half of the amount to be remitted to the donor operator will represent part of the administrative cost incurred. The amount of fee will depend on recurring operating cost and additional resources required associated to it. For the operators, it has been noted that the impact of this will be an increase in operating expenses by at least 10 percent.

Figure 3: It is appropriate that porting fees in Malaysia need to reflect the underlying costs of implementation and international norms

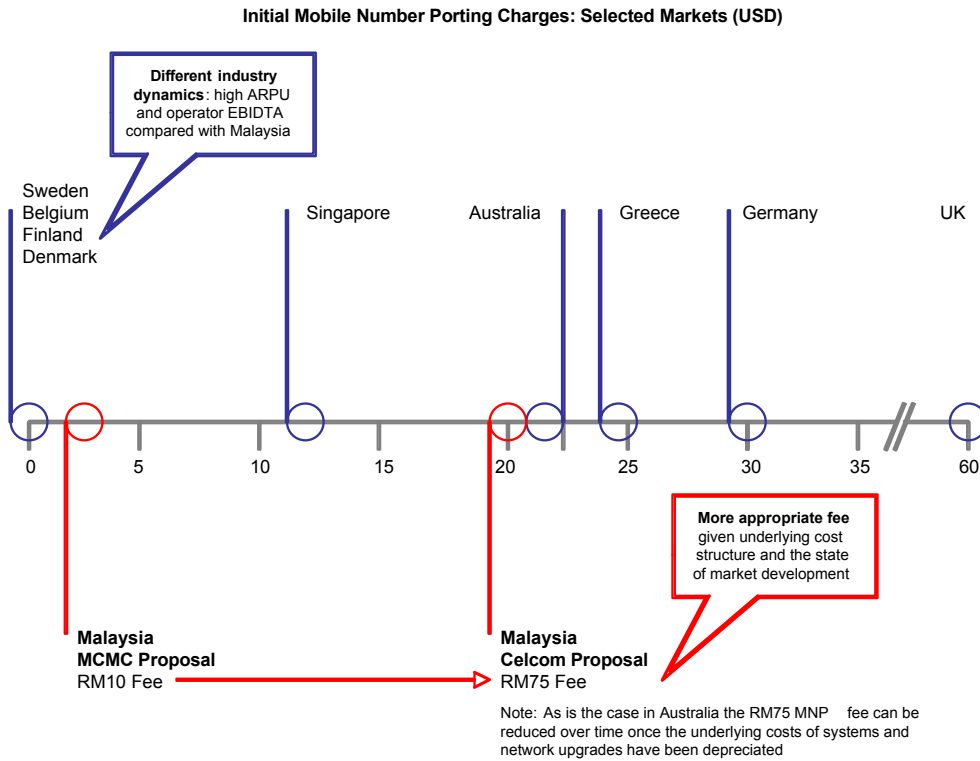


Figure 3

Celcom strongly recommends that the MCMC should not permit operators to offer incentives to potential customers for porting numbers. Under the right circumstances, MNP can be considered as a means to assist competition and should not be encouraged as an end in itself. It should be noted that the incentives offered to dealers in Hong Kong to encourage subscribers to shift networks promoted irrational market behaviour and led to churn rates in excess of 9 percent per month.⁵ In a Malaysian context, it can be expected that such incentives would trigger unhealthy price wars and result in unintended market distortions. Once again using Hong Kong as an indicative precedent, deep tariff competition where average tariffs were falling at a peak rate of 10 percent per quarter⁶, MNP has had a destructive impact on commercial rates of return reducing the margins that support network reinvestment. While may this is not a concern in a city market like Hong Kong in Malaysia there are important distinctions.

⁵ UBS, *Research Note: Is MNP the Next Y2K?*, Sydney 24 September 2001

⁶ UBS, *MNP Rise Confirms Tariff War Start*, Hong Kong 14 April 2003

Further to the proposed introduction of a 'cooling off' period highlighted earlier in this submission, Celcom considers that within one month after number porting, customers should be allowed to port back to the donor operator. This would provide enough opportunity for customers to make the appropriate service comparisons (product, customer support, value added products etc). If the customer decides to return to the donor operator, they may apply to do so within that one month period. After the initial month, customers should be under a minimum of 12 months contract with the recipient operator reflecting the administrative and financial resources that have been committed to execute the number porting. These 12 month contracts should be applicable to both post-paid and pre-paid customers.

(c) (**DIGI**) – original comment

- a) It is important to impose a porting fee to discourage indiscriminate porting and for network operators to recover costs involved. Nevertheless the porting fee charged should not hinder customers from switching networks. DiGi proposes a non-refundable porting fee of between RM10 to RM25.
- b) No incentives other than what is offered to any existing customer should be given to prevent poaching of customers and unnecessary price war among the operators. Operators should be strictly prohibited from offering additional/hidden incentives to encourage porting.
- c) It would seem practical if a certain minimum contract period could be imposed to prevent undue interruption to operations by "bargain hunters". However DiGi is of the opinion that any such measures could undermine the objectives of the implementing MNP. It would be seen as unfriendly to customers and in contradiction of MNP objectives.

(d) (**TM**) – no comment

(e) (**TIME**) – original comment

MCMC is considering a maximum period for the contract period of 12 months to be applied by service providers for new customers. TIME is agreeable to a minimum contract period of 12 months as this will give the opportunity to cover costs incurred in accommodating MNP especially those that is related to customer billing which will require additional processing facilities.

(f) (**REDTONE**) – original comment

Porting Fee of RM10 - We are of the opinion that a sum of money needs to be paid by the subscriber to cover administration and other ancillary costs associated with porting the number. There is however a delicate balance where the need to make the cost low enough so as not to create a “barrier” to porting is to be weighed against the actual cost incurred by operators in porting the number. It is also important to note that the porting fee should also be a deterrent to subscribers from abusing the system by porting too often. We therefore agree with the Commission’s view of a porting fee of RM10.

Incentives for porting - Incentives offered by operators purely for porting should not be encouraged. On the contrary, operators should be encouraged to compete based on quality of service, innovate product packaging as well as branding, whereby the implementation of MNP acts facilitator by removing a barrier to switch. Incentives can be offered as part and parcel of “customer acquisition costs” but specifically targeting subscribers of a particular network to port can be destructive in the long run. We believe that this can be the case due to the fact that a targeted campaign may not raise the overall level of service in terms of quality and packaging and might trigger a tit-for-tat response from the Donor Operator which may not be healthy.

Minimum contract duration - Minimum contract duration is acceptable as long as it is the same or similar to the normal packages. The cost of handset subsidization, for example, is recovered in this manner. What we believe is objectionable is that the tie-in is implement as a direct result of porting which has the potential of being abused by unnecessarily tying in the subscriber, restricting his right to choose. As a general rule, the maximum period for the contract period should not be more than 12 months.

(g) (**NEUSTAR**) – original comment

Question 4.6.a - As stated in section 4.6 of the Public Inquiry Paper, the MCMC does not want to impose or to grant carriers the ability to impose cost-related elements that can act as disincentives to subscriber porting through: 1) unreasonably high port fees imposed on subscribers, or; 2) length of contract (postpaid), nor; 3) unreasonable retailer commissions. MCMC understands that there must be a fair and equitable way for the mobile carriers to recover their costs associated with MNP.

Note: In Taiwan, a one-time portability fee is paid by the subscriber to the losing operator. However, the regulator (DGT) has set up a cap for this fee.

Question 4.6.b - It would be our suggestion that a determination as to whether or not operators should be allowed to offer incentives to potential customer for porting from one service provider to another should be based on market driven dynamics.

We would like to note that based on our observation of the wireless industry since introduction of NP, consumers have benefited greatly in terms of service and function features now included in many operators that are being offered in various packages that act as incentives to attract new subscribers.

Question 4.6.c - It would be our suggestion that a determination as to whether a minimum contract duration should be applied by service providers for new customers should be based on discussions between regulators and the industry.

(h) (**SYNIVERSE**) – original comment

In evaluating the methodology of cost recovery, many options are available to Malaysia and operators to select. Concerning question 4.6a, when subscribers are directly charged to port their number, this methodology can apply to operators recovering their administrative setup costs associated with each port. It is our assumption that the fee in question is being suggested to address this specific cost component. In a Recipient initiated porting scenario, the fee is easily collected by the Recipient and usually shared with the Donor to reimburse them for their incurred administrative costs. It should be noted, that while regulated in various countries in this manner, the Recipient may elect to waive the porting fee as an incentive to the new subscriber to port into their network. For example, in the US, UK and Finland, subscribers are not charged to port their number. However, they may still have responsibility to reimburse the Donor should the porting fee be waived. This is the case in Finland. Regarding the evaluation of a RM10 base charge, the first step is in an understanding of operator average incremental costs to administer each port. This charge is specifically asked of operators in question 8.2. To fully understand the range limits of the RM10 price, Syniverse suggests comparison of the base to the operator feedback from 8.2 to determine the soundness. Please keep in mind that a straight cost-based charge can lead to inefficient low levels of actual porting should this be above what subscribers are willing to pay. To safeguard, Syniverse also suggests

an evaluation of the Malaysian propensity to pay the base charge to ensure it is in alignment with localized economics. There are additional elements in evaluating cost recovery methods for consideration. This includes the recovery of the fixed costs incurred by operators to modify back-office OSS, other business systems and the clearinghouse to accommodate number portability. As listed above, choices are available to recover these costs with associated pros/cons. For example, in the United States, a small monthly fee is assessed to all subscribers as a cost recovery method. In the case of fixed line, this fee is regulated by the FCC in the form of a tariff. The underlying premise with respect to number portability is that ALL subscribers will benefit in the form of better service, network coverage and other associated benefits of number portability. Therefore, ALL subscribers could be charged for these benefits. Syniverse further addresses cost and recovery mechanisms in question 8.4.

It is noted however, Syniverse regards 4.6b and 4.6c to be complimentary in nature. Please allow us to expand upon this. Keeping with free market principals, operators should be permitted to offer incentives specifically to porting customers. In this environment, they will make this decision based upon the costs and benefits of their business case. The revenue projection from the incremental subscribers will be compared to incentive costs such as free minutes, reduced pricing plans, new handsets or others. If they project sufficient numbers of new subscribers, only then will operators move forward with any incentive. A minimum contract period of 12 months in the terms and conditions could assist in the operator pay-back financial analysis. Additionally, the effects 4.6b and 4.6c in terms of porting volumes may offset each other. For example incentives directed at targeted subscribers will increase port take rates. However, in contrast, contract terms generally reduce porting as they are typically tied to an early termination fee. By the operator tying both into an overall marketing strategy, the subscriber will evaluate if the incentive warrants being locked-in for 12 months thereby theoretically balancing these two variables.

(i) (**EVOLVING**) – original comment

a. International experience indicates that any consumer fee associated with the porting process is viewed as a punitive fee and becomes a disincentive to use the capability, leading to low adoption rates. Where no consumer transaction fee is charged, adoption rates tend to be higher, leading to more competition, driving operators to compete more fully on price and quality. As operators compete on price and

quality all consumers benefit, not just those exercising the right to port. Therefore, it seems justifiable that the costs associated with the benefit should be borne by all consumers in the form of general network infrastructure costs.

b. From a consumer perspective, operators should be allowed to do that. For example, one of the current practices of banks in Malaysia is to offer new credit card customers with incentives such as balance transfer with low or zero interest rates.

c. Leaving the choice of whether or not to impose minimum contract durations to individual service providers is most likely to produce a mix of consumer-oriented offerings. We expect that the outcome will be that mobile operators will adopt some plans that include term commitments in exchange for other favorable terms such as hand-set subsidies. Consumers will be responsible for settlement on the term contract if they terminate early, and some operators may offer to cover the settlement fees in exchange for extended contract terms. All of this will allow market forces to favor those products and packages that are best, over all, for the consumers.

(j) **(FP)** – original comment

(a) No basis has been offered for imposing the RM10 fee for the porting. The comparison table of 6 countries shows that 4 of them do NOT charge for porting. However, we are in favour of a fee being imposed so that a conscious decision is made before a subscriber decides to port. This fee should be reviewed by the MCMC after 2 years to adjust to market conditions.

(b) In a competitive market, operators should have the liberty to offer incentives to potential customers to port to their service and for operators to offer similar incentives to retain a customer, provided none of this conduct infringes any of the competition provisions in Part IV Chapter 2 of the CMA.

(k) **(ML)** – original comment

(a) ML believes that the recommended porting fee of RM10 is reasonable to prevent frivolous porting by consumers.

(b) ML believes that the operators should be allowed a free hand to compete in the marketplace and that includes the ability to induce

porting from other mobile operators as well as to win back previous customers who have ported out.

(c) ML believes that there should not be too much constraint on the consumers regarding porting and the above porting fee should be sufficient to serve as a deterrent of frivolous porting by consumers. Furthermore, in the prepaid segment, there is no concept of contract period at all. In other words, the subscribers may just choose to let the prepaid numbers lapse by just not topping up when their account balances are used up.

3.5.2 The MCMC's views

The MCMC welcomes the views expressed by the respondents.

The MCMC sees any high porting fee as a disincentive to port therefore will not generate the competition desired by the MCMC.

Based on the industry response, MCMC believes that the service providers should be allowed to set their own fee up to a maximum of RM25.

We note the comments concerning incentives. The MCMC believes that service providers should be allowed to offer incentives to change service provider generally in line with today's current incentives.

The MCMC notes the comments concerning minimum contract periods and believes that it is for each service provider to decide if they wish to impose a minimum contract but the MCMC would limit this to a maximum 12 months.

3.6 Comments on the centralized clearinghouse approach

MCMC recommends a centralized clearinghouse approach that utilizes a centralized national number portability database to respond to queries from any network.

The Public Inquiry Paper sought views on:

Question 5.5 in the Public Inquiry Paper

MCMC seeks comment on a centralized clearinghouse approach that utilizes a centralized national number portability database to respond to queries from any network.

3.6.1 Comments received

Summarized below are comments received on the issue regarding the centralized clearinghouse approach:

(a) (**MAXIS**) – original comment

Maxis is in full agreement with the proposed approach of establishing a centralized clearinghouse that utilizes a centralized reference database. The database is the core of the number portability system. A central database with fully automated porting processes has clear advantages in terms of process efficiency, overall cost effectiveness, fairness to operators, data accuracy and regular updates, fraud prevention and verification of outstanding or contractual obligations.⁷

Critical will be to select a system that has minimal impact on cost and required upgrades to the OSSs and networks of the operators, and on customers. Ideal would be to have a single solution across the database and the operators' systems. MCMC should work very closely with all operators in deciding on the most appropriate system and trying to establish a single solution. For example, we would request MCMC to involve all operators in the tender evaluation process and

⁷ Whether reference databases should be kept at the operators, will depend on the proposed charging mechanism for the database manager. Maxis will not be supportive of a charge that is related to database queries (which will incur for every call). Such charging mechanism would not be based on porting cost origination, escalate costs to operators, and not foster performance by the database manager (see also response to question 8.2.1 below).

provide their feedback on proposed solutions and vendors to MCMC for consideration. MCMC should also ensure that a roll-back option to the current configuration is being maintained, in case severe problems emerge upon MNP implementation.

(b) (**CELCOM**) – original comment

Celcom does not agree with the establishment of a centralised number portability database and does not consider that this approach would present any real advantages relative to call forwarding arrangements. International evidence does not provide any indication that competition will be enhanced through the adoption of a centralised database, with switching rates generally independent of the technical solution used to support MNP. Countries such as Germany and the Netherlands that have adopted centralised database arrangements do not have any clear advantage over the rate of MNP take-up for markets such as the UK and Singapore that use call forwarding. The technical solution used to provide MNP does not have a bearing on the rates of switching, it merely facilitates it. As a representative of Ovum has noted: 'the option to port one's number is a bonus rather than a reason to churn.'⁸

In addition to the above, Celcom believes that there are various problems or shortcomings associated with the adoption of a third party clearinghouse arrangement:

- This approach represents an expensive option and imposes several categories of additional costs, including system wide and operator specific charges, per line set up expenses and call conveyance costs;
- Such arrangements are complicated and require a high degree of standardisation and interaction across different networks;
- Centralised databases impose additional regulatory requirements given that such facilities represent the core of MNP processing and will need a high level of additional oversight to ensure the performance and integrity of the system; and
- A centralised database provides a single point of failure, with financial or technical disruptions having implications for the entire MNP process.

⁸ The Economist, *Much Ado About Porting*, London 27 November 2003

Celcom's view is that the costs associated with the adoption of a centralised database are likely to exceed the benefits, if any. The MCMC has requested comments on the likely cost estimates for implementing a centralised database approach in Section 8 of the Public Inquiry Paper. Celcom welcomes the MCMC's concern about possible cost implications. Consistent with global best practice, a detailed cost and benefit analysis will be required to substantiate the need to implement a centralised database and will ensure that any decision taken in this regard is founded on a strong evidentiary basis.

(c) (**DIGI**) – original comment

DiGi favours the centralised clearinghouse (CCH) approach which utilises a centralised national number portability database, which is evidently the most favoured approach to managing data associated with ported mobile numbers that are shared amongst network operators.

This approach involves a single reference database containing data for all ported mobile numbers. It is usual for this reference data to be copied to operational databases in each participating network on a frequent basis. The actual operation and maintenance of the CCH and centralised number database may be out-sourced to a third party company which has experience in database operations but generally it is owned and managed by a consortium of network operators, which may comprise just the mobile network operators or all network operators which may be involved in routing of calls to mobile numbers.

DiGi together with other Celcos agree that the 'hybrid' model (per section 5.2.3. of the PI paper) is preferred i.e. CCH incorporating the central database as main repository of ported numbers in conjunction with operators' local database or Flexible Number Register (FNR). (Figure 1)

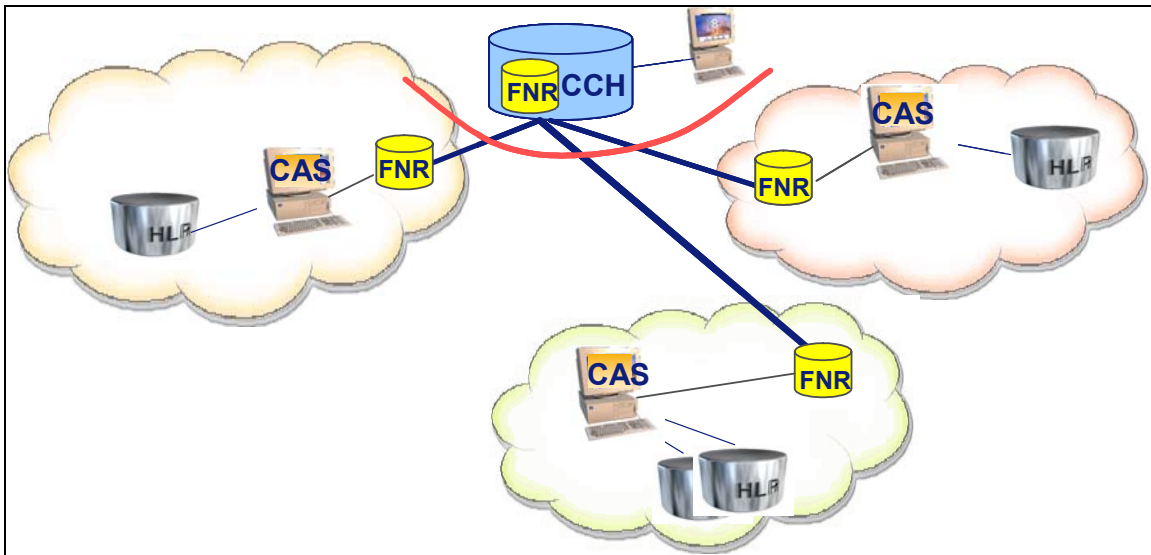


Figure 1 - Hybrid Model with FNR at CCH and each Celco

In the event of a new entrant into the industry, the consortium would consider allowing them to participate as a stakeholder or for them to utilise the service of the CCH as a customer.

(d) **(TM)** – original comment

TM does not consider that the establishment of a centralised number portability database would present any real advantages relative to call forwarding arrangements. Given that switching rates are generally independent of the technical solution used to support MNP, there is no international evidence that provides any indication that competition will be enhanced through the adoption of a centralised database. In fact, countries such as Germany and the Netherlands that have adopted centralised database arrangements do not have any clear advantage over the rate of MNP take-up for markets such as the UK and Singapore that use call forwarding. This is because the technical solution used to provide MNP does not have a bearing on the rates of switching, it merely facilitates it. In addition, we consider that:

- Such arrangements are complicated and require a high degree of standardization and interaction across different networks;
- Centralised databases impose additional regulatory requirements given that such facilities represent the core of MNP processing and will need a high level of additional oversight to ensure the performance and integrity of the system and

- A centralised database provides a single point of failure with financial or technical disruptions having implications for the entire MNP process.

(e) (**TIME**) – original comment

TIME agrees with the centralized clearinghouse approach as long as it is efficient to the MNP implementation and it will be more cost efficient to small fixed-line service operator, which only provide interconnectivity and connections to the industry.

(f) (**REDTONE**) – original comment

We agree with the Commissions proposal for a centralized clearinghouse approach. A centralized approach will ensure that there will be a single source of data and on the same set of rules and protocols which we believe would make it administratively simpler to manage and also reduce overall cost of implementation, operations and maintenance.

(g) (**NEUSTAR**) – original comment

Having the centralized clearinghouse manage the porting events, also supports the concept of a centralized NPDB that can be used to respond to queries from any operator who needs routing information. The centralized NPDB approach can greatly simplify the NP operation since this eliminates any need to broadcast the NPAC DB changes to the operators. A centralized DB that is shared by the mobile operators and others would remove mobile operators' need to deploy the NPDB and receives the updates from the NP third party administrator.

The use of a centralized database architecture approach, managed and administered by a neutral third party, for number portability services has been successfully utilized commercially by US and Canadian fixed operators since 1998, and by US mobile operators since 2003. This technology is mature and has been adopted in many markets and Malaysia should be able to adopt the approach without a problem.

It should also be noted, that to facilitate subscriber competition, a well designed and operated centralized NP platform also enables operators to perform internal network/switch related operations, most cost effectively and with least service interruption to subscribers. For example, the centralized NP platform in the US, called Number Portability Administration Center (NPAC), has been used by operators to perform network/switch technology migrations (i.e.: TDMA to GSM, 2G to 3G), traffic engineering, load balancing, maintenance and

disaster recovery. In addition, the NPAC has also been used to manage Telephone numbers more efficiently (a.k.a “Number Pooling”) since 2001.

NeuStar would also like to point out that in addition to having a centralized database infrastructure for number portability; such infrastructure can also be expanded to support other common platform services, as well as other services and applications that can be leveraged on such infrastructure

Expansion of the centralized database infrastructure utilized for number portability can support numerous other common platform services. As noted below, there are directly related services that are currently sharing the centralized database infrastructure in the US, examples of which are noted below.

- **SMS/MMS Gateway and Exchange** that can process the inter-carrier SMS or MMS messages based on the centralized NP data and route the messages to the mobile operators that currently serve the destination phone numbers.
- **VoIP Gateway and Exchange** that can process the calls that are to be terminated from the IP domain to the current serving circuit-switched domain by using the centralized NP data to determine the fixed or mobile operators that currently serve the called phone numbers.

Although not directly related to NP (or make use of the centralized NP data), the NPAC infrastructure can be expanded to support other services since all the fixed and mobile operators are connected with the NPAC infrastructure. A few examples are described below.

- **Number Administration System**—The fixed and mobile operators can access the system to request for phone number resources or report their forecasted number resource usages and others. This system can be expanded to support number pooling administration.
- **Common Short Code Registry**—This system provides a web-based interface for the content/application providers to view, request, renew or cancel the common short codes and communicates with the mobile operators to approve the new common short code applications or report the status (e.g., conducting testing) of each of the approved common short code application that has not been activated for service.
- **Mobile Content Clearinghouse**—Mobile operators can share one mobile content platform that provides contents that are accessed by the mobile operators' customers. The mobile content platform can

support bulk messaging by sending SMS or MMS messages to all or selected mobile subscribers either periodically or one-time.

- **Emergency Notification System**—The system could be used to notify mobile users in a specific geographic area via an SMS message to all users or a specific group of users based on any perceived need. Example: Emergency broadcast of an emergency condition such as a tsunami that is imminent, immediately after an earthquake has been detected.

- **Disaster Recovery Planning**—Enables the ability to develop ad hoc or predefined disaster recovery plans for any specific purpose.

(h) (**SYNIVERSE**) – original comment

Please see comments below when considering the different options for a centralized clearinghouse approach utilizing a centralized NP database versus a hybrid approach that supports both a centralized NP database as well as distributed NP database.

Centralized Clearinghouse with Centralized NP Database--The use of a centralized clearinghouse with a centralized national number portability database has the advantage of providing a less expensive solution to the operators. In this approach, only the clearinghouse has to incur the cost of a high performance, highly redundant number portability SCP and database. The real-time accuracy of the data as well as the administration of the system is the responsibility of the clearinghouse. This approach eliminates any possibility that multiple number portability databases would become out of synch resulting in undeliverable calls to ported numbers.

Use of this method requires special consideration as to the reliability and location of the Clearinghouse, National Number Portability Database and supporting SCP. Both fault tolerant hardware and software, combined with geographic redundancy, must be provided by the clearinghouse to assure the 99.999% uptime necessary for such a critical application. The geographic redundancy must assure the primary and backup sites are located in areas that are physically secure to prevent both sites from being affected by any single catastrophic event.

While the centralized clearinghouse with a centralized national number portability database approach offers economies of scale, it can initially be met with concerns by operators. Some operators are unwilling to have the centralized database component of the clearinghouse, a

critical network component of call delivery, outside of their own network and not under their own control. A disadvantage of the central database is that it provides one logical point of failure. Failure of the Centralized National Number Portability Database for any reason would result in the catastrophic failure of the all call delivery when using the ACQ network routing approach. All operators would be totally dependent on the clearinghouse provider to completely and accurately recover from the failure. In larger networks, system capacity to handle the high call volumes also becomes a consideration. All operators will be competing for a single resource for call delivery. An unexpected peak in call volumes could result in system contention and a slow down or failure of call delivery for all operators. While this is certainly of concern in large environments, many smaller environments can benefit from the cost savings of a centralized database without any additional risk.

Another disadvantage of the centralized database approach is the elimination of an integrated STP/SCP configuration as an option for operators. This configuration reduces the need and cost for additional links and ports between the STP and the SCP.

Hybrid approach--In the hybrid approach, there is still a centralized clearinghouse and a centralized number portability database. In addition to these centralized features, operators who would prefer to maintain a complete copy of the number portability database can use the hybrid model. The hybrid model adds an optional distributable NP database.

This distributed NP database would allow the operator to receive updates from the same source as the centralized number portability database. This database is optional because operators, who due to cost or convenience, are able to use the centralized number portability database model. Ultimately, the hybrid model allows each operator to choose the approach that is preferred by the operator and not impose an all or none type of solution on the industry. The distributed database option of the hybrid model also includes a clearinghouse database that is not involved in real-time call processing. This database is designed to receive information from service providers, provide validation and distribute updates via the SCP to the distributed number portability databases. This database would normally maintain a history of all ported numbers, status of distributed database updates and the ability to provide complete database synchronization to the distributed databases. Normally the number portability service provider or clearinghouse manages this database.

The use of a distributed database option of the hybrid model requires the use of multiple SCP/Number portability databases either owned and managed by the operators or by a third-party vendor. The distributed databases can contain either a subset of the total data or a complete copy. The distributed model, with subsets of the data, is usually used in networks with high call volume. The databases are organized by some regional characteristic. The distributed architecture limits network hops between the STPs that are attempting to route the call and the SCP that has the routing information needed. An example of this would be having east and west distributed databases each housing the subset of numbers most likely to be used in that respective part of the country.

Distributed databases with a complete copy of the data could be located in each operators own network and maintained by the individual operator reducing out of network traffic. The most efficient model of this approach is the integrated STP/SCP platform with the STP and SCP co-located.

With the distributed model there is no single point of failure that can result in a catastrophic failure of all call delivery. Call volume loads are distributed by location in the distributed subset model or by operator in the total copy model. Operators who maintain a full copy of the number portability database have control of their own environments and are better able to assure the highest level of service to their customers. The distributed model has some disadvantages. Updates do not all take place at the same time and in extreme circumstances fail due to a system problem. Using this model can occasionally result in misrouted and failed call delivery. Additionally, economies of scale are not realized making a distributed model more expensive to operators.

(i) (**EVOLVING**) – no comment

(j) (**FP**) – original comment

This is the ideal setup. It is recommended to have two fully redundant databases in two physically separated data centers (e.g. Penang & Kuala Lumpur) to ensure 100% availability.

(k) (**ML**) – no comment

3.6.2 The MCMC's views

The MCMC welcomes the feedback from the respondents.

We note the concerns of Celcom and the comment that a centralized database will not enhance competition. A centralized database is being proposed as the most efficient management method for the industry and therefore the MCMC disagrees with this statement.

The MCMC notes that industry best practice is today to have a centralized database with many of the early adopters of number portability now looking to move from a call forwarding to a centralized database solution. Examples of such jurisdictions are UK, Singapore, France.

The MCMC believes in the creation of a Centralised National Number Portability Database.

The advantages of a National Number Portability Database are:

1. Synchronization between the notification by the customer that the number is being ported and availability of that information to the operator networks. There is no opportunity for databases in different networks to be misaligned.
2. Low delay in updating the National Number Portability Database.
3. No separate database administration in each operator network.
4. The National Number Portability Database can be readily expanded to support other national services such as carrier pre-selection, emerging IP-based services, and ENUM.

3.7 Comments on the third party clearinghouse

MCMC will oversee the establishment of the clearinghouse owned, managed and operated by a third party.

The Public Inquiry Paper sought views on:

Question 5.5.1 in the Public Inquiry Paper

The MCMC seeks comment on the establishment of a third party clearinghouse to facilitate efficient implementation of mobile number portability in Malaysia.

3.7.1 Comments received

Summarized below are comments received on the issue regarding the third party clearinghouse:

(a) (**MAXIS**) – original comment

In principle, Maxis is in agreement that the clearinghouse should be managed by a third party. We are, however, concerned about choosing the right, capable partner for this task. Operating the clearinghouse is a complex task and the manager's performance will be a key driver of MNP success in Malaysia. We, therefore, recommend choosing an established MNP and/or IT solution provider with a verifiable track record of implementing similar MNP systems in other countries. Operators should be involved in the capability assessment during the tender process. We do not recommend using any newly established or inexperienced IT company. Regarding ownership, we recommend that the mobile network operators will be equal shareholders of the clearinghouse. This will drive performance of the manager and ensure stringent cost control and cost minimization. MCMC should act as chair end ensure proper governance and oversee both industry and consumer interests. As experiences in other countries have shown, we do not foresee any management conflicts arising from the fact that the operators are shareholders. We recognize that MCMC seems concerned about the impact of further consolidation on the effectiveness of the database. We believe, however, that this would be negligible, as the database manager continues to be independent and the MCMC remains as chair to safeguard consumer interests.

(b) (**CELCOM**) – original comment

In addition to the comments provided above in relation to the shortcomings of a centralised database, the operation of such a facility by a third party presents another layer of operational problems. Should the MCMC decide to implement a third party clearinghouse system, Celcom strongly recommends that this be owned and operated by industry. Joint industry participation means a high degree of transparency to those operators who will be dependent on the clearinghouse. In particular, Celcom would like to raise the following potential concerns if the third party is not a representative industry grouping:

- There is no guarantee of the required level of telecommunications experience and capability necessary for the effective operation of a nation-wide MNP system;
- The clearinghouse would represent a monopoly asset and would be able to charge fees and generate profits in a manner inconsistent with underlying costs (in contrast with industry ownership that would ensure lower costs and better outcomes for consumers);
- If the clearing house is to be operated by a third party, Celcom recommends that it should be a collaborative joint industry effort and not run for profit making interests; and
- A third party would have no vested interest in the efficient operation of the clearinghouse. Although possibly subject to a SLA, there is no clear indication how potential damages would be recoverable if the company is a start-up venture without significant assets.

It is proposed that a representative working group from industry be established to address these complex technical and operational matters. It should be noted that the implementation of such arrangements have significantly delayed the introduction in other jurisdictions. In Ireland for example, the Mobile Number Portability Committee have attributed delays to the 'numerous system upgrades required to support MNP and the difficulties encountered in commercial negotiations for access to the central database.⁹ Further, SingTel

⁹ Commission for Communications Regulation, *Information Notice: Mobile Number Portability Implementation Timescales*, January 2003

estimated that the implementation of a centralised database system to take 'approximately 24 months.'¹⁰

(c) (**DIGI**) – original comment

The most essential consideration is to keep costs and charges low whilst promoting efficiency thus a third party ownership of the centralised database is not favourable. We submit that the Centralized Clearing House (CCH) should be jointly owned by the operators in a consortium to ensure efficiency.

(d) (**TM**) – original comment

TM considers there are various problems with the establishment of a third party clearinghouse to facilitate the implementation of MNP in Malaysia arrangement including inter alia:

- There is no guarantee of the required level of telecommunications experience and capability necessary for the effective operation of nation-wide MNP system;
- The clearinghouse would represent a monopoly asset and would be able to charge fees and generate profits in a manner inconsistent with underlying costs (in contrast with industry ownership that would ensure lower costs and better outcomes for consumers); and
- A third party would have no vested interest in the efficient operation of the clearinghouse. Although possibly subject to a SLA, there is no clear indication how potential damages would be recoverable if the company is a startup venture without significant assets;

We propose that should the MCMC decide to implement a third party clearinghouse, that this clearinghouse be owned and operated by the industry given that joint industry participation means a high degree of transparency to those operators who will be *dependent on the* clearinghouse.

We would also that prior to any implementation of clearinghouse that the following issues must be addressed:

- Network security;
- Confidentiality of customers' information/profiles;

¹⁰ SingTel, *Public Consultation on the Review of Number Portability in Singapore*, Singapore 2005

- The clearinghouse is to be operated by a competent party who understands the mechanics of both fixed and mobile networks;
- Service level Agreement needs to be in place to ensure quality of service since the database becomes the focal point for a communication to take place; and
- Since the implementation of MNP would bring very little or no direct benefits to fixed line operator, it is proposed that any recurring transaction fee to the centralized database be waived, while compensation to be given for the cost incurred for the network conditioning on the fixed line network

In the case of OR-1, Hybrid and OR-2 approach favoured by TM, centralized databases are not required for the fixed network, and hence there is materially less implementation costs.

(e) (**TIME**) – original comment

If a third-party clearinghouse is to be established, the interconnect process between the fixed line operators and mobile service operators will need to be revised. TIME is agreeable to consider this option if proper costing can be conducted by MCMC and the same revealed to TIME. TIME will then conduct a cost benefit analysis before making any final commitment.

(f) (**REDTONE**) – original comment

We support the Commission's view that a third party clearinghouse be established to facilitate the implementation of MNP. However, we would like to further add that it is important the entity be independent of any one stakeholder to ensure transparency and fair play. We would also like to suggest a structure akin to that of Bursa Malaysia Berhad where stakeholders in the business have an interest in the bourse but the bourse as a whole is independent of any single party. We believe that the third party clearing house be also a non-profit organization maintained by the stakeholders to implement and manage MNP.

Our arguments to support this are that MNP is an agenda which is supposed to promote competition and there are strong elements of LTIE within its scope. We are of the opinion that making it a profit organization independent third party (not connected to the stakeholders at all) does bring issues especially with regards to the costs of porting. It is critical to the success of the MNP policy that porting should be easy, painless and affordable to the users, hence the cost element should be kept low. On another point, if a company runs

it as a profit organization suffers financial distress, how is this going to affect the operations of this policy as there are going to be very little incentive to see this through as oppose to operators who depend on the services to enable porting.

On another point, we also believe that it is important for the Commission to have a role in this organization to ensure that proper check and balance are in place. This is important for three important reasons :

- As was mentioned above, the implementation of MNP is a policy directive and has a wider scope that encompasses public interest (LTIE);
- To ensure fair play among the operators (amongst themselves) and also between operators and the parties providing the database services; and
- Due to the fact that numbers are a scarce national resource which is under the direct management of the Commission.

(g) (**NEUSTAR**) – original comment

NeuStar firmly believes that a third party clearinghouse approach employing a neutral administrator is the most fair and efficient option for all competing operators.

Given the highly competitive and diverse goals of the mobile industry's operators, it is a difficult challenge to ensure that all competing operators receive fair and even handed treatment, and that their customer data and all other confidential and sensitive information is not used in any unauthorized manner. Establishment of a neutral third party clearinghouse to facilitate efficient implementation and administration of mobile number portability in Malaysia ensures that all competing operators are treated in a fair and even-handed manner, and that their customer data and all other confidential and sensitive information is not shared with others.

Third Party Clearinghouse Advantages—The advantages of implementing a third party clearinghouse approach is the insurance that a “common platform” has been implemented, which reflects a single standardized service interface to support ordering, provisioning, and the notification process to all operators in a fair and evenhanded manner.

In addition, the third party clearinghouse provides operators with a master routing database which glues network and service inter-operation together. This “glue” enables switch routing information and network element identification to be kept in the centralized database,

which when queried by the operators, ensures full inter-operation of calls and telephone number related services of similar and disparate network types.

The third party clearinghouse also provides a technology neutral way of ensuring seamless service inter-operation between competing networks and their subscribers, now and in the future, and serves as the basis to expand to new and emerging technologies and service, e.g. IP telephony and WiFi, Fixed Wireless, etc.

Establishment of a neutral third party clearinghouse also offers additional benefits through this common industry approach in implementing number portability and managing the porting processes and information among the operators. Through oversight by the MCMC, Malaysia's operators will ensure that the third party clearinghouse records all the transactions exchanged between the losing and gaining operators, which can be used for auditing, reporting and especially for dispute resolutions. This third party clearinghouse approach offers:

- **Responsibility**—Establishes one entity with sole responsibility for managing, maintaining and administering a common, centralized number portability data base on behalf of industry and in accordance with industry specified standards of operation and service levels;
- **Neutrality**—Ability by industry, to conduct periodic reviews of the neutral third party administrator to ensure strict neutrality compliance, as established by industry consensus. By design, MNP administration is not adversely influenced by competitive pressures.
- **Auditability**—Given the contractual relationship between the neutral third party and the industry, this approach facilitates the overall management and oversight of the number portability administration function.

The third party clearinghouse approach has proven to be the most cost effective and efficient over time.

(h) (**SYNIVERSE**) – original comment

The clearinghouse should be maintained by a single third-party organization whose core competency includes the setup, administration and management of Number Portability managed service solutions. This enables the operators within Malaysia to focus on their core competency of providing superior voice and data services to their end-users. The responsibility of Syniverse would be to

technically and operationally maintain the clearinghouse service, ensuring that the information held within the database is accurate, and updated where necessary, whilst providing a level of availability appropriate to a telecommunications network. Additional responsibilities would include the facilitation of working groups and other interested parties to establish the operating business rules and procedures necessary to implement Number Portability. Many different business models can be selected with respect to system cost and recovery of those costs.

The Clearinghouse/Managed Service approach carries the following advantages:

- NP managed by an independent, neutral entity
- Security of cross-network information
- Independent audit of processes
- Independent dispute resolution
- Responsible to the Regulatory Authority
- Standardized API interface to Central System
- Assist Operators with back-office system integration
- Detailed Implementation/Project strategies coordinated with all operators
- An accurate central copy of the national database is maintained for reference by all operators

(i) (**EVOLVING**) – original comment

It is in the public interest for the number portability databases to be administered by one or more neutral third parties. The setup, administration and maintenance of the central database should be the responsibility of a neutral third party and responsible to MCMC. This should help to avoid conflict of interest issues and ensure an equitable solution. It will also facilitate the ability of local service providers to transfer new customers by ensuring open and efficient access for purposes of updating customer records.

A neutral third party administration of the carrier routing information also ensures the equal treatment of all carriers and avoids any appearance of impropriety or anti-competitive conduct. Such administration facilitates consumers' access to the public switched network by preventing any one carrier from interfering with interconnection to the database(s) or the processing of routing and customer information. It would thus ensure consistency of the data and interoperability of number portability facilities, thereby minimizing any anti-competitive impacts. An alternative approach is to have all

operators setting up a consortium operating the above. This ensures all operators to agree and fund changes before they are implemented. It takes a lot of effort, but has been shown to be successful.

(j) **(FP)** – original comment

On *database* options, again the PI Paper does not provide a comparative analysis of the various options that have been considered. Elements such as cost of setting up, effect on timing of a port, ease of routing, duplication of data, confidentiality of consumer data etc. need to be considered. In principle a centralised database approach appears to be the most attractive. If it is to be managed and operated by a 3rd party clearing house, than MCMC should exert a tight control of this entity. Issue arises whether it will be independent of all the operators or will it be jointly owned by the operators themselves. From a consumer perspective, the solution that addresses the concerns highlighted above, and one that imposes the least cost will be most welcome.

(k) **(ML)** – no comment

3.7.2 The MCMC's views

The MCMC welcomes the views expressed.

The MCMC believes that having a dedicated third party to manage the clearinghouse will allow the service providers to focus on their core activities of providing communication services to their customers.

The MCMC notes concerns about pricing and network security the MCMC is of the view that these matters will be adequately covered through service level agreements and by the fact that the clearinghouse may be licensed/certified by the MCMC with its charging structure approved by the MCMC.

The MCMC is of the view that the clearinghouse will be third party owned.

3.8 Comments on the All Call Query approach

The MCMC recommends an All Call Query approach for call routing.

The Public Inquiry Paper sought views on:

Question 5.6.6 in the Public Inquiry Paper

MCMC seeks comment on the All Call Query approach for call routing.

3.8.1 Comments received

Summarized below are comments received on the issue regarding the All Call Query approach:

(a) (**MAXIS**) – original comment

Maxis is supportive of the proposed all-call-query approach. The alternative options of call forwarding, drop-back, pivot and (n-1) routing have all significant challenges (despite some implementation and cost advantages). Maxis believes that the all-call-query approach is the most efficient, effective and fastest way to set up calls and differentiate call charges. It also has the least impact on interconnect cost. Obviously, the all-call-query approach is the most complex approach and depends on the capability and performance of the centralized database. This underpins the need for an efficient clearinghouse system and capable manager.

(b) (**CELCOM**) – original comment

Celcom notes that the MCMC has recommended an IN, or All Call Query approach for call routing. As indicated later in this submission, this represents the most expensive option and the substantial set-up and ongoing costs associated with IN platforms are not warranted in Malaysia given unproven consumer demand for MNP. In nearly all instances, customers will be completely unaware of the technical solution used to implement MNP, so the commercially pragmatic approach would be to dismiss All Call Query routing as a viable and sustainable option.

Celcom is concerned that the MCMC is making technical recommendations in the absence of any cost benefit analysis. In accordance with the principal of regulatory transparency, it would be inappropriate for the MCMC to direct operators to adopt technical

solutions if the costs of doing so outweigh the benefits. As such, Celcom is concerned about the MCMC's failure to identify a favourable cost benefit analysis as a precondition for the adoption of an All Call Query approach. As Vodafone has noted with respect to the introduction of MNP in Australia, '... our perspective is that it was regulator thinking rather than customer thinking. The bottom line is we spent \$50 million and nothing has changed. It hasn't been a success from a competition perspective.'¹¹

On this basis, it is recommended that the MCMC avoid mandating a technical solution without proper regard to the costs associated of doing so.

(c) (**DiGi**) – original comment

DiGi concurs that an All Call Query (ACQ) approach would ensure the best and most efficient call routing methodology. This would ensure all calls are routed directly to the Recipient Network operator and not the original operator's (Donor) network. In an ACQ arrangement, the originating network does not route calls to the Donor Network. In fact, once a number has been ported, the Donor Network ceases to be involved. The originating network queries a centralised database and the call is routed directly to the new network. For efficiency and network security we have proposed that network operators also maintain a local database of ported numbers which is synchronised with the central database held by the CCH on a daily basis. This arrangement enables the originating network to directly route the call to the new network without querying the central database on every single call.

(d) (**TM**) – original comment

TM acknowledged that ACQ approach is being adopted in many countries as being the most efficient and stable routing approach for MNP implementation. However, specifically for fixed line operators, this would involve a major exercise and significant investment is required in terms of CAPEX (note: cost of implementation is further discussed in Q7.1.5 and Q8.1). Furthermore from TM's understanding, All Call Query approach for call routing represents the most expensive option and the substantial set-up and ongoing costs associated with IN platforms are not warranted in Malaysia given unproven demand for MNP. We propose that the MCMC undertake a cost benefit study on the

¹¹ ZDNet, *Australia's MNP is a \$50 Million Failure: Vodafone*, Sydney 25 September 2002

All Call Query approach prior to mandating this technical solution. For immediate MNP roll out, TM would support *the* OR-2 approach.

(e) (**TIME**) – original comment

It is not favorable to TIME regarding this approach as being the smallest fixed-line operator. All calls to mobile should be sent to the original prefix mobile phone operator and the original prefix mobile phone operator will do the routing.

(f) (**REDTONE**) – original comment

We agree with the Commission's view on the All Call Query approach for call routing as we believe that it is the most efficient method of routing and does not unnecessarily tie up the Donor Network.

(g) (**NEUSTAR**) – original comment

There are a number of technical options for routing a call to a portable number, which are Call Forwarding, Dropback, Pivot Routing, N-1 Routing, and All Call Query.

Following is a comparison of the four most common routing options, which are depicted in the Table below.

Off-Switch		On-Switch		
(a) ACQ (All Call Query)	(b) QoR (Query on Release)	(c) Call Forwarding		(d) Drop-back
Involve Donor Network	No	Yes	Yes	Yes
Physical Call Segment	One	One	Two	One
Database	Centralized (all ported numbers)	Centralized (all ported numbers)	Local/Internal (only ported out numbers)	Local/Internal (only ported out numbers)
End - to - End SS7 Connectivity (call)	No	Yes	No	Yes
Facility Efficiency	Best	Less	Least	Less
Initial Costs	High	High	Lower*	Lower*

NOTE:

- The total costs for Options C (Call Forwarding, or Onward Routing) grow exponentially with the increase of ported numbers; and
- Option C (Call Forwarding) will not facilitate location portability i.e., it will not be local call forwarding any longer. More specifically, the on-switch solution is technically not efficient nor operator neutral, since it relies on the donor network's switch to apply the routing information for an incoming call to a ported-out number. It also requires the donor operator to trace all their ported-out numbers that they no longer serve.

There are other shortcomings associated with the Call Forward routing solution, such as:

- Call Forwarding is not suitable for porting from 2G to 3G since the subscriber would not be able to realize the 3G-specific services when a session is routed through a donor network's 2G system
- Call Forwarding creates an inefficient use of mobile telephone numbers
- Call Forwarding causes an "Incorrect" Caller Line Identification ("CLI") display
- Call Forwarding is unable to support Multimedia Message ("MMS") and IP based services

The comments above capture the reasons why countries, such as the UK, are working on replacing Call Forwarding (Onward routing), in order to support increased porting volumes and the strong market demand on 3G and IP-based services.

As for off-switch options, both ACQ and QoR require queries to a centralized NP Database (NPDB). QoR queries the NPDB only when the called number has ported out of the donor network, so it queries less than ACQ. However, QoR does involve the donor network, which is less efficient and is not operator-neutral in a competitive environment. QoR also requires additional standards-work to pass the "number ported out" indication, a new call release reason, in the SS7 ISUP parameter, which requires the donor network's switch software upgrade to return the new release reason when it receives an incoming call to a ported-out number.

Therefore, as a result noted in the comments above, a majority of the NP countries in Europe have selected ACQ as their elected long-term NP solution, which is the most fair and efficient option. Other ACQ countries include US, Canada, and Taiwan. While the initial implementation costs might be somewhat higher, the ACQ solution would be justified in the long run, and evident when the porting volumes increase.

(h) (**SYNIVERSE**) – original comment

As Malaysia evaluates Number Portability, it is imperative that the selected solution have the flexibility to ensure calls are routed in any fashion that the network operators/MCMC deem appropriate for the country requirements. Currently, Number Portability solutions deal primarily with the porting of a circuit switched voice call. The fundamental activity and processes behind the porting of a number in this environment will remain unchanged regardless of the routing technology. Therefore, as the market changes in terms of technology

and other market developments, the Syniverse system can evolve to meet the needs of Malaysia. Operators will still need to communicate with each other and the central database where the porting information resides, and ultimately disseminate this information to interested and affected parties to ensure call processing activity. The Syniverse solution Number Portability application can facilitate all of these various methods listed above. Hence your investment in the Syniverse proposed solution will be safe regardless of future routing and call processing technology. Primary factors in your decision include cost, benefit and lifecycle. While solutions such as onward routing can be implemented quickly and cost-effectively in the short-term, long-term inefficiency must be considered. Given the growth statistics and general direction of Malaysia, the All-Call-Query appears to be most advantageous and is the recommended approach. However, careful consideration must be given to the fixed operators network infrastructure. The switches must be able to query the Number Portability databases. Lastly, MNP must also consider new services that result from IP and future technologies. Currently, these include VOIP, ENUM, Multi-Media Voice, Video Conferencing, Presence Detection and others.

In the scheme known as All Call Query (ACQ), the originating network does not route calls to the donor network; in fact, once a number has been ported, the donor network is not involved at all. The originating network queries a centralized database and the call is re-routed to the new network.

There are two forms of ACQ – in one, literally all calls are queried, in the other, the line range in which the number belongs is checked to see if that line range is eligible for porting prior to the database query. In reality, where ACQ is used, most operators query all calls to simplify administration. Additionally, there is a process to update and maintain the database. A third party can perform this process and make available to all vested parties or a subset of as addressed in question 5.5. Alternatively, as also addressed in question 5.5, each operator can own and maintain the routing database within the confines of their internal network. As porting volumes increase, All Call Query becomes the most efficient scheme for call routing. In some cases, countries have started with Onward Routing when porting volumes were low, and have migrated to ACQ as volumes have increased. In other countries, Query-on-release and ACQ coexist, and the choice of implementation is left to each operator.

The general costs of this system include:

- Switch (Fixed and Mobile MSC)--Switch Upgrades for Number Portability query
- New Network Function of NP Database--Real-time network databases (STP or SCP-based)
- C7/SS7 Network--Links to database for real-time queries

(i) (**EVOLVING**) – original comment

The All Call Query (ACQ) requires routing for all calls to query a centralized portability database. The majority of the NP countries in Europe have selected ACQ as their elected long-term NP solution, which is the most fair and efficient option. Other ACQ countries include US, Canada, Taiwan and South Africa.

Even though All-Call-Query requires a central database that may be more complex than the other solutions, we recommend this option based on the following.

- It is the only option that does not involve call setup and routing to the donor network and is therefore the most efficient use of signaling network resources, from a call routing perspective.
- It provides the lowest average per-call set-up time impact when porting is widely used. If the deployment of number portability is successful, it will be widely used.
- While it is generally true that the initial implementation costs for ACQ is higher compared to other options, international experience tells us that over a longer period, the lower operating/maintenance/upgrade costs makes it a better option as the porting volume increases.
- It is the only method that insulates the call path from the donor network. Once the port has occurred, the ACQ method allows the success or failure of each call to depend solely on the merits of the networks naturally involved in the call, and receiving revenue for the call.

(j) (**FP**) – original comment

On call routing options, again the PI Paper does not provide a comparative analysis of the various options that have been considered, the MCMC recommends the “all call query” approach. It would have been most helpful if the experience of other countries has been studied and evaluated, and explained in the PI Paper so that a reasoned response can be given to this question.

(k) (**ML**) – no comment

3.8.2 The MCMC's views

Maxis:

MCMC and Maxis are in agreement with the proposed ACQ approach for call routing.

Celcom:

MCMC believes that the ACQ approach is in the best interests of Malaysia over the long term. NeuStar noted in their response that the total costs for onward routing grow exponentially with the increase of ported numbers.

The cost elements identified in Figure 5 appear to assume a concatenated addressing scheme. While two such schemes are documented in ITU-T Rec. Q.769.1, along with the scheme to use the Called Directory Number parameter to carry the Routing Number, the latter approach has significant benefits.

Digi:

MCMC and Digi are in agreement with the proposed ACQ approach for call routing.

A hybrid solution could be supported with the CCH associated with a database that can:

1. be queried by any network that does not wish to own its own database, and
2. deliver a 'feed' of NP data (DN and associated RN) to networks that wish to own their own databases.

TM:

MCMC believes that the ACQ approach is in the best interests of Malaysia over the long term. NeuStar noted in their response that the total costs for onward routing grow exponentially with the increase of ported numbers. Major disadvantages of the OR-2 approach include:

1. Additional call setup time for ported numbers. Although the additional setup time is no longer than that experienced for traditional Call Forwarding Service, it will take approximately

- twice as long to set up a call to a ported number than to a non-ported number.
2. Unnecessary trunking; two trunks required at the number owner switch for the duration of each call to a ported number.
 3. Normal forwarded call is billed to the forwarding party; compensation mechanism will need to change.
 4. Assumes "number owner" network (ported-from exchange) is notified if the number ports again. Requires that three networks cooperate for subsequent porting (instead of two).
 5. No national tracking of porting; identification/resolution of errors more difficult.
 6. If the porting information in the ported-to network is not updated in a timely fashion, circular routing is possible (donor network to first-ported network, back to donor network) or inefficient routing (donor network to first-ported network to the correct, second-ported network). This may have compensation implications since the original call has been forwarded.

TIME:

Time dotCom expresses a preference for routing to the donor mobile operator, to minimize costs. We note that this minimizes costs to the fixed networks (as stated by TIME), but is less than optimal when considering all networks together. In addition, it is assumed that MCMC would authorize an additional payment from the fixed network operator to the donor mobile operator to offset the costs of determining the appropriate destination network (i.e., the recipient network for ported numbers and the donor network for numbers that have not ported.) It may be possible to envision an alternative architecture where all fixed-to-mobile calls are routed to a limited number of tandem exchanges in the fixed network, which would minimize the number of exchanges that would be required to be upgraded to support MNP.

Redtone:

MCMC and Redtone are in agreement with the proposed ACQ approach for call routing.

NeuStar:

MCMC and NeuStar are in agreement that the ACQ approach is in the best interests of Malaysia over the long term. MCMC agrees with the

views of NeuStar with regards to the shortcomings with a call forwarding solution.

Syniverse:

MCMC agrees with the Syniverse view that the All-Call-Query appears to be most advantageous and is the recommended approach.

Evolving:

MCMC agrees with Evolving's recommendation of the ACQ option.

FP:

The experience of other countries is shown below. The majority of MNP implementations worldwide have adopted the ACQ approach.

Country	How calls are routed from a fixed network to a mobile network	How calls are routed from a mobile network to another mobile network
Austria	Onward routing or all call query	All call query
Belgium	All call query ¹	All call query & query on release ¹
Croatia	All call query	All call query
Cyprus	All call query ²	All call query
Denmark	All call query	All call query
Estonia	All call query	All call query
Finland	All call query (1.10.05-)	All call query
France	Phase 1: onward routing Phase 2: all call query	Phase 1: onward routing Phase 2: all call query
Germany	Onward routing & all call query	All call query
Hungary	All call query & query on release	Phase 1: all call query & query on release
Iceland	All call query	All call query
Ireland	Onward routing	All call query
Italy	All call query ²	All call query
Lithuania	All call query	All call query
Luxembourg	Onward routing	All call query
Malta	Onward routing but ACQ may also be used	All call query
Netherlands	All call query ³	All call query ²
Norway	All call query	All call query
Poland	All call query	All call query
Portugal	All call query & query on release	All call query & query on release
Slovenia	All call query	All call query
Spain	Onward routing	Onward routing
Sweden	Onward routing & all call query	Onward routing & all call query
Switzerland	Onward routing	Onward routing
United Kingdom	Onward routing	Onward routing

Table 3: Methods of routing calls to ported mobile numbers

1. The minimum legal requirement is for onward routing.
2. Queries could be outsourced to other operator.
3. Queries are outsourced by one operator to the incumbent operator.

Source: Implementation Of Mobile Number Portability In CEPT Countries, Electronic Communications Committee (ECC) Within The European Conference Of Postal And Telecommunications Administrations (CEPT), Updated: October 2005.

3.9 Comments on the Signaling Protocol

The MCMC recommends that:

1. Before a routing number has been derived, the directory number is carried in the ISUP Called Party Address.
2. After a routing number has been derived, the directory number be carried in the ISUP Called Directory Number and that the ISUP Called Party Address only carry the routing number.

The Public Inquiry Paper sought views on:

Question 5.7.1 in the Public Inquiry Paper

MCMC seeks comment on this approach of populating the ISUP Called Party Address.

3.9.1 Comments received

Summarized below are comments received on the issue regarding the Signaling Protocol:

(a) (**MAXIS**) – original comment

Maxis has no principal objection to the MCMC recommendation of separating the Directory Number and the Routing Number within ISUP, but we would like an opportunity to fully understand the rationale for proposing this over the concatenated solution. Some markets, such as Belgium, have successfully adopted the concatenated approach which is also fully supported within the ETSI standards. Both solutions work and both are in operation today. Hence, we are not yet fully clear why there is such a clear preference for one over the other in Malaysia.

(b) (**CELCOM**) – original comment

Further to the arguments raised earlier in this submission, Celcom would prefer MCMC to undertake an additional cost benefit assessment

on a Call Forwarding option for MNP in Malaysia. On this basis it is noted that the signalling protocols set out in Section 5.7 do not support Call Forwarding solutions. However, in relation to the specific issue raised in the question above, it would appear sensible to implement any arrangement in accordance with ITU recommendation in ITU-T Q769.1. It should be further noted that there will be a need to define a common industry approach for the Routing Number Format.

(c) (**DIGI**) – original comment

DiGi agrees with the international standards as described in section 5.7 (Signalling Protocol) of the PI paper.

(d) (**TM**) – original comment

MCMC has recommended the following in terms of signaling protocol for the ACQ approach:

- a) Before a routing number has been derived, the directory number is carried in the ISUP Called Party Address.
- b) After a routing number has been derived, the directory number be carried in the ISUP Called Directory Number and that the ISUP Called Party Address only carry the routing number

TM views are:

- For case (a), this is a normal ISUP Initial Address Message (IAM) parameter, which is currently implemented and supported by TM's fixed network
- For case (b), this is considered as new inclusion and currently *not* supported by TM's fixed network. In order to cater for this parameter, TM's POI will need to be upgraded and shall follow ITU-T Q.769.1 recommendation. Costs will be incurred for the upgrading purpose (included in network costs, see Q8.1) as well as requirement for the testing and verification activities.

It should also be noted that the above approach does not support call forwarding. No upgrading is required if MCMC were to adopt the OR-1, Hybrid or OR-2 approaches.

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

We agree with the Commissions proposal and recommendation on populating the ISUP Call Party Address.

(g) (**NEUSTAR**) – original comment

In the US and Canada, the industry has adopted the Location Routing Number (LRN) method to provide LNP call processing. With NP, the individual directory numbers within a central office code will port to different operators and different switches. The directory number is no longer the network routing address. Delivering calls to the ported directory number will require additional routing information. Switches within the call path will require a database dip to obtain the network address for proper call routing.

Through the ACQ approach, the originating network requires an Advanced Intelligent Network (AIN) or AIN-like query to a separate database, or Service Control Point (SCP), which contains the network routing address associated with the customers ported directory number. The network address, referred to as a Location Routing Number (LRN), is an existing telephone number within the recipient switch. After the query to the SCP the switch replaces the Called Party Number, or directory number, with the network routing number, or LRN. At this time, the switch will also put the directory number in another SS7, or Generic Address Parameter (GAP), and sets a query indicator in an SS7 parameter called the Called Party Indicator. The query indicator notifies other switches in the call path that a query has been performed, switches route the call using the LRN. When the call arrives at the recipient switch it is identified as an MNP call, the switch gets the customer number and terminates the call normally. The ACQ approach, as just described, has been successfully implemented in the US and Canada for both wireline and wireless number portability.

Generally speaking, signaling protocol and switch software upgrades are required to support MNP, with the third party clearinghouse database functioning as the "Golden Database" for routing information to the operators. The existing interconnection arrangements can stay the same as long as the same routing principles are used. Under this approach, the switches need to know which number in which parameter should be used for call routing.

(h) (**SYNIVERSE**) – original comment

We concur with the approach recommended by the MCMC. In addition to the brief outline presented in section 5.7, the following considerations may assist MCMC. Three scenarios exist in call setup relative to number portability:

Scenario 1: Called directory number checked and not ported—

This scenario checks the directory number but does not produce a routing number since the directory number is not ported. The contents of the ISUP IAM message should indicate that the directory number has been checked in order to avoid the same checking by subsequent switches in the call's signaling path. One effective method is to use the Forward Call Indicators to specify whether or not the directory number has been checked for porting. With the use of the Forward Call Indicator:

- The ISUP IAM Called Party Address parameter contains the directory number
- The ISUP IAM Forward Call Indicator parameter identifies the directory number as having been checked.

Scenario 2: Called directory number checked and ported--The ISUP IAM Called Party Address parameter contains the routing number to the appropriate switch of the recipient network, The ISUP IAM Called Directory Number (Generic Address) parameter contains the directory number. The ISUP IAM Forward Call Indicator parameter identifies the directory number as having been checked.

Scenario 3: Called directory number not checked--The ISUP IAM Called Party Address parameter contains the directory number The ISUP IAM Forward Call Indicator parameter identifies the directory number as having not been checked.

(i) (**EVOLVING**) – original comment

This approach is not practical with ACQ mobile number portability implemented; the IAM will need to be updated in-sync with the database of the ported number database. A major concern is the refresh rate and also bandwidth utilization of such practice. ISUP is used on PSTN (ISDN or non-ISDN circuit). When a call is placed to an out-of-switch number, the originating SSP transmits an ISUP IAM to reserve an idle trunk circuit from the originating switch to the destination switch. The IAM includes the originating point code, destination point code, circuit identification code, dialed digits and,

optionally, the calling party number and name. We defer further comment on this to the network operators.

(j) (**FP**) – no comment

(k) (**ML**) – no comment

3.9.2 The MCMC's views

Maxis:

The use of the recommended signaling method (carrying the dialed number in the Called Directory Number parameter after the number portability query has been performed), rather than one of concatenated signaling methods (carrying both the dialed number and the routing number in the Called Party Address parameter), minimizes required changes to the routing process at all exchanges. Although the concatenated methods are also recognized by the ITU-T Recommendation, either method will require that exchanges from one manufacturer or another change how they analyze the Called Party Address parameter when routing the call. With the use of the Called Directory Number, exchanges that are not involved with MNP (e.g., transit exchanges) can route calls as today, based on a Called Party Address of known length; the Called Directory Number parameter can and will be ignored until the call setup reaches the destination exchange. Since this exchange is involved in MNP (i.e., the number in the Called Directory Number is expected to be that of a customer who has ported into this exchange), MNP software should be deployed at this exchange to deliver calls to ported-in numbers.

Celcom:

The protocols proposed in the PI are directed to the proposed ACQ mechanism. If a call forwarding option were to be selected, MCMC would need to consider the specific disadvantages to customers and to networks for the following two descriptions of MNP using call forwarding:

1. Using normal call forwarding as supported today or querying for the RN
2. Querying for the RN at the donor exchange and using the protocol as described.

The disadvantages, in terms of customer loss of service functionality and inefficient use of network resources should not be understated.

While the signaling protocols set out in Section 5.7 do not propose to use Call Forwarding to provide MNP, they are not incompatible with the Call Forwarding Service. Celcom correctly notes that the Call Forwarding solution for MNP does not require enhancements to the existing switching software that supports the basic Call Forwarding Service. The deficiencies in the Call Forwarding lie elsewhere in its impacts on numbering resources, signaling network resources, trunking resource utilization, and billing.

Within the scope of ITU-T Recommendation Q.769.1, the concatenated addressing schemes are significantly less attractive than the scheme using the Called Directory Number parameter to carry the Routing Number, and the "common industry approach" should acknowledge this.

Digi:

MCMC and Digi are in agreement with the protocols proposed in the PI.

TM:

TM correctly notes that the upgrade required to support ACQ need not impact every exchange, but may be centralized at or near the POI. A call forwarding mechanism that does not require changes to the protocol requires that two numbers be assigned to a ported customer and still has a negative impact on services such as Calling Name Delivery.

Redtone:

MCMC and Redtone are in agreement with the PI proposal and recommendation on populating the ISUP Call Party Address.

NeuStar:

The NeuStar response appears to confuse the ITU-T Q 769.1 standard number portability mechanism with the ANSI standard that is used in North America.

Syniverse:

MCMC and Syniverse are in agreement with the PI proposal and recommendation on populating the ISUP Call Party Address.

Evolving:

Further clarification is needed to respond to the Evolving Systems comment. The comment as written appears to misunderstand that the "dialed digits" referenced in the comment (and carried in the ISUP IAM Called Party Address parameter) are used by each exchange (including the originating exchange) to determine the destination point code and circuit identification code in the IAM. SS7 routing of the IAM (based on the destination point code) is not affected by MNP; the changes occur in call processing at the exchange. There is no "updating" of the IAM by the SS7 transport network; rather, call processing at the originating exchange uses the dialed digits to populate the Called Directory Number parameter and the Routing Number (determined by MNP, and equal to the dialed digits if the number is not ported) to populate the Called Party Address parameter. The IAM is then marked as having completed the MNP number query process and MNP does not cause any further changes to the IAM at subsequent exchanges.

If the originating exchange populates the Called Party Address parameter with the dialed digits and does not mark the IAM as having completed the MNP number query process, a subsequent exchange determines the Routing Number and uses it to populate the Calling Party Address in the outgoing IAM. As above, the subsequent exchange marks the IAM so that this process only occurs once during the call setup.

If the Evolving Systems comment references the "refresh rate" of the MNP database (i.e., how well the database reflects porting requests from customers), then this is not a comment on the acceptability of ACQ, but rather it implies that there should be a reasonable requirement for timely updating of the MNP database. This is acknowledged elsewhere in the PI document.

3.10 Comments on the Loss of Service Provider Identity

Currently the mobile phone numbers in use have the form of [01A-XXXXXXX] whereby A denotes the service provider serving the subscriber. When MNP is introduced, the service provider identifier A in the directory number may no longer identify the customer's service

provider. The identity of a mobile service provider prefix is typically derived from the directory number for various purposes; including tariff transparency, interoperability with fixed networks and branding and promotion and billing of SMS content providers. The above impacts will require several changes by mobile service providers in their internal business operations, marketing strategies and customer relationship.

The Public Inquiry Paper sought views on:

Question 6.2 in the Public Inquiry Paper

The MCMC seeks comment on what, if any, additional impacts the loss of identifier will have on mobile service provider operations.

3.10.1 Comments received

Summarized below are comments received on the issue regarding the Loss of Service Provider Identity:

(a) (**MAXIS**) – original comment

The loss of identifier will have a significant impact on operators. Firstly, the prefix is regarded widely as a key part of the operators' market positioning in Malaysia – and, to a certain extent, even as a sub-brand. For example, Maxis' '012' has traditionally been seen as more prestigious than others. Hence, the loss of prefix will have a significant impact on the operators' branding and marketing strategies, with probably further escalating marketing costs (already the 3 mobile operators are among the top 5 advertisers in the country).

Secondly, it will be harder for consumers to understand call charges between different operators, especially as on-net and off-net tariffs are very much differentiated in Malaysia. This might require operators to set up additional, and costly, call-in and online directories where customers can check the cost of calling a specific mobile number. Overall, we believe, MNP will reduce the transparency of tariffs (see below).

Thirdly, MNP will trigger significant additional costs and resource commitments to train point-of-sale, customer service, marketing and operations staff and to institute new operational and administrative

methods of dealing with ported numbers. This will include potential interconnect reconfiguration, call set-up and routing, products and call plans, and top-up, billing and customer care processes to handle other prefixes. Given the very high level of churn in the market (50-60% for pre-paid), this is likely to require very significant preparations, as most churners will now take advantage of MNP and start porting their numbers (instead of just churning).

Finally, we expect significant additional staff commitments upon MNP introduction due to the anticipated initial fault management issues (>50% in first few months based on experiences in other countries) and required customer education. This includes the need to change customer behaviour who dial on-net calls without using the prefix. While only 12% of 012 calls, this still constitutes about 2 million calls per day – and will require major pro-active education and call management.

(b) (**CELCOM**) – original comment

Celcom agrees with the assertion that the identity of a mobile service provider's prefix is essential for tariff transparency, interoperability with fixed networks, branding and promotions, and billing of SMS content providers. We welcome MCMC's concern about the possible operational impacts - intended and otherwise - that MNP will have on service performance.

There are certainly significant technical risks associated with the failure of the recipient network. This is especially true in Malaysia where there is a strong association of number prefixes (013 and 019, 012 and 017 and 016) with the network operator. A failed call due to the recipient network failure may be wrongly perceived as a service quality issue with the donor network. Additional impacts that have been identified by Celcom would include the following:

- Interconnection settlements if donor network is involved in the call set-up;
- An inability to prevent unauthorised transit calls given that currently, 'A' number screening is done at GMSC by analysing service operator's prefix is used to prevent unauthorised transit call. With MNP, this is no longer possible and given the potential loss of legitimate industry revenues to the black market, Celcom considers that that this is issue that must be resolved;

- The Management Reporting Systems (MRS) that access regional performance would need to be upgraded; and
- An increase in number management complexity, requiring existing numbering systems to be substantially upgraded.

(c) (**DIGI**) – original comment

From the market's perspective, we do not foresee any significant impact from the loss of identifier. Currently, all the industry players have been building their respective brand equity on the corporate/product name instead of the prefixes. However there are few areas of concern that might affect the back end operations and need to be agreed among operators:

1. Inbound IDD Routing
2. Content services and billing by content partners
3. Inbound and outbound international messaging (SMS/MMS) services
4. Closed user group service (Friends and Family concept)

(d) (**TM**) – no comment

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

We believe that the most significant impact to the loss of identifier will be tariff transparency. Impact to other issues like branding will be, we believe, minimal and can be managed via a subscriber awareness programme or a branding campaign. It is already quite clear in the mobile market place that operators are shifting their brands from identifiers and are building sub-brands within their main product offering. Subscribers too, on the other hand, are responding by identifying the operator with the brand or sub-brands as the case may be and not the identifier.

(g) (**NEUSTAR**) – original comment

Loss of Service Provider identity is of course a concern for any operator in the Malaysian telecommunications industry that has worked diligently to hone a recognizable public identify for their services. MNP will require operators to make changes in their internal business operations, marketing strategies, and customer relationships.

Although loss of Service Provider identity is unavoidable when number portability is introduced, it should also be noted, that a well-designed and operated MNP solution could also be used to expand the general mobile content and application providers markets, which can improve ROI and streamline operations for operators:

The third party, centralized database approach to MNP is, generally speaking, numbering agnostic. And as noted in the response to the previous question (5.7.1), the ACQ scheme would ensure that the calls to the ported numbers are routed correctly and reach the intended customers. Through a third party managed database, operators have the capability to address their content messages to the customers directory number and route the messages to the mobile operator that is currently serving that directory number by querying a local or remote database for the routing information or the current serving operator information. Mobile content providers can also contract with a third party for performing such queries and routing the messages to the current serving operator of directory number by forwarding these messages to that third party.

(h) (**SYNIVERSE**) – original comment

Although a number has changed from one operator to another in porting, it is possible to know the type of carrier (wireless, fixed, etc.), the specific carrier and the switch from which the call originated and terminated. Information is available in the call detail record and signaling messages that can be used for roaming, rating and billing and most switches should have software that is capable of supporting it. This is available to the operators. However, from a subscriber's perspective, they will not have the same visibility to determine if the porting number is terminating to a specific type of service or operator. For example, the subscriber may think they are calling a subscriber on a specific network by virtue of the dialed number. However if the number has ported, they will be in fact be terminating to a different network. This may result in a much higher tariff paid by the subscriber.

Hence porting can reduce tariff transparency. Callers can no longer tell from the number dialed and as a consequence, what price they will pay for the call. As a result, Malaysia fundamentally has the following options with respect to regulation:

- _ choose to restrict the tariffs charged under Number Portability or
- _ require enhanced tariff transparency services.

It should also be noted that a byproduct of porting is that subscribers will no longer be able to associate a specific operators by virtue of the numbers dialed. This will impact the marketing campaigns of each operator. In short, every internal system and process that is dependant upon the dialed number will need to be evaluated and potentially modified.

(i) (**EVOLVING**) – no comment

(j) (**FP**) – original comment

It is our view that MCMC should not concern itself on the impacts of the loss of the service provider identifier. The general principle is that national resources such as numbers and spectrum are not owned by the operators. They are given a license to use such resources and ownership always rests with the MCMC. The new proposed numbering plan clearly identified this and suggested the move away from 3 digit short codes for mobile operators, but that plan has yet to be implemented. Notwithstanding that, MCMC has to remind the operators the short code identifier should not be associated with their brand promotions because such short codes do not belong to them.

(k) (**ML**) – no comment

3.10.2 The MCMC's views

Celcom:

On the matter of a failed call due to the recipient network failure may be wrongly perceived as a service quality issue with the donor network, increasing the public's awareness of the implications of MNP will help to mitigate such a perception.

For the additional impacts identified by Celcom:

- Interconnection settlements if donor network is involved in the call set-up;
 - The ACQ recommendation does not involve the donor network.
- An inability to prevent unauthorised transit calls
 - An explanation of this impact is required.
- The Management Reporting Systems (MRS) that access regional performance would need to be upgraded

- More information is required about the functionality of this system.
- An increase in number management complexity, requiring existing numbering systems to be substantially upgraded.
 - The introduction of MNP will have required changes to numbering systems regardless of the loss of identifier. Such systems might have to be upgraded due to changes in the national numbering plan.

Digi:

MCMC accepts the noted areas of concern that might affect the back end operations:

1. Inbound IDD Routing
2. Content services and billing by content partners
3. Inbound and outbound international messaging (SMS/MMS) services
4. Closed user group service (Friends and Family concept)

MCMC believes that forming an operator working group as part of the MNP implementation team would be an appropriate way to discuss and reach agreement on the issues identified.

Maxis:

Maxis noted that the prefix is regarded widely as a key part of the operators' market positioning in Malaysia. From a marketing strategy and customer relationship standpoint, mobile operators in many countries have increasingly relied more on branding and positioning their company and product, as opposed to numbering, to expand their market share. From an operations standpoint, internal changes will need to be made to compensate for the loss of the identifier.

On the matter of consumers understanding call charges between different operators, there are several ways that this can be addressed (tariff transparency) as discussed in Section 3.11.

The remaining responses did not directly address the loss of the identifier.

Redtone:

The MCMC is of similar view expressed by Redtone.

NeuStar:

The MCMC is of similar view expressed by NeuStar.

Syniverse:

The MCMC is of similar view expressed by Syniverse.

FP:

The MCMC is of similar view expressed by FP.

3.11 Comments on the Tariff Transparency

The issue of tariff transparency is recognized in many of the countries in which MNP 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 telephone information service (IVR) 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 (a tone alert or announcement) at the beginning of a call that indicates it will be charged at an off-net rate. This could potentially give the caller the option to abandon the call at no charge. Under the tone alert approach, the aural signal would be generated and inserted by the originating mobile network and receipt would not be dependent on the functionality of the originating customer’s handset.

The Public Inquiry Paper sought views on:

Question 6.3.2 in the Public Inquiry Paper

The MCMC seeks comment on ways of achieving tariff transparency with respect to calls made to/from mobile numbers.

3.11.1 Comments received

Summarized below are comments received on the issue regarding the tariff transparency:

(a) (**MAXIS**) – original comment

As indicated above, setting up telephone information or online directory services are common ways of trying to address the issue of deteriorating price transparency between on-net and off-net calls. However, experiences from other countries also show that few customers do check-ups before calling. Audible alerts for off-net calls appear to be an interesting idea, though raise questions around implementation cost, potential call delays, intrusiveness and required customer education. Similar systems have been tried (e.g., Ireland, Italy, Portugal), but Maxis is concerned with the additional complexity of both checking the recipient network and sending an audible signal before connecting the call. Moreover, customers will need to be educated about the signal meaning. This seems a challenging task for both the expected high number of ports (as prepaid churners will start porting their numbers) and the broader base of mobile users in Malaysia. Overall, we see such a system as potentially invasive and, rather than promoting MNP, could discourage customers from porting.

(b) (**CELCOM**) – original comment

All cellular operators in Malaysia offer on-net tariff plans in recognition of the lower costs of providing services between subscribers of the same network. These arrangements have had a significant impact on the traffic profile and have proved to be very popular with consumers. MNP compromises the ability of consumers to take advantage of these tariff plans. Celcom does not believe that any current technical solution to this matter will be totally satisfactory to the market.

As noted in Section 6.3.2 of the Public Inquiry Paper, some advanced economies have adopted alert announcements during call set-up as an indication that the tariff will be charged at an off-net rate. Other options include establishing a nationwide IVR information service that provides tariff data on registered numbers. Celcom submits that either of these arrangements do not provide effective solutions to this issue for a range of factors including:

- The additional costs and complexities of establishing the systems required to support;
- Uncertainty about who would be tasked to manage these systems and which stakeholder would have to bear the capital expenditure and ongoing operating costs;

- The principle of cost recovery may mean that unpopular charging structures for the service may need to be introduced;
- The challenges about building consumer awareness as to the availability and use of such systems; and
- The need to provide multiple language options in Malaysia.

In line with practices in other markets, Celcom believes that the responsibility of financing and operating these arrangements is with regulator.¹² Although there is a general recognition that tariff transparency is a pre-requisite for the effective adoption of MNP, the practical implementation of such schemes has been inconsistent. As an indicative precedent for Malaysia, Figure 4 shows the implementation of tariff transparency solutions in EU markets.

Figure 4: The implementation of tariff transparency schemes in support of MNP have not been consistently deployed across EU markets

¹² As an example Celcom notes Number 21 Article 1 of the EU *Universal Service Directive* which establishes that 'Member States shall ensure that transparent and up-to-date information on applicable prices and tariffs and on standard terms and conditions in respect of access to, and use of publicly available telephone services is available to end users.'

Deployment of Tariff Transparency Measures in EU Markets (2005)

TRANSPARENCY MECHANISM	YES	NO
Is there any telephone information service implemented to promote tariff transparency on calls to ported numbers?	12 [Denmark, Estonia, Finland, Greece, Germany, Hungary, Italy, Netherlands, Norway, Portugal, Switzerland, UK]	9 [Austria, Cyprus, Czech Republic, France, Iceland, Ireland, Lithuania, Spain, Sweden]
Is the information service provided by SMS?	5 [Germany, Hungary, Ireland, Italy, Switzerland]	16 [Austria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Iceland, Lithuania, Netherlands, Norway, Portugal, Spain, Sweden, UK]
Is the information service provided by the Internet?	8 [Austria, Denmark, Estonia, Finland, Germany, Iceland, Italy, Netherlands]	13 [Cyprus, Czech Republic, France, Hungary, Greece, Ireland, Lithuania, Norway, Portugal, Spain, Sweden, Switzerland, UK]
Is there an online announcement at the start of the call	6 [Austria, Germany, Italy, Ireland, Lithuania, Portugal]	15 [Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Hungary, Greece, Iceland, Netherlands, Norway, Spain, Sweden, Switzerland, UK]

Even though information services are provided, many countries have reported **low levels of user awareness**

Note: Of the EU Markets Poland and Malta have not yet implemented MNP

Figure 4

(c) (**DiGi**) – original comment

The customer may be provided an avenue to check whether the Called Party (B Party) is registered with the same network. This could be made available through SMS, internet or STK at no cost to the customer. Any attempt to identify the Called Party's network at the point when the call is made would not be a good resolution since any visible or audio signal for identification purposes would disrupt call flow and compromise customer experience.

Nevertheless DiGi is of the view that it would be desirable if callers are able to estimate the price of calls to mobile numbers if they so wish. Initially geographical MNP will reduce tariff transparency for mobile subscribers due to price difference that exists for on- and off-net calls. Customers will lose the capacity of distinguishing service providers on the basis of prefix of the called number.

We are of the opinion that all mobile users must have access to information that enables them to calculate call charges. It is proposed that MCMC facilitates the appropriate tariff transparency as part of

MNP implementation via the issuance of a Directive for all Celcos to publish their on-net and off-net tariffs together with the price plans for postpaid and prepaid service.

(d) (**TM**) – no comment

(e) (**TIME**) – original comment

The current mobile traffic rate is charged based on geographical tariffing. With the implementation of MNP, a flat-rate tariff non-geographic is recommended for effective implementation. Non-geographical tariffing will no doubt resolve the tariff transparency issue but this will also affect revenue to TIME.

(f) (**REDTONE**) – original comment

The key factor to the successful implementation of MNP will be to make it easy for subscribers to use MNPs and that it does not alter the current user habit or experience in a significant way. Therefore the method of an audible warning tone is the least intrusive to the user experience whilst being able to notify the calling party of the off-net charges. The “telephone information service” highlighted in para 6.3.1. can be provided in tandem with warning tone to service subscribers who wants more information about the ported number.

(g) (**NEUSTAR**) – original comment

Introduction of MNP will have unavoidable consequences that will impact such areas as tariff transparency. It is crucial that regulators play regulators play a key role in promoting public awareness of MNP and its consumer impacts.

It is also crucial that regulators work closely with the various Malaysian telecommunications industry constituents to devise various approaches and solutions to mitigate the loss of tariff transparency when a number is ported. Examples of possible solutions, as noted in the Public Inquiry Paper, include such solutions as publication of consumer information about MNP in the form of frequently asked questions and answers by the regulators and service providers, deployment of a “telephone information service” via a recorded telephone information service (IVR), an SMS information service, which provides the correct tariff information on input by the user of the number which will be called, or, possibly, an audible warning (a tone alert or announcement) at the beginning of a call that will allow the option to abandon the call without incurring a charge. All

suggested solutions are good ideas that bear further industry study and possible implementation. Ideally, competitive market conditions will solve this particular problem over time.

(h) (**SYNIVERSE**) – original comment

There is an inherent conflict between number portability and tariff transparency. Allowing a called party to keep his/her number when changing operator, location or service has significant competitive and user benefits. Nevertheless, it also reduces tariff transparency. Callers can no longer tell from the number dialed and as a consequence, what price they will pay for the call. As a result, Malaysia fundamentally has the following options with respect to regulation: A) choose to restrict the tariffs charged under Number Portability or B) require enhanced tariff transparency services. Number Portability obscures differences in price between on-net and off-net for terminated calls. In many countries, some operators charge significantly less for on-net than off-net calls as a way of attracting customers. Number Portability can hide such price differences.

Number Portability can also cloak differences in the price of making calls to competing networks of the same kind. For example, in a call made from a fixed line to a mobile, the interconnection costs of the mobile network may differ from that of another mobile network. In some EU member states this led to different retail prices for fixed to mobile calls according to the mobile network called. Operator NP between mobile operators hides these differences in retail price and this also reduces tariff transparency.

Potential measures to ensure tariff transparency: Allowing the loss of tariff transparency on the grounds that it is immaterial; requiring the dominant fixed line operator to set a uniform retail price for calls to all mobile networks – whatever the call termination charge

- A full tariff transparency service (in which the user is automatically informed of the price of calls in advance of making them) would help solve these problems. Examples of these are recorded announcements at the start of a call or when the caller has a terminal with a screen the tariff or service information could be displayed on it.
- Provided via voice information service, SMS service, or Web page), which enables the subscriber to identify the network of the called party.

- Another approach, evident in Hong Kong and in the U.S., is to allow full transparency, with carriers taking advantage of on-network rates where available

(i) (**EVOLVING**) – original comment

This is a complicated issue that requires further study before the best answer can be given. At the surface, however, a simple solution is to put an intercept message on all ported numbers such that the caller is aware that the number has been ported and that any associated operator prefix is no longer in place. As such any special rate plans offered by the donor are no longer in place (i.e. free calls to other subscribers using the same operator).

(j) (**FP**) – no comment

(k) (**ML**) – no comment

3.11.2 The MCMC's views

Maxis:

The MCMC is of similar view with Maxis about setting up telephone information or online directory services to address the issue of deteriorating price transparency between on-net and off-net calls.

Regarding an audible alert for off-net calls, the MCMC is of similar view with Maxis that such a system as potentially invasive and, rather than promoting MNP, and could discourage customers from porting.

Celcom:

The EU directive referenced by Celcom does not state that the responsibility of financing and operating these arrangements is with regulator. It does state, in part, that:

“National regulatory authorities should, where feasible, facilitate appropriate tariff transparency as part of the implementation of number portability”.

1. Member States shall ensure that transparent and up-to-date information on applicable prices and tariffs, and on standard terms and conditions, in respect of access to and use of publicly available

telephone services is available to end-users and consumers, in accordance with the provisions of Annex II.

2. National regulatory authorities shall encourage the provision of information to enable end-users, as far as appropriate, and consumers to make an independent evaluation of the cost of alternative usage patterns, by means of, for instance, interactive guides.

Some form of tariff transparency has been implemented in every country in which MNP has been introduced. At a minimum, MCMC will require each mobile operator to publish their rates as they relate to off-net calls on their respective websites. In particular, such information should be published prominently and adjacent to that describing their MNP service. Also, all media advertisements should mention that off-net calls may attract a higher charge.

Beyond publishing tariff information, MCMC will facilitate discussions with mobile operators to determine whether an additional method is needed, based on their knowledge of consumer characteristics and preferences and taking technical and economic factors into account.

Digi:

MCMC notes the comments. MCMC would like to reiterate that the publishing of call tariffs is required under the CMA 1998.

TIME:

MCMC notes TIME's comments but this is outside the scope of this public inquiry.

REDTONE:

MCMC will require each mobile operator to publish their rates as they relate to off-net calls on their respective websites. In particular, such information should be published prominently and adjacent to that describing their MNP service. Also, all media advertisements should mention that off-net calls may attract a higher charge.

Beyond publishing tariff information, MCMC will facilitate discussions with mobile operators to determine whether an additional method is needed, based on their knowledge of consumer characteristics and preferences and taking technical and economic factors into account.

NeuStar:

It is agreed that MCMC needs to work closely with the various Malaysian telecommunications industry constituents to devise various approaches and solutions to mitigate the loss of tariff transparency when a number is ported.

Syniverse:

The MCMC is of similar view expressed by Syniverse.

Evolving:

Beyond publishing tariff information, MCMC will facilitate discussions with mobile operators to determine whether an additional method is needed, based on their knowledge of consumer characteristics and preferences and taking technical and economic factors into account.

3.12 Comments on the Interoperability with Fixed Networks

Fixed network service providers will need to route calls to portable numbers so interconnection agreements will need to be reached. At first glance, it may appear that the fixed line service providers would not need to account for MNP; calls would simply be delivered as today to the donor operator. However, if the current interconnect charging regimen remains, there will be some motivation for the fixed network to deliver the call as close to its destination as possible, i.e., there will be a tradeoff for the fixed line service provider between:

- a) Implementing number portability so that the call may be delivered to the appropriate mobile network in the appropriate geographic region, or
- b) Compensating the donor network for re-directing the call to the recipient network in the appropriate geographic area.

The Public Inquiry Paper sought views on:

Question 6.4 in the Public Inquiry Paper

MCMC seeks feedback on whether fixed line service providers are to be compensated and if so how they should be compensated for cost associated with MNP.

3.12.1 Comments received

Summarized below are comments received on the issue regarding the Interoperability with Fixed Networks:

(a) (**MAXIS**) – original comment

Compensation of fixed line service providers - Fixed line operators should deliver the call to the recipient network in the appropriate registered geographic region. Instead of delivering the call to the donor operator, fixed-line operators should query first with the centralized database to which network the call should be directed. This avoids routing through the donor operator – and the need to compensate the donor operator for the additional call routing costs. Consequently, fixed line operators should be given access to the centralized database. The cost of implementing the necessary interface system should be borne by the fixed-line operators in the MNP spirit of improving overall customer service levels in the telecoms industry.

Removal of prevailing system of geographical numbering - In any case, we recommend discontinuing the prevailing system of geographically allocated mobile phone numbers – and the resulting differentiated interconnect costs. We believe this is in the best interest of both customers and mobile operators. It will foster the continuation of “one-nation, one-rate” tariffs, result in more efficient call routing, and overcome current constraints in availability of number ranges. This will require changes to the current interconnect regime and pricing, which should be part of the MNP implementation. This will avoid any additional and complex changes to the interconnect regime, centralized database, and inter-region porting approach at a later stage.

(b) (**CELCOM**) – original comment

Celcom notes that the implementation of MNP in Malaysia will have an impact on fixed line operators given the interconnection charging regime. However, the scale and scope of compensation is difficult to assess if calls are directed to a mobile network on a near-end handover basis. This arrangement would effectively change the way in which calls in Malaysia are routed from fixed to mobile: where calls are sent to a registered location based on the prefix (ie: 013 NXX XXXX where N represents a particular geographic area of Malaysia). Given the proportion of all calls involved this is a non-trivial issue which

requires considerably more review and investigation before any final decision is taken.

On this basis, fixed line operators may need additional billing information from cellular operators to confirm that the higher interconnection tariff applicable to long distance fixed to mobile calls is not being charged. The current differential between these rates as detailed in the Mandatory Standard on Access Pricing and in the Access Agreement are material: 11.26 sen per minute for local fixed to mobile and 14.47 sen per minute for long distance fixed to mobile.¹³ It should be noted that network architecture has been designed on the basis of far-end handover and changes to the framework as a consequence of MNP may lead to stranded assets and under-performing investment in the national information infrastructure.

(c) (**DIGI**) – original comment

Costs should be shared among all subscribers of all operators. Fixed line operators should bear the cost towards MNP since it is a cost associated with providing their service to their customers. It would not be fair if mobile service providers are made to subsidise fixed line operators.

(d) (**TM**) – original comment

Firstly, since TM's comments are from a fixed line operator perspective, few benefits would be gained by TM in modifying its fixed network in order to accommodate for the for the MNP traffic routing. Again, a considerable sum of money would need to be invested in the case of ACQ approach, the OR-2 approach on the other hand would require much less investment.

For the implementation using ACQ approach, TM foresees the following cost elements or "unavoidable costs" that could be imposed on TM:

- . Network conditioning - initial set-up costs;
- . Modification on OSS;
- . Transaction fee to centralised database; and
- . Operational costs - operation and maintenance, human resources (resource planning, training for up-skilling

¹³ Minister of Energy, Communications and Multimedia, *Ministerial Direction to Determine a Mandatory Standard for Access Pricing*, Kuala Lumpur February 2003

As the MNP implementation is claimed to benefit the mobile operators (although we are not certain this is the case), and as a means to mitigate the impact and possible losses to the fixed line operators, it is in our opinion that compensation ought be paid for the costs incurred to condition the fixed network for the MNP service regardless of the routing approach adopted, such as by having the mobile operators or MCMC to bear all the network costs involved. At the same time, TM requests a waiver be given for the recurring transaction costs for database queries under the proposed ACQ scheme.

Secondly, given the existing interconnect charging regime, the implementation of MNP in Malaysia will have an impact on fixed line operators. If all calls directed to a mobile network are handed over on a near-end handover basis, it would be difficult determine and appropriate mobile termination charge being levied. The current arrangement of call handling between fixed and mobile will be effected. Calls to mobile will no longer be routed to their registered geographical area (a call from fixed in Central to a mobile registered in Kuala Terengganu - will not be carried by TM to be handed over in Kuala Terengganu, but instead will be terminated at the nearest POI in Central. As the proportion of calls is substantial, further in-depth study is required before any decision is taken. We may also need additional billing information from cellular operators to ensure the cellular operators is not charged the higher interconnect tariff for far end handover. The current differential between these rates as detailed in the Mandatory Standard on Access Pricing and in the current Access Agreement are material: 11.26 sen per minute for local fixed to mobile and 14.47 sen per minute for long distance fixed to mobile. It should be noted that network architecture has been designed on the basis of far-end handover and changes to the framework as a consequence of MNP may lead to stranded assets and under-performing investment in the national information infrastructure.

Furthermore, TM is proposing for the MCMC to review the interconnect rates (reducing the current gap) to accommodate for the implementation of the MNP service. Alternatively, if Maxis and DiGi were to get their way and fixed line operators were charged for MNP, then retail prices for fixed to mobile calls may need to be raised in order to recover such costs.

(e) (**TIME**) – original comment

There should be compensation for the fixed-line service provider, as fixed-line service provider might need to replace or upgrade the

hardware if MNP is implemented. Upgrading or replacing of hardware or devices will incur cost on the fixed-line service provider. Fixed-line service provider is only playing a supporting role with the implementation of the MNP.

(f) (**REDTONE**) – original comment

This is a delicate issue that will need further consideration and discussion among the operators. We understand that the current charge bands for mobile is divided into four regions (for the peninsular) for example, and certain number blocks may be assigned a region on the Donor Operator's network. Porting the number may have an issue with regards to notifying the caller party's network and how to manage the information between the three operators. This is a technical and commercial issue that needs further deliberation before a policy decision is made.

(g) (**NEUSTAR**) – original comment

Since fixed network service providers will need to route calls to portable numbers, the service providers must have appropriate options to successfully and economically terminate a call to a ported number.

In countries where NP has been deployed, a range of options have arisen, based on a combination of regulatory policies, industry structures, market dynamics, operations and technical considerations.

The general practice is that whoever collects the fee from the caller does a number portability database (NPDB) query when only service provider portability is involved. When location portability is supported, the originating local operator would normally do the NPDB query because the number could be ported from another remote location to the area local to the originating network (e.g.: a number from one area of Malaysia was ported to another area in Malaysia). In that case, whether the operator who bills the caller (if different from the originating operator) should compensate the originating operator for the query performed is a subject for further discussion.

In some countries where NP is implemented for mobile only, "default routing" approach has been adopted by the fixed line operators when its customers dial mobile numbers. In this case, the original mobile operator of the dialed number will receive the call forwarded from the fixed line operator, perform the NPDB query, and route the call to its current operator. This could be a temporarily, interim solution until all legacy switches are upgraded by the fixed line operators.

(h) (**SYNIVERSE**) – original comment

Ideally a solution could be deployed that does not impose any cost on fixed carriers. The obvious difficulty in allowing fixed carriers to charge is that the additional cost will ultimately be passed on to the consumer and will act as a deterrent to porting and competition. However, it is not fair to expect the cost of supporting MNP to be fully born by the fixed line carrier. The MCMC may want to consider sharing costs in an equitable ratio.

(i) (**EVOLVING**) – no comment

(j) (**FP**) – no comment

(k) (**ML**) – no comment

3.12.2 The MCMC's views

Below are the MCMC's responses concerning the comments received on the issue regarding the Interoperability with Fixed Networks:

(a) (**MAXIS**)

The MCMC makes no response to the comments of Maxis at this time.

(b) (**CELCOM**)

The MCMC disagrees with Celcom that introduction of MNP in the mobile operator networks could necessitate a change in the way calls are directed from a fixed network to a mobile network from a far-end handover basis to a near-end handover basis. The PIP made no recommendation regarding how fixed line operators should respond to the introduction of MNP in the mobile networks. The PIP discussed several possible options. One option would be for the fixed line operators to avoid make any changes to their networks for MNP and, therefore, to deliver calls to ported mobile numbers to the original donor mobile network and require that network to reroute the calls. Alternatively, another option would be for fixed line operators to query the centralized database (only for calls to mobile subscribers) to determine if the number has been ported. The PIP points out that there is a tradeoff associated with both option for the fixed line operators. In the first option fixed line operators may be require to compensating the donor network for re-directing the call to the

recipient network in the appropriate geographic area. In the second option there is a cost associated with implementing a solution to deliver a call to a ported mobile number to the appropriate mobile network in the appropriate geographic region. In any case the response by fixed line operators to MNP does not require call handling to change significantly for fixed to mobile calls or cause stranded assets and under-performing investment in the national information infrastructure.

(c) (**DIGI**)

The MCMC makes no response to the comments of DIGI at this time.

(d) (**TM**)

The MCMC makes the following response to TM's comment that a considerable sum of money would need to be invested in the case of the ACQ approach, and the OR-2 approach would require much less investment. In the PIP the MCMC made a comparison between the estimated investment required for an ACQ solution and a Call Forwarding solution, like the OR-2 approach, to implementing MNP in Malaysia. The comparison shows that a Call Forwarding solution requires less investment. However, the PIP also points out a number of significant technical difficulties associated with a Call Forwarding solution. The PIP also examined the investment associated with implementation of MNP in several other countries around the world. In each of these countries an ACQ solution was chosen for the final implementation of MNP. Furthermore MCMC knows of no country where MNP has been recently implemented, that did not implement an ACQ solution either initially or as the eventual final solution.

The MCMC takes note of the comments of TM that compensation ought to be paid for the costs incurred to condition the fixed network for the MNP service regardless of the routing approach adopted, such as by having the mobile operators or MCMC to bear all the network costs involved.

The MCMC takes note of the comments of TM that a waiver be given for the recurring transaction costs for database queries under the proposed ACQ scheme.

The MCMC disagrees with TM that introduction of MNP in the mobile operator networks could necessitate a change in the way calls are directed from a fixed network to a mobile network from a far-end handover basis to a near-end handover basis. The PIP made no

recommendation regarding how fixed line operators should respond to the introduction of MNP in the mobile networks. The PIP discussed several possible options. One option would be for the fixed line operators to avoid make any changes to their networks for MNP and, therefore, to deliver calls to ported mobile numbers to the original donor mobile network and require that network to reroute the calls. Alternatively, another option would be for fixed line operators to query the centralized database (only for calls to mobile subscribers) to determine if the number has been ported. The PIP points out that there is a tradeoff associated with both option for the fixed line operators. In the first option fixed line operators may be require to compensating the donor network for re-directing the call to the recipient network in the appropriate geographic area In the second option there is a cost associate with implementing a solution to deliver a call to a ported mobile number to the appropriate mobile network in the appropriate geographic region. In any case the response by fixed line operators to MNP does not require call handling to change significantly for fixed to mobile calls or cause stranded assets and under-performing investment in the national information infrastructure

(e) (**TIME**)

MCMC has noted the comments.

(f) (**REDTONE**)

MCMC has noted the comments.

(g) (**NEUSTAR**)

MCMC has noted the comments.

(h) (**SYNIVERSE**)

MCMC has noted the comments.

3.13 Comments on the Branding and Promotion

All Malaysia mobile service providers have previously branded on their network prefix (01X). With the arrival of MNP, such marketing promotions will no longer be valid since the prefix will not have any service provider significance. So service providers will have to use other tactics to retain and expand their customer base.

The Public Inquiry Paper sought views on:

Question 6.5 in the Public Inquiry Paper

MCMC seek to understand what are the impacts of MNP to the mobile service providers' branding and promotion strategies and activities.

3.13.1 Comments received

Summarized below are comments received on the issue regarding the Branding and Promotion:

(a) (**MAXIS**) – original comment

See response to question 6.2.

(b) (**CELCOM**) – original comment

The introduction of MNP in other markets has led to dramatic increases to advertising and marketing budgets as a means of protect the operators' installed base of customers. This will represents a substantial and unproductive investment at a time when the industry is moving to rollout next generation 3G infrastructure. Practice from other jurisdictions suggests that operators will focus on winning subscribers from competitors rather than addressing underserved customer segments. This will have significant impact on the forward looking mix of urban and rural network and service coverage. On this basis, MNP implementation could be considered as a distraction for the industry that undermines broader policy objectives.

Malaysia can also expect operators to undertake extensive retention strategies rather than using MNP as a means to grow the broader market. Celcom intends to position itself for MNP by aligning it with its service offerings in such a way that makes a positive difference for its subscribers. However, the immediate threat is that MNP will be used

as a tool to force tariffs down within a market environment that is already highly competitive. Celcom's assessment of marketing best practices have provided it with a range of responses to the introduction of MNP:

- Undertake a stringent network optimisation programme,
- Develop an updated marketing framework;
- Emphasis customer retention as the core strategy; and
- Forge closer relations with existing customers to minimise the potential impacts of churn.

It should also be noted that prefix numbers in Malaysia are strongly associated with mobile network operators. Most dealers market and sell products according to prefix numbers and not the network. It should be noted that implementation of MNP would engineer a change to this particular industry dynamic.

(c) (**DIGI**) – original comment

To compete effectively after implementation of MNP, operators would have to improve on customer service and value added services since customers will no longer be tied to a service provider for fear of losing their numbers in search of better services from other providers. The main differences in promotions are:

- Prefixes will no longer be used to identify a network
- While existing loyalty programme may still be valid, the inability to identify on-net numbers versus off-net numbers makes it difficult to maintain promotions based on the close user group service concept

(d) (**TM**) – no comment

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

We have highlighted this issue in our comment to Question 6.2 in which we believe that the impact to branding will be minimal. Operators already are shifting their branding campaigns from identifiers and focusing more on the main brand and sub-brands within the product offering. We believe that an awareness campaign on MNP in conjunction with a clear branding message will be able to address any subscriber confusion that may arise.

(g) (**NEUSTAR**) – original comment

As a consequence of MNP, service providers can no longer exclusively base their promotion strategies and activities strictly on their network prefix brand. With MNP, operators will need to adjust their internal business operations, marketing strategies, and develop new customer relationships that may be based on new and innovative rate plans, service packages, and new and innovative service offerings.

Although service providers will experience a certain loss of brand identity based on their network prefix, which is unavoidable when number portability is introduced, it should also be noted, that a well-designed and functional MNP solution could also be used to expand the general mobile content and application providers markets, which can improve ROI and streamline operations for operators:

Since November, 2003, US customers have had the ability to port their telephone numbers, and as of October 13, 2005, mobile customers of Taiwan are also beginning to experience transparent and seamless porting through the use of a centralized NP solution. As a result of industry's decision in the US and now Taiwan, customers are able to realize the benefits of competition as it is enabled through the centralized database approach for NP. Utilization of this centralized database structure for MNP can also be used to support the introduction of next generation services, such as Multimedia Messaging Service (MMS), VoIP, Push-To-Talk over Cellular (PoC), and Short Message Service (SMS)

In addition, more and more countries have realized that operator-specific or technology-specific (e.g.: fixed line, mobile, 3G, VoIP, and etc.) telephone number prefixes are inefficient for numbering resources, new technology development, and subscriber and economic growth. Some countries have had to change all their phone numbers because of inability to accurately predict growth rates of numbers by operator and/or technology, which is an enormous effort and significant costs to the public, the industry, and the economy. These countries are now considering eliminating these prefixes to enable quick adoption of the most efficient technology by consumer and operators, and allow them to port and migrate transparently over time.

These are just a few examples we have observed in US, Taiwan and other NP countries by mobile service providers that are expanding their brands beyond the traditional network prefix, and NeuStar welcomes the opportunity to work closely with MCMC, operators, and other service providers to make sure that the selected NP solution will

work for value-added services such as SMS, MMS, IP Multimedia Subsystem (IMS), and enhanced location-based services, data, voicemail and fax.

(h) (**SYNIVERSE**) – original comment

A byproduct of porting is that subscribers will no longer be able to associate a specific operators by virtue of the numbers dialed. This will impact the marketing campaigns of each operator. In short, every internal system and process that is dependant upon the dialed number will need to be evaluated and potentially modified.

(i) (**EVOLVING**) – no comment

(j) (**FP**) – original comment

It is our view that MCMC should not concern itself on the impacts of the loss of the service provider identifier. The general principle is that national resources such as numbers and spectrum are not owned by the operators. They are given a license to use such resources and ownership always rests with the MCMC. The new proposed numbering plan clearly identified this and suggested the move away from 3 digit short codes for mobile operators, but that plan has yet to be implemented. Notwithstanding that, MCMC has to remind the operators the short code identifier should not be associated with their brand promotions because such short codes do not belong to them.

(k) (**ML**) – no comment

3.13.2 The MCMC's views

TM:

MCMC is of the view that there will be an impact on the operators' branding and marketing strategies and from an advertising content standpoint, rather than increased costs.

Digi:

MCMC is of similar view that operators would have to improve on customer service and value added services since customers will no longer be tied to a service provider for fear of losing their numbers in search of better services from other providers.

Maxis:

MCMC is of the view that there will be an impact on the operators' branding and marketing strategies and from an advertising content standpoint, rather than increased costs.

Redtone:

MCMC acknowledges the view of Redtone.

NeuStar:

MCMC is of similar view that operators will need to adjust their internal business operations, marketing strategies, and develop new customer relationships.

Syniverse:

MCMC acknowledges the Syniverse position of deferring to the viewpoint of the operators.

First Principles:

MCMC acknowledges the view of First Principles.

3.14 Comments on the cost estimates of OSS modifications

Each of the three Malaysian mobile service providers has advanced operations support systems (OSSs) that serve their subscriber base. These systems span customer service where orders are placed, to network provisioning and service activation, and conclude with billing.

The Public Inquiry Paper sought views on:

Question 7.1.5 in the Public Inquiry Paper

MCMC seeks cost estimates for the necessary modifications to OSSs for an all call query and centralized database approach to MNP from both mobile service providers / fixed line service providers.

3.14.1 Comments received

The responses from the service providers contain confidential information but are generally in line with the expectations of MCMC. Where there are differences from MCMC's estimates further clarification will be sought from the service provider.

3.14.2 The MCMC's views

MCMC has noted the estimated cost provided and will consider them in the final report. In view of the confidential nature of the information provided, no other views will be published.

3.15 Comments on the Network Costs

These are costs incurred in preparing the network for providing the number portability services. Establishment costs include costs that are incurred as a result of establishing network and operational capabilities to provide the service in question. These are costs that are required once in order to provision the service. Examples would be upgrade of exchanges with NP triggers, Right-To- Use fees.

The Public Inquiry Paper sought views on:

Question 8.1 in the Public Inquiry Paper

MCMC seeks cost estimates for the necessary modifications to the network for an all call query and centralized database approach to MNP from both mobile service providers / fixed line service providers.

3.15.1 Comments received

The responses from the service providers contain confidential information but are generally in line with the expectations of MCMC. Where there are differences from MCMC's estimates further clarification will be sought from the service provider.

3.15.2 The MCMC's views

MCMC has noted the estimated cost provided and will consider them in the final report. In view of the confidential nature of the information provided, no other views will be published.

3.16 Comments on the Per-Line Administrative Costs

These costs are incurred by the service provider as a result of providing the service. These costs involve costs associated with fulfilling the request for service for activation of porting of a number for a particular customer line. These costs which vary depending the MNP approach used and may include the cost of populating the call forwarding number (call forwarding approach); additional cost to support the database (centralized database approach); cost of modification of subscriber data in network elements, customer care and billing systems or cost of modifying inter-operator accounting and billing systems.

The Public Inquiry Paper sought views on:

Question 8.2 in the Public Inquiry Paper

MCMC seeks estimated per line administrative costs (exclusive of the clearinghouse fixed fee and per transaction fee) for an all call query and centralized clearinghouse centralized database approach to MNP from both mobile service providers / fixed line service providers.

3.16.1 Comments received

The responses from the service providers contain confidential information but are generally in line with the expectations of MCMC. Where there are differences from MCMC's estimates further clarification will be sought from the service provider.

3.16.2 The MCMC's views

MCMC has noted the estimated cost provided and will consider them in the final report. In view of the confidential nature of the information provided, no other views will be published.

3.17 Comments on the clearinghouse charging mechanism

The MCMC recommends imposing a fixed fee plus transaction fee for each database access and porting transaction for the centralized clearinghouse centralized database approach.

The Public Inquiry Paper sought views on:

Question 8.2.1 in the Public Inquiry Paper

The MCMC seeks comment on the proposed clearinghouse charging mechanism.

3.17.1 Comments received

Summarized below are comments received on the issue regarding the clearinghouse charging mechanism:

(a) (**MAXIS**) – original comment

Overall cost recovery framework - We believe the cost recovery framework for MNP requires more analysis and comprehensive detail before we can respond to the MCMC's general questions. As argued above, Maxis suggests the Government to bear the direct costs of MNP implementation. Already, the 3 operators are contributing significantly to USP funding and T2 rollout and we do not believe that the operators should incur further high costs as a result of MNP implementation (direct costs of RM 200-250 m¹⁴ and overall costs of >RM 400 m at industry level). Actual benefits to operators are very limited, as MNP is not likely to result in major shifts in market share due to the already high percentage of prepaid churn (50-60% per annum). Hence, we believe that the Government should bear the direct costs of MNP implementation, i.e., the creation of the central clearinghouse and database, and the respective operator upgrades of network and IT systems. As mechanism, we suggest rebates on licensing fees.

Compensation of the manager of the clearinghouse and database - We agree with the principle of a fixed management fee, but would need to

¹⁴ Assuming similar direct costs of MNP between the 3 mobile operators, plus the additional industry costs for introduction of the centralized clearinghouse and database, and the costs for TM for MNP preparation.

understand the rationale for a transaction fee. For example, a transaction fee that is based on per database query would seem unreasonable and operators would then be better off with a system of reference databases under their own control. A transaction fee could be justified, if the database manager was indeed to incur any significant additional administrative costs for each porting (e.g., for database modification or testing). Preferably, Maxis suggests a management and performance fee. The management fee should cover the cost of setting up and operating the clearinghouse and database. The performance fee should provide a reasonable profit and return on investment, if key performance targets are achieved.

(b) (**CELCOM**) – original comment

As indicated in our earlier response to Question 5.5.1 of this submission, Celcom strongly recommends that proposed clearinghouse be owned and operated by a consortium of industry stakeholders. Given that this facility will represent a monopoly asset, any charging arrangements will need to be regulated by the MCMC. On this basis, it is strongly recommended that any charges related to the clearinghouse are guaranteed to be based on the concept of cost recovery. If the MCMC is committed to pursuing this option, any proposed charging regime will need to be the subject of an independent audit in order to ensure transparency and to build industry confidence in the clearinghouse. Celcom submits that it is too early to provide any definitive response to this issue, given that it is a shared resource and no consultation with other parties has taken place. As is the case in other markets, it is suggested that the MCMC establish a MNP Working Group comprised of current network operators in Malaysia as a means of establishing appropriate charging mechanisms and pricing levels for clearinghouse services.

(c) (**DIGI**) – original comment

In the proposal mentioned in section 2.1 above where a consortium owns and manages the CCH we envisage that a fund be set up and controlled by the Commission. Each operator contributes to the fund based upon its number of subscribers and withdrawals are based on actual costs.

In Norway where DiGi's parent Telenor operates, the central number reference database akin to the proposed CCH is jointly owned by the

operators. The operators in turn are charged for the use of the CCH which contributes to the operating costs. The costs elements include:

- connection fee (especially for a new entrant)
- fee per quarter
- variable fee that is dependent upon the number of ports initiated by the operator as Recipient Network Operator. This can be mutually agreed between owners of the CCH.

We foresee a similar arrangement be agreed upon in Malaysia. The various fees described above will contribute to the fund that is used to manage the CCH.

(d) (**TM**) – original comment

As stated in our comments to Question 5.5.1, TM proposes that the clearinghouse be owned and operated by a consortium of industry stakeholders. Given that this facility will represent a monopoly asset, we propose that any charging arrangements will need to be regulated by MCMC. On this basis, it is strongly recommended that any charges related to the clearinghouse are guaranteed to be based on the concept of cost recovery. If the MCMC is committed in pursuing this option, any proposed charging regime will need to be the subject of an independent audit in order to ensure transparency and to build industry confidence in the clearinghouse. Again, as previously explained, fixed line operators are not the interested party, whereby the costs are considered as “unavoidable costs” to allow MNP service to take place. As such, TM is to be excluded from being imposed of the said charges, and instead should be fairly compensated (note: see Q6.4)

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

We propose that the charging mechanism to consist of a fee that is charged for porting the number plus a fixed maintenance fee in proportion to the audited mobile revenue during the previous calendar year. We believe that a transaction fee is administratively more cumbersome to administer and will be open to dispute when it comes to verification and billing. A fixed maintenance fee is not only more administratively efficient but is also inline with our earlier statement that the clearing house should not be a profit centric organization.

(g) (**NEUSTAR**) – original comment

In developing a clearinghouse charging mechanism, it is noted that the MCMC recommends imposing a fixed fee plus a transaction fee for each database access and porting transaction event. NeuStar agrees that this approach is a formula that is fair and even handed to all operators in the Malaysian telecommunications markets.

Another approach for a charging mechanism to fund the clearinghouse would be to impose direct charges and transaction charges. The transaction charge would be a specific charge assessed to a carrier for each network access service, or a per port charge when a number is ported from one carrier to another. The per-port charge would be assessed to the new carrier directly, or the MCMC could also determine that each carrier assume a portion of the port charge, based on an allocated cost algorithm. Other activity specific to the operator, such as Help Desk assistance, could be charged directly to the operator requesting the specific activity or assistance.

(h) (**SYNIVERSE**) – original comment

Syniverse advocates the recommendation of the MCMC of a fixed fee and transactional fee for responsibilities to administer and run the proposed clearinghouse.

(i) (**EVOLVING**) – no comment

(j) (**FP**) – no comment

(k) (**ML**) – no comment

3.17.2 The MCMC's views

Maxis:

The proposed charging mechanism of a fixed fee plus transaction fee is consistent with those employed in several countries in which MNP has been implemented. Examples include the USA, Finland, and Sweden. Additional service-specific charges such as customized reports, reference database download to restore local databases, and premium help desk support have been levied. MCMC could regulate the charging arrangements which would be based on the principle of cost recovery.

With regard to a performance fee, in some countries, an MNP service level agreement between the clearinghouse provider and operators does allow for service credits to be issued if a service performance metric falls below an acceptable level.

Celcom:

The proposed charging mechanism of a fixed fee plus transaction fee is consistent with those employed in several countries in which MNP has been implemented. Examples include the USA, Finland, and Sweden. Additional service-specific charges such as customized reports, reference database download to restore local databases, and premium help desk support have been levied. MCMC could regulate the charging arrangements which would be based on the principle of cost recovery.

Digi:

The MCMC is of similar view expressed by Digi.

TM:

The MCMC is of similar view expressed by TM

Redtone:

The proposed charging mechanism of a fixed fee plus transaction fee is consistent with those employed in several countries in which MNP has been implemented. The transaction fee has not seen to be administratively cumbersome to administer in other jurisdictions.

NeuStar:

The MCMC is of similar view expressed by NeuStar.

Syniverse:

The MCMC is of similar view expressed by Syniverse.

3.18 Comments on the Call Conveyance Costs

These are cost associated with number portability are related to additional call processing, signaling, call setup, and routing. The additional call processing is required for the triggering associated with database queries for the ACQ approach. The call forwarding approach also required additional processing to forwarded calls to ported numbers. The ACQ approach requires addition processing for the routing schemes required to route ported calls. The additional signaling is required for database queries and the signaling associated with ported calls. Call set-up delays cause additional costs by demanding greater capacity in the switch and transmission network elements used during call set-up. Additional routing is required to route calls to ported numbers especially when a call forwarding approach is used. Conveyance costs vary greatly from network to network and are dependent on volume of ported numbers, implementation approach, volume of queries, and network characteristics

The Public Inquiry Paper sought views on:

Question 8.3 in the Public Inquiry Paper

MCMC seeks estimated call conveyance costs for an all call query and centralized database approach to MNP from both mobile service providers / fixed line service providers.

3.18.1 Comments received

The responses from the service providers contain confidential information but are generally in line with the expectations of MCMC. Where there are differences from MCMC's estimates further clarification will be sought from the service provider.

3.18.2 The MCMC's views

MCMC has noted the estimated cost provided and will consider them in the final report. In view of the confidential nature of the information provided, no other views will be published.

3.19 Comments on the Costs Recovery

The MCMC will establish guiding principles to ensure that the cost recovery process is equitable in terms of ensuring the appropriate allocation of costs resulting from the introduction of mobile number portability between service providers. These principles include cost causation (examining the relevant costs); cost causality (requiring that the customer who decides to port a telephone number incur appropriate costs); cost minimization; and ensuring effective competition.

The Public Inquiry Paper sought views on:

Question 8.4 in the Public Inquiry Paper

The MCMC seeks comment on the general principles which will guide cost recovery for mobile number portability.

3.19.1 Comments received

Summarized below are comments received on the issue regarding the cost recovery:

(a) (**MAXIS**) – original comment

See response to question 8.2.1 and suggested framework for cost recovery.

(b) (**CELCOM**) – original comment

As indicated above in Celcom’s response to Question 8.2.1 of this submission, there will need to be general agreement on fundamental principles given the impact of MNP across all sector stakeholders. General principles for cost recovery do not represent an arbitrary decision that can be taken by any one single operator, but should be determined by a co-operative and collaborative approach. Against this background, Celcom is of the view that this a matter for broad industry consultation through a forum such as the MNP Working Group proposed above. We note that extensive work has been undertaken with respect to the principles of cost apportionment for MNP in other global markets. There is currently no industry consensus about the best approach. In general terms however, Celcom considers it appropriate that the industry be compensated for those significant investments related to MNP implementation through the porting fee

proposed in our response to Question 4.6 of this submission. If the MCMC does not want to pass on these costs directly to the consumer, it could consider alternative compensation arrangements such as reductions in USO contributions, taxation rebates or a reduction in licence fees.

(c) (**DIGI**) – original comment

Practical choices in apportioning a particular cost for cost recovery include:

- Imposing it entirely on the Donor Network Operator
- Imposing it entirely on the Recipient Network Operator
- Sharing it among the relevant market players
- Allowing the relevant market providers to negotiate how the cost is apportioned
- Requiring all market players to bear their own cost
- Imposing it on users

In the context of Malaysia we are of the opinion that costs should be shared among all subscribers of all operators. According to the arrangement as proposed in section 2.1 of this document, cost is recovered via charges to Recipient Network operators proportionate to the number of portings (see 5.2).

Administrative costs associated with each porting are recovered via porting fees charged while any additional costs should be built into tariffs i.e. recovered indirectly from customers. It is imperative that no extra fees are charged.

(d) (**TM**) – original comment

TM considers that it is too early to provide any definitive response to this issue as it is a shared resource and no consultation with other parties has taken place. We would suggest that the MCMC establish a MNP Working Group comprised of current network operators in Malaysia as a means of establishing appropriate charging mechanisms, pricing levels and other related matters for clearinghouse services. In our view, general principles for cost recovery do not represent an arbitrary decision that can be taken by anyone single operator but should be determined by a co-operative and collaborative approach. Having said that, as in essence the fixed line operator would gain little from the implementation of the MNP. In addition, the implementation would give rise to more disputes as the fixed network would need to allow all mobile prefixes (ie. 01x) at all interconnect routes regardless

the routing approach adopted (except for the OR-2 approach, where routing arrangement remains status quo). Hence, would further results in possible losses from settlement disputes with recipient networks. Under the above circumstances, TM is in the opinion that the General Principles for Costs Recovery are not relevant to fixed line operators. Instead MCMC should make some provisions of how to lessen the financial implications on fixed line operators as a result of having to comply with the MNP implementation. This could be done by adopting a low cost MNP Solution (i.e. OR-1, Hybrid and OR-2 approaches) and introduction of compensation plan/package.

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

Operators should be allowed to recover their costs. Our concerns are more towards issues as to how the costs are allocated and calculated in a fair and transparent manner. Generally we are in agreement with the cost recovery principles stated in para 8.4 however we would like to highlight that the issues arises in the details when implementing.

(g) (**NEUSTAR**) – original comment

Different cost recovery models have been adopted in different countries, based on their unique market situations. NeuStar suggests that MCMC study all available models and their associated pros and cons in order to determine which cost recovery model best suits the Malaysian market. To facilitate MCMC's evaluation of different cost recovery models, NeuStar offers a brief overview of two separate cost recovery models which have been deployed separately in the US and Canadian markets.

Both cost recovery models take into consideration certain common industry costs associated with the MNP database, infrastructure and administration costs. Thorough analysis and careful deliberation should be given as to how industry will support the costs associated with the design, implementation, and general day-to-day operations and administrative costs of a Number Portability Database, which may take the form of either a centralized, distributed, or possibly a hybrid solution. Recovery of common industry costs associate with the National Database must be based on a transparent and fair methodology that does not disadvantage one market competitor over another market competitor.

Cost Recovery Models—For common industry costs, number portability cost recovery methods often follow one of two common

approaches. MCMC recognizes that the costs associated with the implementation of MNP could be significant, and may wish to consider the pros and cons from the various cost recovery models described below, as well as other cost recovery models that have been adopted in different countries, based on their unique situations. NeuStar suggest that MCMC study all available models and associated pros and cons to make the right decision for Malaysia.

In the US markets, regulators allowed operators to recover NP related costs through a Cost Allocation Methodology. In certain other countries, the model employed is a Cost Causer Model, which assigns the NP related costs back to the carrier that created the cost. As another example, a one-time portability fee will be paid by the subscriber to the losing operator; however, the regulator typically establishes a cap for this fee.

Cost Causer Model—In this model, NP costs are charged proportionally to the amount that operators port numbers into their networks. Therefore the more port-ins an operator causes, the larger its proportion of the costs will be. The Cost Causer Model is a transaction based costing model that assigns the specific NP charges back to the carrier that has incurred the charge. This model forces carriers to prudently focus on utilizing NP strictly as a competitive tool.

As operators become more comfortable with NP, they have found that the NP platform enables them to perform internal network/switch related operations, as a cost effective method and with the least service interruption to subscribers as an alternative to other more traditional approaches. Under a Cost Causer Model, the use of the NP platform can become expensive to a small operator, hence causing them to forego such network/switch efficiencies, leaving in place inefficient network routing or stranding numbering resources.

Allocated Cost Recovery Model—In this model, all transaction and NPAC system upgrade NP costs are pro-rated among the participants of the NPAC contract, based on their respective telecom-related revenues, thus harmonizing costs among all telecom participants. In the US, the Federal Communications Commission (FCC) allows carriers to recover NP deployment related costs via a Cost Allocation Methodology that assesses a monthly NP surcharge to each served subscriber for a period of up to five years. These costs, however, must be approved by the FCC before being applied, based on certain capital expenditures and expense of the operator.

In general, allocating NP costs among all carriers has benefited local competition in the US, enabling smaller operators to effectively compete with Incumbents without undue financial hardships. Allocation

of costs is also of benefit to the consumer, resulting in a wide variety of programs and service packages offered by the new entrants into the telecommunications markets.

One other aspect, as noted previously, is that operators have learned that the NP platform enables operators to perform internal network/switch related operations. Use of the NP platform can also assist operators in restoring subscribers' telephone service in the case of network outages due to failures, natural disasters or acts of terrorism. Restoration of the telecommunications infrastructure can sometimes take many months, however, through NP, operators are able to "port" government and commercial telephone numbers out of an affected area, thus restoring incoming calls to these customers – without incurring huge internal costs for restoring service by the affected operators for restoring service.

The key for a good cost allocation mechanism is to have very well defined rules with little ambiguity and that is easy to enforce. In general, it is a good practice that NP costs be shared amongst all benefiting constituencies so as not to overburden any specific party.

(h) (**SYNIVERSE**) – original comment

The structure of costs for Number Portability varies with the technological implementation and with the specific business model arrangements selected by the industry. From an economic point of view, these costs fall into three specific categories, each of which can be separately analyzed. These include:

- System Setup Costs – Results from decisions to implement NP and incurred at outset. These comprise one time costs and would be incurred even if no subscribers ported their number
- Cost of establishing and maintaining central application
- Cost of SW upgrades necessary to modify OSS, Switching
- Administrative Setup – Admin costs caused directly by a subscribers request to port their number on a per line or group of lines basis
- Conveyance/NPDB Query – costs for the additional conveyance of calls resulting from individual calls

In considering the fixed costs of the initial setup of the service, the outlay will be incurred prior to any subscribers benefiting from the mandate.

Fixed costs are typically defined as the infrastructure of the central system administered by a potential third party. Additionally, fixed costs will be absorbed by operators specifically as they modify networks, Operational support systems, integration and other NP implementation costs. A primary decision in a central model is the determination of whether these costs can be allocated on a shared basis. To facilitate this, regulators will provide guidance regarding whether the costs of a central solution may be shared, the allocation methodology (market share vs. usage etc.) and what measures will be granted to recover these costs if any. Regarding the variable administrative costs associated with each port, decisions must be made as well to determine what party will be charged (Donor, Recipient, and Subscriber) and what measures if any will be granted to recover. In order to ensure the level of porting would not be inhibited, any potential charges to the subscriber should be minimized. Too high a level of per subscriber setup charge will compromise the ultimate objective of enhancing consumer interest and potentially reduce the propensity to port. For Administrative cost and recovery, please refer to question 4.6a. Lastly, conveyance cost of the ensuring the call or content receives the ported subscriber must be accounted for. Typically, this charge in an All-Call-Query routing scenario is absorbed by individual operators and not shared unless the service is provided by a third party.

In view of the highly competitive characteristics of the mobile industry, particularly after MNP has been made available, each mobile operator could have a more or less similar ratio of porting-in and porting-out customers. It is expected that the DNO charge set by each mobile operator should be similar and some of them may even agree to set zero charges on a reciprocal basis based upon this. If the variable database updating/porting administration charges to be imposed on the Recipient Network Operator (RNO) or by the Donor Network Operator (DNO) cannot be commercially agreed, the regulator should be prepared to look into the actual amount of work involved and determine the reasonable charge that could be imposed. In all circumstances, it is necessary to ensure that all the per subscriber porting set-up/variable cost procedures would be carried out efficiently and that no operators should be asked to compensate for the other parties' inefficiencies. The general level Long-Run Average Incremental Cost (LRAIC) theory can be considered for gauging this charge.

Charging Arrangements/Models for NP - Operators can potentially recover these costs as directed in the guidelines set forth by MCMC.

Listed below are several cost recovery model examples of many permutations; each with unique tradeoffs.

Model One - This first model uses a fund owned and controlled by the regulatory agency or its assignee. Each operator contributes to the fund based upon its number of subscribers and withdrawals are based on actual costs. The benefit of this model is that the costs are shared among all subscribers of all operators. Because portability benefits everyone, not just those who port, through better coverage, better customer service and better rate plans, this is considered a fair cost model. The downside is that there is no incentive to keep costs down, since an operator will be reimbursed for costs incurred.

Model Two - This second cost model calls for each operator to assess a small monthly fee to all its subscribers. Since all subscribers benefit from number portability, this is a fair model, which allows for cost sharing among the subscribers. In addition, costs are kept at a minimum because the operator wants to keep its monthly fees low or it will lose subscribers. In this model, the regulators should enforce a reasonable ceiling for charges.

Model Three - The third model involves charging the subscriber who ports. In this case, the recipient operator, the donor operator, or both may collect the fees. Please note that in some countries contract law limits what the donor operator may collect. In general, the recipient operator is in a better position to charge a fee because it is gaining a customer. The recipient operator also may choose to waive the fee during special incentive periods or for highly valued subscribers. Charging a subscriber to port is a deterrent to porting and operators may end up paying up front for mandated changes for which it can never fully recover costs if all cost recovery is dependent upon port charges.

Alternative Models to Apportion NP Costs:

- Imposing Costs directly to Donor Operator
- Imposing Costs directly on Recipient Operator
- Sharing it among all Network Operators
- Allowing Market Players to negotiate how cost is apportioned
- Requiring all Operators to bear own costs
- Imposing costs of NP on market subscribers

- Fixed monthly charges, per transaction charges, connection/subscription charges, data downloads, or combinations of above

(i) (**EVOLVING**) – no comment

(j) (**FP**) – no comment

(k) (**ML**) – no comment

3.19.2 The MCMC's views

Maxis:

The views of Maxis are acknowledged and will be taken into account. It is not envisaged that the Government will bear any costs associated with MNP implementation.

As stated in the PIP, the general principles which will guide cost recovery for MNP are consistent with those applied in many countries. MCMC will make recommendations on an appropriate cost-recovery mechanism(s) for operators and will convene a cross-industry working group to reach agreement.

Celcom:

The views of Celcom are acknowledged and will be taken into account. MCMC will make recommendations on an appropriate cost-recovery mechanism(s) for operators and will convene a cross-industry working group to reach agreement.

TM:

The views of TM are acknowledged and will be taken into account. MCMC will make recommendations on an appropriate cost-recovery mechanism(s) for operators and will convene a cross-industry working group to reach agreement.

Redtone:

MCMC is of similar view with Redtone.

NeuStar:

The MCMC acknowledges the views of NeuStar which will be helpful in making recommendations on an appropriate cost-recovery mechanism(s) for operators.

Syniverse:

The MCMC acknowledges the views of Syniverse which will be helpful in making recommendations on an appropriate cost-recovery mechanism(s) for operators.

3.20 Comments on the Porting Costs

The MCMC will establish guidelines as to the amount of costs that can be charged by the donor service provider to the recipient service operator each time a customer ports their number.

The Public Inquiry Paper sought views on:

Question 8.5 in the Public Inquiry Paper

The MCMC seeks comment as to the costs involved by the donor operator and if they should be compensated for these costs by the recipient operator. If they should be compensated should the recipient pay all or part of the costs.

3.20.1 Comments received

Summarized below are comments received on the issue regarding the porting cost:

(a) (**MAXIS**) – original comment

See response to question 8.2.1 and suggested framework for cost recovery.

(b) (**CELCOM**) – original comment

In Celcom’s assessment of international industry practices with respect to MNP, there appears to be no consistent view in relation to settlement payments between donor and recipient networks. In some countries, such as Australia, the donor and recipient networks meet

their own costs. In other jurisdictions such as Hong Kong, Singapore and Ireland, the recipient network pays a charge to cover the donor network's administrative costs of processing porting requests. Within this context, Celcom acknowledges that compensation arrangements should ultimately be driven by specific country market circumstances. On this basis, there needs to be a recognition of the sunk investment of all existing network operators in developing a highly effective mobile industry in Malaysia. MNP frameworks that fail to recognise these contributions would not be appropriate in a developing market context.

As a general guide, Figure 6 provides a summary overview of the cost apportionment arrangements in selected economies. It should be noted that this refers to operator specific costs and not common industry costs such as shared infrastructure (such as a centralised database clearinghouse) established by the sector to support inter-operator number portability processes. The balance between operator specific and common industry costs will depend on the technical solution deployed.

Figure 6: There is no common global agreement as to compensation arrangements for donor networks

There is broad consensus that each network operator should bear its own set up costs for MNP

International approaches to Apportionment of Operator-Specific Costs

Country	Set-Up Costs	Additional Conveyance Costs	Per Port Charges
Australia	Each bears own costs	Each bears own costs	Each bears own costs
Netherlands	Each bears own costs	Each bears own costs	Each bears own costs
Ireland	Each bears own costs	Each bears own costs	Recipient operator pays a per port charge
United Kingdom	Each bears own costs	If call transits from originating to recipient network across donor operator recipient pays transit charge to donor network	Recipient operator pays a per port charge
Hong Kong	Each bears own costs	Mobile operators contribute to fixed incumbent's costs	Recipient operator pays a per port charge
United States	Each bears own costs	Each bears own costs	Each bears own costs
Singapore	Each bears own costs	Each bears own costs	Recipient operator pays a per port charge

Figure 6

Asian markets such as Singapore and Hong Kong have moved to compensate donor networks

Source: TelstraClear, *Submission on Local and Mobile Number Portability: A Response to the Commission's Request for Comments on Cost Apportionment Principles*, Auckland 18 August 2004

As a principle, Celcom recommends that in Malaysia's case, the donor network should be compensated on all associated costs from the recipient. The scale and scope of such compensation should be the subject of industry discussion and consultation.

(c) (**DIGI**) – original comment

The donor operator should only be compensated (if at all – to be mutually agreed by all parties) for the following:

- A standard administrative fee
- Any delay in returning a ported number which has been terminated

(d) (**TM**) – no comment

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

We are of the opinion that the donor operator should not be compensated for the cost by the recipient operator as we believe that the costs are ancillary and is part of the cost of doing business. We believe that such similar costs will arise in the normal circumstances when a customer traditionally churns (without porting his number). This is in line with other service industries like banking and credit card services where customer attrition is part and parcel of the cost of doing business.

(g) (**NEUSTAR**) – original comment

It should be noted that each individual operator's internal costs could vary significantly depending upon their systems, administrative staffing, and operational processes. As a result, developing a guideline as to the amount of costs that can be charged by the donor service provider to the recipient service operator each time a customer ports their number may be difficult to establish.

As a point of reference on different models on compensation for costs incurred by the donor operator, in Taiwan, a one-time portability fee is paid by the subscriber to the losing operator. However, the regulator (DGT) has set a cap for this fee.

While recognizing that operators will incur certain internal costs associated with the porting process when they are the donor operator, a case made that operator specific porting costs should be borne separately by each operator, thereby providing incentives for each operator to minimize internal costs while maintaining the ability and incentive to compete.

(h) (**SYNIVERSE**) – original comment

It should be noted that in a Recipient initiated porting scenario, any assessed fee directed to subscriber is easily collected by the Recipient. In turn this fee is usually shared with the Donor to reimburse them for their incurred administrative costs. The guiding principal is premised upon the nature of the Donor losing the revenue attributed to the lost subscriber. As such, they have administrative responsibility in which cost will be incurred and may receive compensation for this activity. It should be noted, that while regulated in various countries in this manner, the Recipient may elect to waive the porting fee as an incentive to the new subscriber to port into their network. However,

they may still have responsibility to reimburse the Donor for an agreed or regulated fee should the porting fee be waived.

(i) (**EVOLVING**) – no comment

(j) (**FP**) – no comment

(k) (**ML**) – no comment

3.20.2 The MCMC's views

Maxis:

The Maxis response did not directly address the question regarding the recipient compensation of the donor for costs incurred by the donor.

Celcom:

MCMC is of similar view with Celcom that the donor network should be compensated on all associated costs from the recipient. In this context, associated costs mean the per-line administrative costs incurred when a number is ported. MCMC accepts that the scale and scope of such compensation should be the subject of industry discussion and consultation.

Digi:

MCMC is of similar view with DiGi.

Redtone:

The MCMC believes that the donor network should be compensated by the recipient for administrative costs when a number is ported. This practice is consistent with those in many countries.

NeuStar:

The MCMC recognizes that each individual operator's internal costs could vary significantly. MCMC accepts that the scale and scope of such compensation should be the subject of industry discussion and consultation.

Syniverse:

The MCMC is of similar view of Syniverse.

3.21 Comments on the Implementation timeframe

It is the goal of the MCMC to establish a realistic implementation timeframe, while also recognizing that the expediency by which mobile number portability is implemented will result in greater choice for consumers and enhancement of competition among mobile service providers. MCMC is targeting a duration of 12 to 15 months for implementing the proposed technical solution.

The Public Inquiry Paper sought views on:

Question 9.1 in the Public Inquiry Paper

The MCMC seeks comment on the proposed technical solution implementation timeframe.

3.21.1 Comments received

Summarized below are comments received on the issue regarding the implementation timeframe:

(a) (**MAXIS**) – original comment

Based on the experiences in other countries, we believe that the proposed time frame of 12-15 months to implement the technical solutions across all operators is realistic.

However, as argued above, we recommend aligning the overall MNP implementation time frame with the other ongoing industry-wide implementation initiatives, especially T2, 3G, broadband and USP. All four initiatives are major efforts and require the dedication of the operators' best resources. Therefore, we recommend implementing MNP only in early 2008. This timeframe will also allow catering to the changed inter-region porting and interconnecting that we suggest introducing with MNP.

Once the implementation timeline is clear, we suggest setting clear deadlines to ensure all operators (including Maxis) are getting focused

on undertaking the required changes to network and systems, as well as driving the establishment of the central clearinghouse and database.

(b) (**CELCOM**) – original comment

In most jurisdictions the implementation of IN based MNP solutions has taken several years. The amount of work that must be undertaken in the planning and execution of the technical solution proposed by the MCMC cannot be underestimated. In advance of any technical rollout, it should also be acknowledged that a wide range of issues (including those highlighted in Celcom's response to Questions 4.4, 5.5.1, 8.2.1 and 8.4 in this submission) need to be agreed and negotiated between industry participants as part of an MNP Working Group forum.

As indicated below, on the basis of our best estimate, Celcom believes that at least 21 months will be required for the successful implementation of a MNP solution along the lines proposed by the MCMC. A more aggressive timeline would seriously compromise the robustness of the implementation and is likely to lead to degraded service levels and technical faults

Figure 7: It is estimated that the implementation of a highly complex technical MNP solution will take almost two years in Malaysia

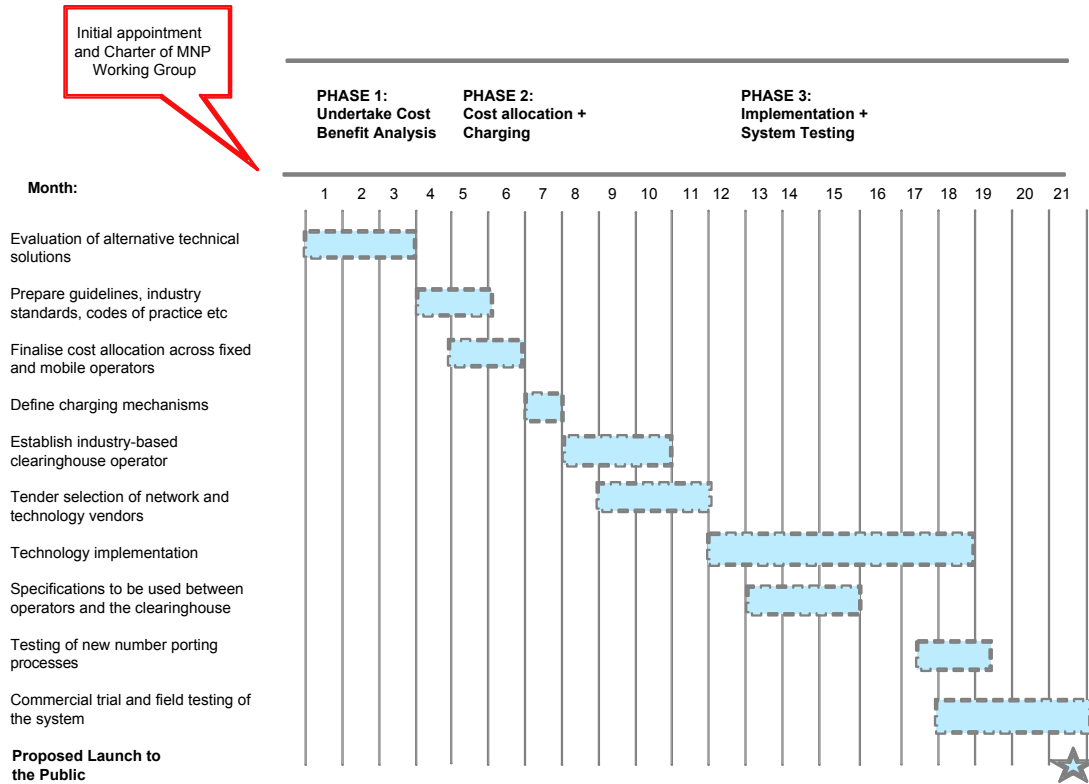


Figure 7

Against the timeline suggested in Figure 7, it should also be noted that implementation schedules for a call forwarding option would be much shorter (and significantly less expensive).

(c) **(DIGI)** – original comment

We envisage that a full MNP programme can be implemented over a period of 16 months from the MNP Determination by MCMC. Please see Attachment A – MNP Implementation Timeframe.

(d) **(TM)** – original comment

Prior to implementation of the technical solution (in this case assuming MCMC is going ahead with the ACO and centralised database approach), the main concern about the potential risks associated with uncertain demand for MNP from the end users in Malaysia needs to be carefully addressed. At present, such demand⁶ (if present) has not been quantified by the MCMC to justify its implementation.

MCMC should also consider the success rate of MNP implementation in countries like the Netherlands and UK (note: see Section 2, General

Views and Comments), who had launched the service back in 1999, but apparently have not seen an encouraging number of take up.

Using the above facts as a basis, a costly MNP implementation using ACO with centralised database approach could be seen as prohibitive especially to a fixed line operator in the absence of any proven demand. Nevertheless, in order to fulfill the Ministerial Direction, TM would like to recommend that MCMC considers the OR-2 approach as the immediate solution. Subject to technical feasibility, the OR-1 and Hybrid approaches may also be considered.

TM is therefore in the opinion, that MNP implementation in general is only feasible for long term planning, that is when the consumers are ready and aware of the MNP service and more demands exist. This is in line with TM fixed network migration to NGN where a more robust and flexible solution for MNP service is available.

Based on the above timeline, the 12 - 15 months duration for the proposed technical solution (ie. ACQ with centralised database) is not supported. OR-1 and Hybrid approaches are possible as interim solutions, but would require the fixed line operator to re-configure and re-dimension the network capacity, hence more time required (as well as more costs would be incurred) compared under normal circumstance. Therefore, for immediate roll out and minimal investment requirement, OR-2 approach is recommended.

(e) (**TIME**) – no comment

(f) (**REDTONE**) – original comment

We would like to highlight that the implementation of number portability is long overdue and Malaysia is behind many countries in the region, for example Hong Kong. It is therefore in the interest of the public that the policy be implemented on an expedient basis. We are of the opinion that the technical solution for the implementation timeframe should take no longer than 9 months and should be shortened if the technical barriers can be resolved at an earlier date. This is due to the fact that most of the learning process and the technical considerations can be benchmarked from other jurisdictions therefore we will not be working from scratch.

(g) (**NEUSTAR**) – original comment

Implementation of the ideal MNP solution is a complicated and multi-step process. MCMC has stated that the technical implementation for

MNP should be targeted for a duration of between 12 to 15 months. It is suggested that MCMC should consider that the following areas must be addressed in order to meet the target schedule for implementation of the MNP technical solution:

- Drafting and finalizing regulations and policies;
- Defining system requirements and interface specifications;
- Industry agreeing on business rules and porting flows;
- Selecting vendors and solutions, to design, implement, deploy and test the MNP system(s);
- Operational readiness and internal training, and;
- Public marketing campaign and user education/promotion

Based on worldwide experience, typically the preparation and implementation timelines for a national NP rollout can be anywhere from 6 to 15 months, depending on the degree of new development, certification and testing necessary. This period cannot really begin to any great extent, of course, until MNP rules are established and process decisions are made, the process of which may be a time consuming effort.

It would be our recommendation, based on our experience, that the sooner Malaysia can begin addressing the multiple issues and getting the process started, the better prepared and positioned it will be.

(h) (**SYNIVERSE**) – no comment

(i) (**EVOLVING**) – no comment

(j) (**FP**) – original comment

We believe that implementation of MNP should not have to wait another 15 to 18 months, especially so where a 3rd party clearing house will be involved. This will reduce the workload of the operators and we do not see the need for 12 to 15 months for the implementing the technical solution. By way of analogy, operators take less than 6 months to plan, build and roll out an entire mobile network from scratch. Thus it begs the question why rolling out MNP should take so long. In the words of the PI paper, “..the expediency by which mobile number portability is implemented will result in greater choice for consumers and enhancement of competition..”. We suggest that MCMC set shorter time frames for the technical implementation and

deployment. In our view, deployment should not take longer than 6 months from commencement. MCMC can always review the time frames if the need arises.

(k) **(ML)** – original comment

ML believes that the proposed technical solution implementation timeframe is reasonable for postpaid subscribers. Technical solution implementation timeframe for prepaid subscribers can be at least 3-6 months shorter.

3.21.2 The MCMC's views

Maxis:

MCMC and Maxis agree with the proposed technical solution implementation timeline of 12-15 months. The MCMC will take the ongoing industry-wide implementations into consideration.

Celcom:

The MCMC disagrees that at least 21 months will be required for the successful implementation of MNP in Malaysia. Many activities prior to technology implementation identified in the suggested timeline can be executed in a parallel thereby shortening the implementation period.

Digi:

The MCMC and Digi implementation timeframes only differ by one (1) month.

TM:

The proposed timeframe was based on implementing MNP using an ACQ and centralized database approach.

Redtone:

MCMC considers a 9 month implementation timeframe proposed by Redtone to be too aggressive. MCMC estimates that the time between tender preparation and service launch will be 9 months.

NeuStar:

In proposing the 12-15 month timeline, MCMC has taken into account the areas mentioned by NeuStar for implementing an MNP solution.

FP:

MCMC considers the 6 month implementation timeframe proposed by FP to be too aggressive. MCMC estimates that the time between tender preparation and service launch will be at least 9 months.

ML:

MCMC would prefer to implement an MNP solution for both pre- and post-paid subscribers at the same time within the 12-15 month period.

3.22 Comments on the deployment timeframe

MCMC is targeting for the deployment of mobile number portability service to the Malaysia public in a 15 to 18 month timeframe.

The Public Inquiry Paper sought views on:

Question 9.2

The MCMC seeks comment on the proposed deployment timeframe.

3.22.1 Comments received

Summarized below are comments received on the issue regarding the deployment timeframe:

(a) (**MAXIS**) – original comment

Maxis believes that 15-18 months is a realistic time frame for service implementation. See also response to question 9.1.

Additional comment on fixed-to-mobile porting

In addition, Maxis is suggesting that fixed-to-mobile porting is being included into the MNP implementation approach. We believe that consumers will significantly benefit from this for four reasons:

1. Reflects the increasing convergence between fixed and mobile services, as many customers are already using mobile as their primary and only line (e.g., 40% of Maxis' homes passed by fixed lines only use mobile).
2. Stimulates further competition to the incumbent, and dominant, fixed line operator and will promote improvement in service levels.
3. Encourages mobile operators to foster the development of integrated fixed-mobile home-zone solutions for both rural areas and urban/sub-urban areas that are still predominantly fixed line.
4. Prepares for the large-scale introduction of wireless broadband services (e.g., HSDPA or WBB technologies like Soma, IPW or WiMax) that will also see the provisioning of voice-over-broadband (not necessarily only via VOIP) within the next 12 months.¹⁵

The experiences from other markets like the U.S. and Taiwan indicate that the introduction of both mobile-to-mobile, fixed-to-mobile and fixed-to-fixed¹⁶ porting provides more benefits to consumers and results into greater success of number portability overall. We do not believe that this would confuse consumers, as already mobile is the only or primary line in many households in Malaysia. Moreover, the costs incurred in providing fixed-to-mobile and mobile-to-mobile porting are essentially the same. VOIP providers (the allocated 0154x numbers) should be excluded, as this describes a different, 2nd-tier class of service. Overall, we believe it is better to implement mobile-to-mobile and fixed-to-mobile in one go than in stages.¹⁷

(b) (**CELCOM**) - original comment

As already indicated in our response to Question 9.1 of this submission, Celcom believes that the deployment of an IN-based

¹⁵ As such we would define 'fixed' to also include offering 'fixed services' over wireless technologies.

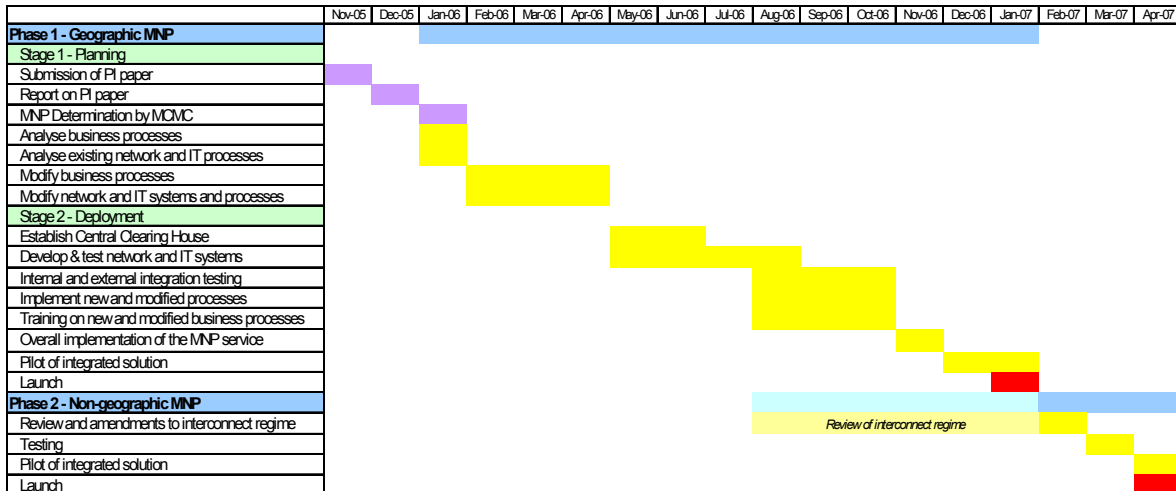
¹⁶ Fixed-to-fixed number portability could also be considered, though we do not see that the very small fixed-line operators like Time and Maxis will have any interest in further building out their fixed-line networks (given the prohibitive costs of trenching and cabling).

¹⁷ See the example of New Zealand that has decided to combine fixed-to-mobile and mobile-to-mobile porting upon introduction in April 2007.

solution for MNP will consume significant time and resources. Precedents from MNP deployments in other international markets suggest that implementation is generally measured in years, not months. Celcom also notes that service deployment is highly dependent on the state of the industry's readiness to implement new network and technology systems. In order to ensure that appropriate industry guidelines and processes are established, commercial issues resolved and a rigorous cost benefit analysis is undertaken, Celcom cannot foresee the technical implementation and system testing phase beginning until at least 2008. There is a strong incentive for all industry stakeholders, including the MCMC, to certify that key prerequisites for successful deployment (including agreed cost allocation and charging mechanisms) are established prior to launching MNP services to the public. In addition to these comments, Celcom believes that the MCMC needs to place the appropriate level of priority on MNP given a wide range of competing initiatives that commercial operators are trying to digest. Such projects which includes the development of new access, frameworks, 3G coverage expansion and revision of the national numbering plan are critical to the future competitiveness and success of Malaysia's communications industry. The outcomes of these initiatives will also have significant impact on the nature of MNP deployment. On this basis, Celcom requests that the implementation of these regulatory requirements be staggered in order to make sure that these inter-dependent industry arrangements are robust and mutually supporting.

(c) (**DIGI**) – original comment

We envisage that a full MNP programme can be implemented over a period of 16 months from the MNP Determination by MCMC. Please see Attachment A – MNP Implementation Timeframe.



Attachment A

(d) **(TM)** – original comment

This question is not relevant to a fixed line operator, as we do not provide the MNP service to customers. The fixed line operator's concern would be to make its network ready in accordance to the adopted routing approach to ensure call from/to ported number could be achieved. In addition, MCMC should consider a minimum duration of 3 months for the purpose service trial/testing when the technical solution implementation is completed to ensure the service would smooth deployment of the service to the consumers.

(e) **(TIME)** – no comment

(f) **(REDTONE)** – no comment

Due to the importance of this policy, we strongly suggest that the proposed deployment time frame should take no more than 12 months for the reasons that have been cited above.

(g) **(NEUSTAR)** – original comment

Implementation of a number portability solution can generally span a time frame from 6 to 15 months, depending on the degree of new development, certification and testing necessary. One recent example of a country implementing number portability is Taiwan. The number portability solution implemented in Taiwan required approximately ten (10) months, from RFP award in December 2004 to the live start of commercial operations as of October 13th, 2005.

Meeting a stated country's MNP time frames requires a coordinated industry and regulatory partnership to address the litany of business issues that will need resolution for a successful MNP roll-out. It is important that the NP solution is defined and that NP rules are established and process decisions made in the early stages of the deployment timeline in order for all parties to have adequate time to implement the desired solution. Leveraging what NeuStar has learned from our extensive involvement, where we have worked extensively with industry in the design, implementation, and general day-to-day operations of number portability, we would like to offer the following observations, which are by no means exhaustive, but seeks to identify certain major industry challenges previously encountered in NP implementations:

Industry Consensus—Achieving industry consensus in the competitive telecommunications industry is critical in order to bring diverse trading partners and varied constituents to a common solution that best satisfies the needs of Malaysia's operators and customers. The ability to facilitate common solutions, acceptable to diverse and varied telecom stakeholders, has been key to the success of NP in the US, Canada, and Taiwan.

Consumer Services—NP impacts normal consumer services and will need to be further reviewed as to system and operational/administrative processes. Specific consumer services to be considered, to list a few, are:

- Directory Listings
- Emergency Services (medical, police, fire, etc.)
- Do Not Call Listings
- Repair Services
- Operator Services

Porting Business Rules—Agreement will need to be achieved on the business rules that will dictate issues such as, time intervals, dispute resolution, porting in error, and any number of other operational process that need to be governed by business rules. Also worth noting will be the need for reseller and pre-pay specific business rules, as these situations warrant special handling in porting situations.

Inter-carrier Communications Processes (ICP)—Industry consensus will need to re-evaluate on how "new" and "old" service providers will exchange customer information, validate the subscriber's agreement and determine the subscriber's ability to port. The response

time expectations and the degree to which the process will be automated will also need to be decided.

Employee Education—Operator employee education and training is extremely critical and a rigorous training program must cover all functional areas of the porting process. From back-office to front-office, employees must be trained to handle the functions and actions associated with the porting process. Training material will need to be produced and training performed prior to MNP rollout.

Consumer Education—Customer satisfaction levels will need to be set and the general population educated as to the opportunities and processes involved in portability.

As a neutral third party with 10 years of hands-on NP design, implementation, and operations experience (and lessons learned) in US, Canada and Taiwan, NeuStar would welcome the opportunity to work closely with MCMC, all operators, and other local constituencies to facilitate the best MNP solution with the most realistic implementation timeline for Malaysia and its stakeholders.

(h) (**SYNIVERSE**) – original comment

Syniverse would be able to support the deployment timeframe of 15 to 18 months.

(i) (**EVOLVING**) – original comment

Deployment on MNP should be as soon as possible. From drafting and finalizing regulations and policies, to defining system requirements and interface specifications, to agreeing on business rules and porting flows, to selecting vendors and solutions, to design, implementation, deployment and testing of the NP system, to operations readiness and internal training, and to marketing campaign and user education/promotion, the process is a time consuming one.

Based on our experience of US deployment, approximate timelines would be:

Activity	Timeframe relative to Legislation	Timeframe relative to planned go-live	Comments
Partnerships formed to provide clearinghouse functionality	5 months prior	14 months prior	The legislation mandating number portability was widely anticipated, and in-depth industry discussions occurred determining the feasibility of the intended approach.
Evaluation of clearinghouse proposals	4 to 2 months prior	13 to 11 months prior	
Legislation enacted requiring operators to implement number portability	0	9 months prior	
Initial contracts awarded to clearinghouse operator	0	9 months prior	
System interface specification draft published	2 months following	7 months prior	
System requirements finalized (version 1.0)	2.5 months following	6.5 months prior	

System pre-acceptance test	7.5 months following	1.5 months prior	
First production use	9.5 months following	.5 months following	

(j) **(FP)** – original comment

We believe that implementation of MNP should not have to wait another 15 to 18 months, especially so where a 3rd party clearing house will be involved. This will reduce the workload of the operators and we do not see the need for 12 to 15 months for the implementing the technical solution. By way of analogy, operators take less than 6 months to plan, build and roll out an entire mobile network from scratch. Thus it begs the question why rolling out MNP should take so long. In the words of the PI paper, “..the expediency by which mobile number portability is implemented will result in greater choice for consumers and enhancement of competition..”. We suggest that MCMC set shorter time frames for the technical implementation and deployment. In our view, deployment should not take longer than 6 months from commencement. MCMC can always review the time frames if the need arises.

(k) **(ML)** – original comment

ML believes that the proposed deployment timeframe is reasonable for postpaid subscribers. Deployment timeframe for prepaid subscribers can be at least 3-6 months shorter as well.

3.22.2 The MCMC’s views

Maxis:

MCMC and Maxis are in agreement that 15-18 months is a realistic time frame for service implementation.

Celcom:

The MCMC believes that not implementing MNP in Malaysia until at least 2008 is unacceptable. The proposed 15-18 month deployment

timeframe is consistent with those that have been achieved in numerous countries.

Digi:

The MNP implementation timeframe submitted by Digi is consistent with the 15-18 month timeframe proposed by MCMC.

TM:

MCMC accepts TM's proposal of a minimum duration of 3 months for the purpose service trial/testing when the technical solution implementation is completed to ensure the service would smooth deployment of the service to the consumers.

Redtone:

MCMC considers a maximum 12 month timeframe proposed by Redtone to be too aggressive. MCMC believes that the development of several policy decisions, in addition to the technical implementation, will exceed 12 months.

NeuStar:

MCMC agrees with all the industry challenges encountered in number portability implementations cited by NeuStar. MCMC is confident that a 15-18 month implementation timeline is appropriate for the fixed and mobile operators in Malaysia.

Syniverse:

MCMC and Syniverse are in agreement with the 15-18 month deployment timeframe.

Evolving:

MCMC agrees with the deployment activities cited by Evolving. MCMC is confident that a 15-18 month implementation timeline is appropriate for the fixed and mobile operators in Malaysia.

FP:

MCMC considers the 6 month timeframe proposed by FP for deployment to be too aggressive. MCMC believes that the technical implementation alone will take at least 6 months.

ML:

MCMC would prefer to implement an MNP solution for both pre- and post-paid subscribers at the same time within the 15-18 month deployment timeframe.

SECTION 4: ACKNOWLEDGEMENTS

The MCMC wishes to thank all those who took part in this important Public Inquiry. In particular, the MCMC would like to thank all companies and individuals who made written submissions for their constructive comments. As noted, the MCMC gave close considerations to all submissions received, and the submissions have assisted the MCMC to better formulate a MNP implementation plan that is acceptable to all parties involved directly and indirectly, and the most importantly, to the Malaysia public.