

An explanatory document issued by the
Telecommunications Regulatory Authority of the
Kingdom of Bahrain

14 October 2008

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The deadline for responses is **5 pm on 13 November 2008**

Purpose: To explain the accompanying draft number portability regulation.



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**An explanatory document on the implementation of Number
Portability**

1 Introduction

- 1.1 This explanatory document is issued in conjunction with the proposed regulation on Number portability pursuant to the Authority's Consultation Process Regulation issued by the Authority on 10 August 2003¹.
- 1.2 The proposed regulation and this explanatory document set out the case for the implementation of number portability in Bahrain. The explanatory document sets out the rationale which underlies TRA's proposed Regulation on which comments are invited.
- 1.3 TRA has prepared a draft regulation on number portability, which is provided as a separate document to this explanatory document.
- 1.4 TRA seeks the comments of stakeholders in the Bahrain Telecommunications industry on the proposed measure.

2 Background

- 2.1 The Telecommunications Law states that number portability in fixed and mobile services shall be introduced "when the Authority determines that sufficient demand exists for such a service"². TRA conducted market research with both consumer and business groups as part of the Strategic and Retail Market Review. One of the findings of the market research was that "the lack of number portability constitutes a significant barrier to switching for both business and residential customers"³.
- 2.2 The research provides strong evidence of "sufficient" demand for number portability. Consequently, TRA has determined that the legal requirements necessary for the introduction of number portability have been met to the satisfaction of TRA. The regulation is designed to bring the introduction of number portability into effect.

¹ Arabic and English versions of the Consultation Process Regulation can be found at <http://www.tra.org.bh/en/LegalRegulations.asp>. Note that only the Arabic version of Consultation Process Regulation may be relied upon for legal purposes. The English translation is published for information purposes only.

² Telecommunications Law of 2002, Section 40 Timetable for other matters; available at http://www.tra.org.bh/en/pdf/Telecom_Law_final.pdf

³ Strategic and Retail Market Review Report, Section 4.10; available at <http://www.tra.org.bh/en/pdf/FINALStrategicandRetailMarketReviewReport.pdf>

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2.3 As part of its Strategic and Retail Market Review, TRA identified Number Portability as a key measure to be introduced to foster the further development of competition. Regulatory measure 7 in the final statement of the Strategic and Retail Market Review (3rd June 2008) states:

“Number portability will be introduced to facilitate any fixed or mobile customers switching provider by giving them the possibility to retain their existing phone number when changing operator. TRA intends to work with the industry to identify the most cost effective and pragmatic solution to implement mobile and fixed number portability.

If necessary, TRA would be minded to consider financing some of the costs of introducing number portability from proceeds of auctions or similar revenues subject to necessary approvals and/or consultations. This could minimize the cost to the industry of activities beneficial to all operators and ultimately to consumers”.

3 The benefits and costs of number portability

3.1 The main effect of number portability is to reduce the costs of changing operator for subscribers. This both benefits the subscriber and increases competition. Although attempts have been made to quantify the increase in competition, it is not possible to isolate the effects of number portability sufficiently from other effects in the market place such as the entry of new operators or changes in regulation.

Classification of benefits

3.2 The benefits of number portability are normally classified⁴ as follows:

- Direct benefits to customers who change operator of which some would change anyway and others would change only if there is number portability
- Indirect benefits to all customers in terms of increased competition and reduced costs in changing entries in address books or finding new numbers for people whose numbers have changed.

⁴ This classification was initially used by NERA in 1993, (Cost-Benefit Analysis of NP under Condition 34B of BT's licence - published by OFTEL in January 1994) and subsequently referred to by the UK MMC in its 1995 ruling (Telephone number portability: A report on a reference under section 13 of the Telecommunications Act 1984), by Ovum in its cost benefit analysis for Oftel (UK) in 1997 (Oftel (1997), Economic Evaluation of Number Portability in the UK Mobile Telephony Market, Oftel: London, July 1997) and by NERA for OFTA Hong Kong in 1998 (NERA/Smith (1998), Feasibility Study & Cost Benefit Analysis of Number Portability for Mobile Services in Hong Kong, Final Report to OFTA, NERA/Smith: London, May 1998).

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This classification is illustrated in Figure 1 below.

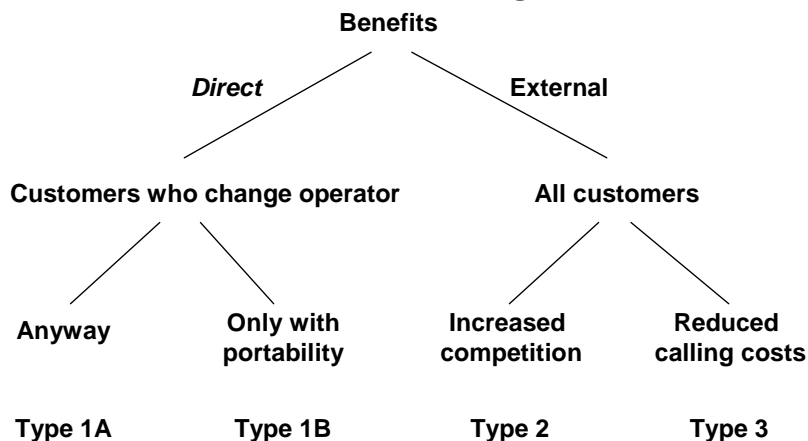


Figure 1: Benefits of number portability

3.3 Type 1A, 1B and 3 benefits are roughly proportional to the number of subscribers who port. Type 2 benefits are proportional to the reduction in tariffs that results from the increase in competition that is enabled by number portability.

Type 1A benefits: Benefits to those who port

3.4 These are the benefits to the people who port and consequently the total benefits of this type are proportional to the number of people who port.

3.5 These benefits are the avoidance of costs concerned with changing number. They include primarily the costs of:

- Telling correspondents about the change of number
- The cost of providing for some form of call trapping where incoming calls to the old number receive a message that the number has changed
- The risk of lost calls that could mean lost business, eg lost new orders
- The costs of having cards and stationery that display the number reprinted
- The costs of having signs that display the number repainted or replaced.

Type 1B benefits: Benefits to those who port only with number portability

3.6 These benefits are conceptually more difficult to understand than Type 1A. They are meant to cover the benefit that a subscriber will receive from changing operator in terms of lower

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prices etc. These benefits are realised only if there is number portability otherwise the subscriber will not change operator.

Type 2 benefits: Benefits to all subscribers in terms of increased competition

- 3.7 These are the benefits to the whole country of increased competition resulting from number portability. The benefits are reduced prices and improved quality of service (including customer care).

Type 3 benefits: Benefits to callers to people who port their numbers

- 3.8 These benefits are the avoided costs of:
- Having to update address books;
 - Making “wasted” calls to old numbers that have been changed, and having to spend time finding the new number.

Costs of number portability

- 3.9 The costs of implementing number portability typically comprise⁵:
- set up costs for common systems across the industry;
 - individual set up costs for each of the operators implementing NP;
 - per-line set up costs for each individual number porting; and
 - additional call conveyance costs as a result of call routing to a ported number.
- 3.10 The costs are normally dominated by the set-up costs which are independent of the number of people who will eventually port their number. The setup costs include:
- Changes to the network for call and SMS routing
 - Changes to the support and billing systems to handle numbers from blocks not allocated to the operator concerned
 - Establishment of the ordering process
 - Establishment and running of a central database where this is required
 - Training of retail outlets in taking orders for portings

⁵ For example see also: New Zealand Commerce Commission, “Determination on the multi-party application for determination of ‘local telephone number portability service’ and ‘cellular telephone number portability service’ designated multinet network services”, August 2005

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- 3.11 Once established the main on-going cost is the daily handling of portings.
- 3.12 The set-up costs may vary very widely from operator to operator depending on the state of their network and support systems. The implementation costs in mobile, VoIP and next generation networks are normally significantly lower than the costs in established fixed networks.

Maximising the benefits of number portability

- 3.13 In order to maximise the benefits of number portability, the porting process must be as user friendly and reliable as possible. To give the correct economic indicator to the subscriber, the price paid by the subscriber to the recipient for porting should be equal to the volume dependent incremental cost of porting. However, in many countries porting is free of charge to the customer.

4 The form of the number portability requirement

- 4.1 The basic obligation to provide number portability can be expressed in two quite different ways:
- As a user right, eg the approach taken within the European Union⁶;
 - As a measure to increase competition, eg the approach taken initially in the United Kingdom (UK)⁷.
- 4.2 The choice of approach affects the details of the requirement. If number portability is seen primarily as a user right, then:
- The requirement should apply to all operators, even new entrants;
 - All operators should start at the same time;
 - The start time should be set by the regulator;
 - All operators must import as well as export numbers;
 - The requirement applies whatever the cost and there is no need for comparing costs and benefits.

⁶ Directive of the European Parliament and of the Council on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive) February 2002, Article 30; available at http://ec.europa.eu/information_society/topics/telecoms/regulatory/new_rf/documents/03673en1.pdf

⁷ Inquiry by the Monopolies and Mergers Commission into Telephone Number Portability – Explanatory Statement from the Director of Telecommunications (12/95), Oftel 1995 at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/index.htm#Numbering

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- 4.3 If number portability is seen primarily as a measure to increase competition, then:
- The requirement should be focused mainly on established operators (Incumbents);
 - Number portability should start when requested by another operator, eg a new entrant;
 - The regulatory requirement should be to export when requested, importing is optional (importing is more expensive than exporting);
 - If a new entrant requests porting they must also offer porting – reciprocity;
 - The requirement should be justified by cost benefit analysis.
- 4.4 Implementing number portability as a user right focuses primarily on delivering the benefits to the porting user, ie Type 1A and part of the Type 1B benefits, while also contributing to the delivery in Type 2 benefits. Considering number portability as a measure to increase competition focuses more on the other part of the Type 1B benefits and the Type 2 benefits.
- 4.5 TRA considers number portability as a user right that will also facilitate the further development of competition in the market.
- 4.6 TRA therefore proposes to implement a policy, in common with that adopted in the European Union, of requiring all operators to both export and import numbers and to do so from a given date, which is 30 September 2009.
- New entrants and niche market operators**
- 4.7 Implementing number portability incurs costs and requires resources, some of which may be scarce such as IT system expertise. When an operator is rolling out a new service they have many issues to resolve and may prefer the flexibility to launch their service before they offer number portability.
- 4.8 The market may be entered in the future by companies who wish to develop a more specialised service targeted at a part of the market that has little demand for portability. An example might be a company that offers only machine to machine communications where number portability provides no user benefit.
- 4.9 For these reasons a case for allowing new entrants and smaller specialized companies the possibility to opt-out of the requirements for number portability may be put forward. TRA is therefore including in the proposed regulation a provision to

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allow exemptions that will have to be justified on their merit and may apply for limited or unlimited periods. In assessing the case for exemption TRA will have particular regard to the interests of the users.

5 Mobile number portability

- 5.1 The mobile market is currently shared by two large operators: Batelco and Zain, and the overall penetration level reached 107% at the end of 2007⁸. TRA plans to issue a third mobile licence by end 2008 and the availability of Number Portability is expected to be an important factor for the third operator.
- 5.2 Mobile number portability is normally implemented in the network by adding database functionality between the Gateway Mobile Switching Centre (GMSC) and the Home Location Register (HLR), commonly called signalling relay technology. This enables the mobile operator both to do All Call Query for out-going calls and to onward route calls to numbers that it has exported. This solution also supports SMS services to ported numbers.
- 5.3 With mobile portability, the subscriber has to replace their current SIM card with a SIM card from the recipient operator.
- 5.4 TRA proposes to require all licensed mobile Service Providers to introduce number portability as soon as reasonably possible and no later than 30th September 2009. This target date is planned on the basis of an implementation plan set out below.
- 5.5 The third operator will have a range of new numbers and this range will contain some highly attractive numbers. With number portability, it will be possible for subscribers to acquire these attractive numbers and then port them immediately to another network, especially if the third operator experiences any practical problems during the early months of operation. Therefore to allow the third operator time to introduce its service properly, TRA proposes to allow the third operator to opt out, as discussed above for a new entrant, for a limited period.

6 Fixed number portability

- 6.1 Fixed number portability is relevant only where there is competition for incoming calls.

⁸ TRA data

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- 6.2 TRA expects competition to develop further with local loop unbundling, provision of services by new entrants in new building developments and voice services over wireless access.
- 6.3 The routing solution that is planned would allow operators to choose whether to use onward routing or all call query for call routing. (Routing solutions are explained further in section 11 below). Any fixed operator with circuit switched technology would be likely to choose to use onward routing at least initially.
- 6.4 Alternative routing solutions such as the use of an unmodified call forwarding supplementary service are not optimal as they involve either:
- the same number being used on more than one network, or
 - a second (hidden) number being used on the recipient network

However TRA does not plan to constrain the choice of technology used for onward routing provided that the original Calling Line Identity is unchanged by the re-routing process.

- 6.5 Fixed number portability should be compatible with carrier selection. Although both features involve adding a routing prefix to the call, the carrier selection prefix is added only for the initial stage of the call and is removed before any number portability prefix is added. Thus it should never be necessary to have both prefixes used together on the same stage of a call, which could create a problem in terms of the number length.
- 6.6 TRA proposes to require fixed operators to introduce number portability as soon as reasonably possible and no later than 30 September 2009.
- 6.7 The porting process for fixed services is broadly similar to that for mobile but a longer time may be needed and flexibility is needed for completion of local loop unbundling or the installation of a line by another operator.

7 National fixed wireless access services

- 7.1 Fixed wireless access services have been introduced by Zain and are being introduced by Mena Telecom. As yet only Zain has operational numbering arrangements, the termination rates to which have not yet been published. Fixed wireless access

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services may be based on fixed numbers or Universal numbers under the new Numbering Plan.

- 7.2 TRA considers that services provided over fixed wireless access, whether using fixed or universal numbers, shall be included within fixed number portability and, from 17 November 2010, mobile services provided under National Fixed Wireless Service licenses shall be included under mobile number portability.

8 VoIP number portability

- 8.1 VoIP services that support incoming calls are currently numbered within the same range as fixed services. In practice they are used at present either as:

- A means to make out-going calls at low prices from any location with Internet access
- A substitute for fixed telephony (often called voice over broadband).

- 8.2 Where they are a substitute for fixed telephony there is a case for including them within the scope of fixed portability.

- 8.3 A practical issue is that specifically with Batelco's ADSL services it is not possible to obtain broadband without also having a conventional telephony service with a number. The expectation is that this number is the number that most people are likely to wish to port to a voice over broadband service. It will therefore be necessary for Batelco to replace this number with another new number to be used in connection with the Batelco connection if the subscriber wishes to port their existing number to a VoIP service yet continue to use the Batelco fixed access service.

- 8.4 TRA proposes to include VoIP services within the scope of number portability but to consider allowing these services the possibility of opting-out for at least the next two to five years because they are relatively small companies and some are working in specialist niche markets where portability is less important.

9 Special service and premium rate service number portability

- 9.1 The market for services such as Freephone and premium rate is so far at an early stage of development. In practice such numbers may be translated by the special service or premium rate service provider into a fixed or mobile number for the call

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delivery. Special service and premium rate service numbers may be highly valuable if they are used extensively in publicity and advertising or in maintenance manuals.

- 9.2 Number portability can be provided relatively easily for special service and premium rate service numbers, however because of the wide variations in tariffs, portability must be limited to the same tariff types, ie portability only within freephone services or portability only within a given tariff range of premium rate services.
- 9.3 TRA proposes to require portability within each tariff band for special service and premium rate service numbers as soon as reasonably possible and no later than 31 December 2009.

10 Impact on the numbering plan

- 10.1 Number portability does not affect existing number allocations; numbers may continue to be used but with different operators or service providers. Furthermore numbers are not ported between ranges but rather a number from a given range may be ported to another operator with allocations in the same or a different range.
- 10.2 If numbers may be ported to an operator who would normally be allocated numbers in a different range then it becomes appropriate to widen the definitions of the different number ranges and to adopt the same wider definition for ranges used for operators who port numbers between each other.
- 10.3 Within Bahrain's recently issued National Numbering Plan⁹, distinctions are made between fixed, mobile and universal (which may be used for any service, fixed or mobile) number ranges, but numbers for VoIP based services are not distinguished from those for fixed.
- 10.4 There are also separate allocations in the 8-series and 9-series for non-geographic or special services such as freephone and premium rate.
- 10.5 In the past fixed networks were the primary means of making calls and mobile networks were used when mobility was needed. This situation has changed with mobile services becoming a substitute for fixed services in that some households have only

⁹ National Numbering Plan, 10th September 2008, at http://www.tra.org.bh/en/pdf/National_Numbering_Plan_2.pdf

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mobile services¹⁰. Distinctions based on charging are becoming much less important and now:

- Fixed services may be regarded as shared services to a premises and a means of obtaining broadband Internet access
- Mobile services are regarded as personal/individual communications services.

10.6 In Europe, the European Communications Committee of CEPT has recommended in report 87 - "The Future of E.164 Numbering Plans and Allocation Arrangements - September 2006":

Recommendation 1: When the terminating rates for different services are within, say, 20% of each other, NRAs should consider changing the definitions of the scope of services in the numbering plan, in such a way that number portability between all the services concerned can be required.

Recommendation 2: NRAs should introduce new number ranges for new services only when really needed and only if it is quite inappropriate to accommodate the new services in existing ranges. Subscribers should be allowed to retain their existing numbers for enhancements to existing services and new services that retain compatibility with existing services. The scopes of services allowed for the number ranges concerned should be correspondingly widened.

10.7 These changes have not yet occurred in practice and portability is still treated separately between fixed and mobile in all countries of which TRA is aware. Recent revisions to Bahrain's National Numbering Plan¹¹, however, mean that the definitional distinction between fixed and mobile services number ranges is being partially removed, in that fixed and mobile services are now defined within the National Numbering Plan taking account of Recommendation 1 above.

10.8 For Bahrain, TRA proposes that fixed, mobile, special service and premium rate service number portability should be treated separately for the immediate future in view of the retail and termination rate charging differences. Operators should be aware that portability is likely to be extended to be between fixed and mobile services, and services employing "Universal

¹⁰ Understanding Telecom Usage in Bahrain Residential Module Findings – Consumer module July 2007. 34% of surveyed respondents are not subscribed to a fixed line and of these, 85% cite the use of a mobile for the reason no to have a fixed line.

¹¹ See Section 2 Definitions – "Fixed services" and "Mobile services" in National Numbering Plan, 10th September 2008, at http://www.tra.org.bh/en/pdf/National_Numbering_Plan_2.pdf

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numbers”, which may be fixed or mobile, under the new number plan, in the future and that they should build this possibility in to their procurements where it does not entail significant extra costs.

11 Routing and charging

11.1 Approaches to number portability have developed over a number of years. Initially the focus was on deciding at a national level what technical solution (eg all call query or onward routing) should be used for routing and then deciding what rules should apply for the additional conveyance charging.

11.2 The problems with deciding on a particular routing solution is that the cost implications can be quite different for different operators and the cost differences between different solutions vary markedly with traffic volumes. This situation has led to the development of the more generalised approach of defining responsibilities for routing and setting corresponding charging principles but leaving the operators to make their own decisions about routing within this framework. This means that operators are able to start with the routing solution that is cheapest when the volume of calls to ported numbers is low and choose their own timing for changing to a different solution when the volume of such calls increases.

ETSI Routing solutions

11.3 The European Telecommunications Standardisation Institute (ETSI) has defined four technical options for number portability routing¹²:

- Onward routing
- Drop-back
- Query on Release IN
- All call query IN

11.4 These terms are intended to be used for solutions between networks.

11.5 Figures 2 to 5 distinguish the solutions.

- The serving network is the latest recipient of the number.
- The number range network is the network identified by number analysis, ie the network that originally served the number and through which the number was allocated.
- For the first porting, the number range network is the donor and the serving network is the recipient.

¹² ETSI Technical Report TR 101 118 V1.1.1 (1997-11)

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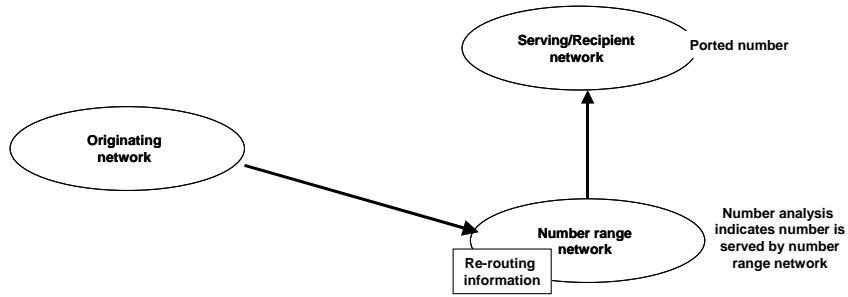


Figure 2: Onward routing

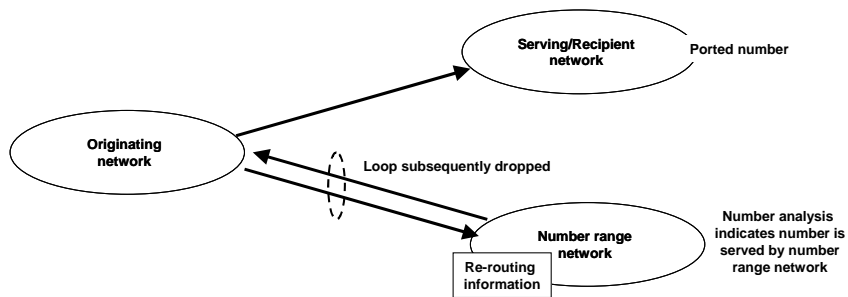


Figure 3: Dropback

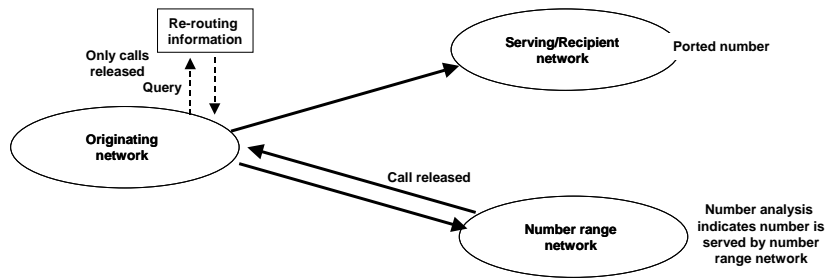


Figure 4: Query on release

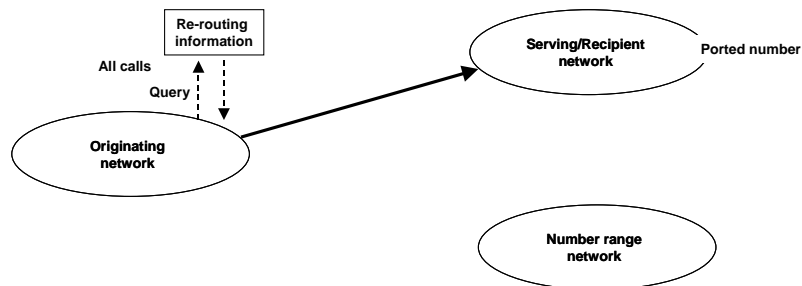


Figure 5: All call query

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11.6 Onward routing would be used by the number range network in both cases.

- With the inter-dependent solution it would be the only solution and would be used for all traffic.
- With the independent solution it is an option and should always be available for traffic that reaches the number range network.

11.7 With the independent solution (see below), the operators would have the option to use:

- Drop-back
- Query on Release IN
- All call query IN

as well. Each operator can choose for themselves whether or not to use All Call Query. The use of Query on Release and Dropback depends on cooperation with the number range network. In practice dropback is not used between networks. Most operators choose to use All Call Query but Query on Release is used in Portugal.

Combined routing and charging rules

11.8 The two solutions that combine routing and charging consistently are distinguished by defining the responsibility for routing and requiring the operator that has the responsibility for routing to pay the additional conveyance costs but allowing them a choice over the routing mechanism used.

11.9 The alternatives have been named:

- The independent solution, where the originating network has responsibility for routing and can make this choice independently. This means that all networks are affected by number portability, not just the ones that are porting numbers between each other. In the case of incoming international calls, the originating network is the national network that receives the call from the foreign operator.
- The inter-dependent solution, where the networks at terminating end are jointly responsible for routing. This means in practice that the number range operator performs onward routing and that the recipient operator pays for some or all of the additional conveyance costs. In this case only the networks that are porting numbers between each other are affected.

11.10 These two solutions are illustrated in Figure 6.

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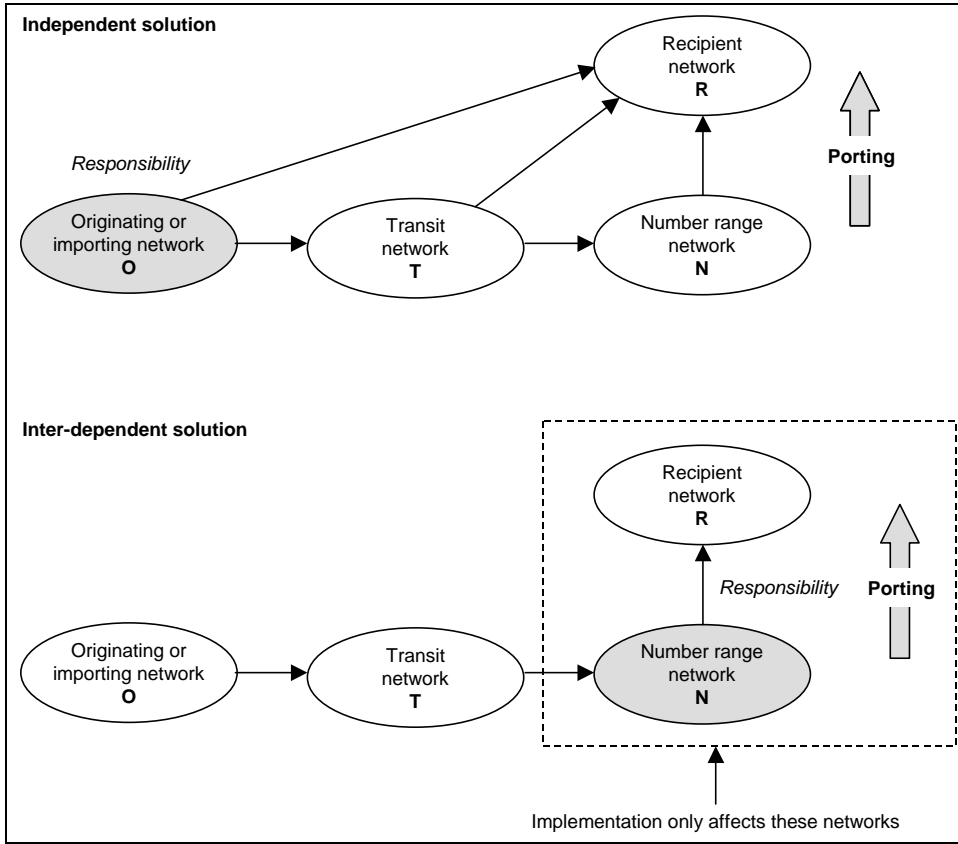


Figure 6: The two solutions

11.11 The main disadvantage of the inter-dependent solution is that it is incapable of creating an incentive for the originating operator to use all call query routing and route calls direct to the recipient operator.

11.12 Since number portability is being required for both fixed and mobile and since the technology changes in the networks are making ACQ routing increasingly cheaper and more practicable, TRA proposes to require operators to adopt the independent solution.

The independent solution explained in more detail

11.13 Figure 7 helps to explain the independent solution in more detail.

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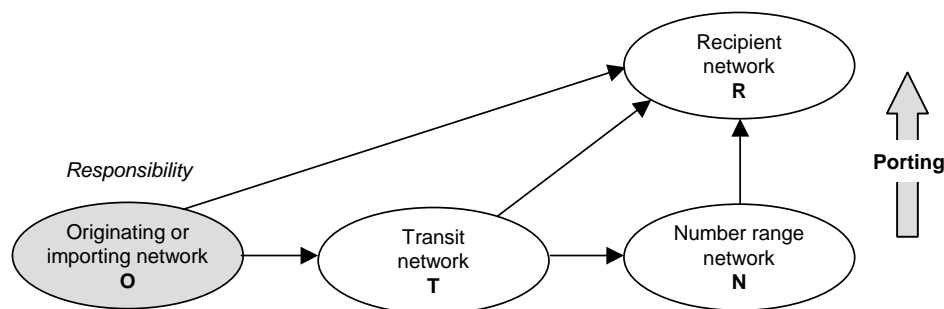


Figure 7: The independent solution

- 11.14 Depending on the interconnection routes available, the Originating network, O, has the option to determine which network is serving the called number and route the call there directly, eg along route OR, or to pass the call to T.
- 11.15 If the call is passed to T then T has the option to determine which network is serving the called number and route the call there directly, eg along route TR, or to pass the call to N.
- 11.16 If the call is passed to N, then N has to onward route the call to R. N will need the capability anyway to route its own subscribers' calls to numbers ported to R.
- 11.17 Each operator is entitled to charge for what it does and so T and N can both charge for their work as a transit operator and for the costs that either might incur in determining which network is serving the ported number.
- 11.18 When an operator determines which operator is serving the ported number, it adds a number portability prefix in front of the called number to indicate the recipient network. The existence of this prefix indicates that the routing for the number has already been determined and need not be repeated.
- 11.19 Thus each network that does not determine which network is serving the called number and passes on the call with routing based on normal number analysis will have to pay more to the other operators. When the volume of calls to ported numbers is low, this may be the cheapest option but as it increases it becomes cost effective for the originating operator or the transit operator to determine the routing itself. This would normally be done by interrogating a routing database.

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Destination Information

11.20 The sharing of information on ported numbers can be done by publishing or broadcasting lists of the ported numbers at regular intervals, eg daily, or it can be done through each operator sending this information to a reference database that compiles and makes available the information. Most countries favour having a central reference database. Where there is an independent third party who supports the porting procedure, this party normally provides the database. This is discussed further in the following section.

12 Central database

12.1 Information always needs to be exchanged between the operators who are porting numbers between each other. The information may be exchanged directly in some agreed form or sent via a third party database.

12.2 Each operator that wishes to use all call query routing needs information on which operator is serving each ported number. This information is distributed at the end of each porting by the recipient (new serving) operator. The information may be distributed to the other operators individually, or may be passed to a third party central database from which it can be downloaded by each other operator.

12.3 Third party databases can therefore have two different functions:

- Acting as message relay during the porting process
- Maintaining a record of which operator is serving each ported number.

12.4 Figure 8 shows the information flows without a third party central database. In the diagram a number is ported from operator 3 (donor) to operator 4 (recipient). The list of served numbers held by each operator is the list of their own subscribers with ported numbers. This is the “master” information.

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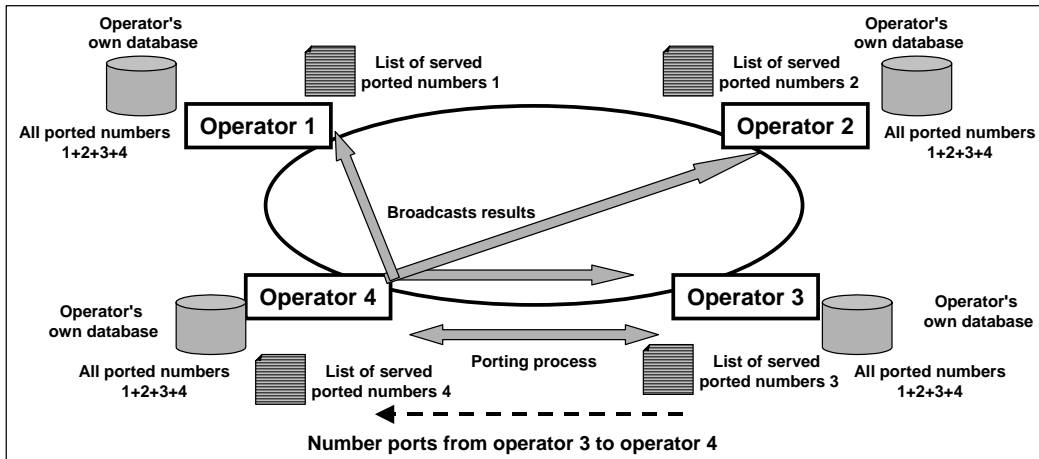


Figure 8: Porting without a central database

Note: The double headed arrow labelled “Porting process” shows the exchange of messages between the donor and recipient requesting and confirming the porting. The “operator’s own database” is the database that is shown in the diagrams for all call query and onward routing above and contains the collection of all ported numbers served by all operators. In this diagram it is assumed that all operators have implemented all call query and that all have their own database for routing.

12.5 Austria, Australia, Hong Kong and Malta are examples of countries where there is information exchange and all call query routing without a third party central database.

12.6 Figure 9 shows the information flows with a third party central database. The flows are essentially the same except that all the messages flow through the central database. The third party database holds a list of all ported numbers that any operator may copy.

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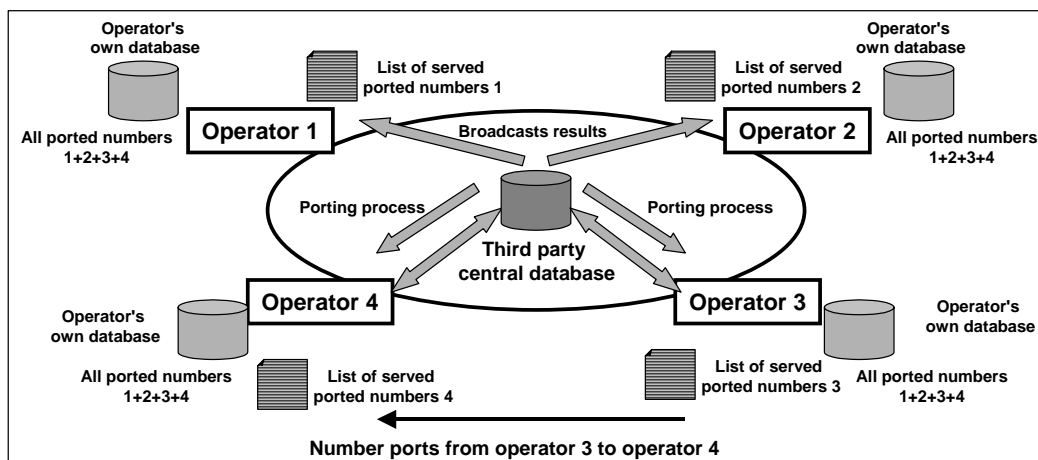


Figure 9: Porting with a central database

12.7 It is possible for a third party central database to replace the role of the operators' own databases and handle the queries for all call query routing but this approach is not used since the operators want to have the database used for routing under their own control because it is critical for the handling of calls.

12.8 Third party databases are not essential for number portability; neither for the procedure nor the support of all call query routing. However, in many countries, third party central databases are beneficial and they are used in the United States (US), and the majority of European countries. Singapore has also recently adopted a central database and all call query implementation¹³. A central database also facilitates entry of new operators to the market as it is a clear point of reference where all the information can be obtained. Furthermore, a database administrator being neutral from the parties is able to facilitate porting process and overcome unreasonable refusals to port from donors.

Current unpublished work in the Channel Islands, made available to TRA, demonstrates how a third party database can be used to reduce the operators' workload in validating and handling porting requests and correspondingly reduce the variable cost of porting. Furthermore using the database with automated SMS messages from the subscriber as part of the

¹³ Decision issued by Infocomm Development Authority of Singapore on the Review of Number Portability in Singapore, IDA, 02/08/2006 at [http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies_and_Regulation_Level2/02-08-2006_IDA's_Consultation_Decision_on_NP_Review_\(Final\).pdf](http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies_and_Regulation_Level2/02-08-2006_IDA's_Consultation_Decision_on_NP_Review_(Final).pdf)

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validation process strengthens the process and removes the need for some other processes. These recent developments increase the attractiveness of having a third party central database.

12.9 The case for having a third party database improves further if the third party also provides other services such as:

- Routine allocation of numbers according to principles set by TRA
- Individual number allocation direct to customers, which is a possibility for services where the number is especially important such as freephone and premium rate numbers; there is also a predicted trend of increase use of individually assigned personal numbers¹⁴;
- Management of the Bahrain country code ".bh"

It is recognised that the databases needed for these functions may differ to some extent – as a minimum a database of all the numbers (not only the ported ones) will have to be kept. In addition, the management of ENUM, if needed, could be achieved via the same database.

12.10 In view of the increasing range of potential benefits from having a third party database, TRA proposes that a third party central database should be procured for Bahrain and that the role of the third party should gradually be expanded beyond number portability.

12.11 Two different approaches have been taken to the funding of central databases in other countries. In some countries such as Ireland, the US, South Africa and the current plans for the UK, the database is procured and funded either through a multi-party contract with the operators, or through a holding company established by the operators. In these companies much time and effort has been taken with the legal aspects and the administrative arrangements. In other countries such as Malaysia, Saudi Arabia and Pakistan, the regulator has procured the database and thereby accelerated the introduction of number portability. Then at a later stage the regulator may hand over the on-going operation of the database to a joint arrangement of the operators.

¹⁴ CEPT ECC Report 87 The Future of E.164 Numbering Plans and Allocation Arrangements; September 2006

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12.12 Regulatory measure 7 in the final statement of the Strategic and Retail Market Review (3rd June 2008) states:

“Number portability will be introduced to facilitate any fixed or mobile customers switching provider by giving them the possibility to retain their existing phone number when changing operator. TRA intends to work with the industry to identify the most cost effective and pragmatic solution to implement mobile and fixed number portability.

If necessary, TRA would be minded to consider financing some of the costs of introducing number portability from proceeds of auctions or similar revenues subject to necessary approvals and/or consultations. This could minimize the cost to the industry of activities beneficial to all operators and ultimately to consumers”.

12.13 In accordance with this statement, TRA proposes to accelerate the process by procuring the database itself. However TRA intends that detailed specifications for the database will be prepared in conjunction with operators to ensure that the database fully meets the operational needs of the operators. Operator staff will be invited to meetings with the supplier to ensure full commitment to the process.

13 Cost recovery

13.1 There are four main elements in the cost of number portability:

- Setup costs that may be larger for a long established operator than for new entrants and that may be greater for importing and exporting numbers than just for exporting them. The setup costs involve both network and IT systems costs, may also include central database costs, and include training for retailers;
- Additional annual running costs relating to equipment that is needed specifically for number portability. This includes the annual volume independent costs of the ordering system;
- A cost for the handling of each porting (ie a volume dependent porting cost);
- Additional conveyance costs, which may be negligible if the networks are capable of performing all call query.

13.2 The charging arrangements for number portability are based on the economic principles listed in Table 1¹⁵:

¹⁵ Number Portability in the Mobile Telephony Market – Oftel July 1997, citing UK MMC report on Fixed Number Portability; 1995; NERA/Smith (1998), Feasibility Study & Cost Benefit Analysis of Number Portability for Mobile Services in Hong Kong, Final Report to OFTA, NERA/Smith: London, May 1998. Broadly similar principles have also been used by other regulators (e.g. See also Malta

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<i>Principle</i>	<i>Charging Rule</i>
Cost causation	He who causes the cost bears it
Cost minimisation	He who can minimise the cost bears it
Distribution of benefits	He who benefits bears the cost
Effective competition	Cost recovery must not frustrate competition
Reciprocity	The rules apply equally to all parties
Practicability	The rules should be easy to apply

Table 1: Six economic principles for recovery of NP costs

13.3 TRA is of the view that the operators should all bear their own set-up costs. This reflects the principles of cost minimisation, distribution of benefits and practicability. As discussed above, the set up costs related to a central database will be funded by TRA.

13.4 For the porting transaction costs, the theoretical solution based on cost causation, is that the recipient pays the donor the incremental costs of an efficient transaction. This approach is adopted in many countries but in practice the costs are sometimes waived because the volumes of portings in each direction tend to balance after porting has been running for a year or so and so it becomes no longer cost effective to charge. In theory there are the following options:

- No charge
- A charge set by negotiation, but successful negotiation is unlikely between operators who see themselves as winners or losers
- A non-reciprocal cost based charge based on the donor operator's actual costs, but these will not be known until porting has run for a year or so.
- A reciprocal charge average related to average costs
- A charge set by TRA based broadly on benchmarking with other countries and aimed to reflect average incremental costs.

13.5 TRA considers that the charges should be reciprocal between porting operators so that each pays the other the same amount for the same "service". This is common practice in other countries (e.g. Ireland, Malta) and encourages efficiency among operators. Some operators choose to waive these charges. TRA

Communications Authority; Introducing Number Portability in Malta' Report on Consultation and Decision March 2005 and New Zealand Commerce Commission, Decision 554 "Determination on the multi-party application for determination of 'local telephone number portability service' and 'cellular telephone number portability service' designated multinet network services", August 2005)

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favours a charge set to match the incremental costs incurred by efficient operators in Bahrain, for example an average of all the operators' incremental costs. Such charges cannot yet be calculated based on actual costs because the costs in Bahrain are not known and will not be known until porting has been running for some time. TRA therefore proposes to set reciprocal default charges as a ceiling based on benchmarking. Operators will be free to agree alternative reciprocal charges below this ceiling provided they are applied in a non-discriminatory manner. TRA will also consider any representations for changing these charges based on evidence of the incremental costs. This is the approach that has been adopted in Malta¹⁶ and the operators have welcomed the simplicity of the approach.

13.6 In 2005 the CEPT published Report 31 rev1 on Mobile Number Portability containing a survey of transaction charges for mobile portability ranging from 0€ up to 29€; the average charge being 12,80€¹⁷. Figures are also available in figure 15 of the European Commission's 13th Implementation Report¹⁸. Cullen International¹⁹ also provides a survey of European inter-operator mobile porting charges, the average of which is approximately 10€. The Maltese regulator has set a default figure of ~10€ for pre-pay and ~14€ for post-pay (the regulation is in the former local currency). The Irish regulator Comreg has recently published²⁰ a review of the fully automated incremental costs of mobile portability and proposed to reduce the charge from 20€ to 2.05€ per successful porting. Taking account of these comparisons, TRA proposes a default charge for mobile portings of 4 BHD (~7€).

13.7 CEPT has not published a similar survey for fixed portings. Figure 46 of the European Commission's 13 Implementation Report provides some figures and quotes an average customer charge of 9.69€. Both the UK and Ireland have a complex set of charges for different types of operation with lower charges for portings that fail and higher charges for successful portings. A simple charge applying only to successful portings seems preferable initially. In its review, the Irish regulator proposed to reduce the charges for successful portings from the range 14€ to 24€ to the range 4€ to 8€ depending on circumstances but

¹⁶ Malta Communications Authority; Introducing Number Portability in Malta, Report on Consultation and Decision March 2005

¹⁷ CEPT published Report 31 rev1 Table 9 2005

¹⁸ Progress Report on the Single European Electronic Communications Market 2007 (13th Report) Annex 2

¹⁹ Cullen International SA; Western Europe Cross Country Analysis; September 2008

²⁰ see ComReg Consultation and Draft Decision 08/65, 15/08/2008

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with smaller charges for unsuccessful portings. Where number portability is added to local loop unbundling the additional charge would be 3.5€. Taking account of these comparisons, TRA proposes an initial default charge for successful single line fixed portings of 6 BHD (~11€).

- 13.8 Less comparative information is available on porting transaction charges for special services and premium rate services numbers. The Irish regulator Comreg has proposed a new charge of 5.74€. BT's charges range from £7 in the working day to over £100 outside normal working hours. Taking account of these comparisons, TRA proposes a default charge for special services and premium rate services portings of 10 BHD (~18€).
- 13.9 For additional conveyance, the principles conflict. Applying the cost causation principle for example leads to the conclusion that the receiving operator should pay the donor operator for the additional conveyance costs incurred in routing calls to ported numbers (interdependent solution). But applying the cost minimisation principle suggests that the originating or transit network operator, which is in a position to route such calls optimally (independent solution), should bear the additional conveyance costs.
- 13.10 TRA considers that it is preferable that the originating operator should bear the additional conveyance costs. Additional conveyance costs are avoidable if the originating operator chooses to use All Call Query. This provides an incentive to the originating operator to minimise costs. Ofcom in UK has reviewed the additional conveyance charges in some detail on two occasions. In 1999 it determined that the cost of transiting a donor mobile network was 1.6 ppm²¹ or 1.9 Euro cents per minute. In a dispute resolution in 2007, it revised the figure to 0.2 ppm²² or 0.24 Euro cents per minute. The Austrian regulator in 2006 or slightly earlier has determined the charge to be 0.6 Euro cents per minute²³. Taking account of the smaller size of the Bahrain networks and the decreasing costs of network switching and transmission, TRA proposes that the default charge should not exceed BHD 0.0025/minute (0.45 Euro cents per minute) and this be applied as a common ceiling.

²¹ See

http://www.ofcom.org.uk/static/archive/oftel/ind_info/numbering/mnpdetre.pdf

²² See <http://www.ofcom.org.uk/consult/condocs/deter/deter.pdf>

²³ Figure given in correspondence with the regulator

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13.11 In summary, TRA proposes that, in common with cost allocations used by other regulators²⁴:

- Each operator should bear its own set-up costs and those running costs that are not dependent on the volumes of portings;
- Set up costs for a central database will be funded by TRA, while database operational costs will be funded by operators in proportion their number allocations adjusted to take account of ported numbers.
- The recipient should pay the donor for the incremental cost of each porting. In practice TRA will set a default ceiling reciprocal charge but allow operators to set their own reciprocal charges by negotiation;
- The originating operator should pay for any additional conveyance costs. In practice TRA will set a default ceiling charge.

14 Termination rates and tariff transparency

14.1 Tariff transparency is the ability of the caller to infer the tariff or price of the call by examining the first part or the number that they are calling.

14.2 Tariff transparency is normally good where the retail rates for a call service offered by different operators are the same or, if they are different, then the operator is clearly identifiable from the called number. This is the case currently in Bahrain.

14.3 With number portability the identity of the terminating operator is no longer readily apparent from the number. This means that tariff transparency will be affected adversely if:

- Retail rates for calls to operators who are porting numbers are different;
- There are significant on-net discounts.

14.4 Batelco's retail rates for calls from fixed to mobile are higher than for calls from fixed to fixed, i.e. fixed to fixed: 21 fils for 3.0 minutes; fixed to mobile: 21 fils for 1.5 minutes. Retail charges for calls from mobiles are typically the same whether the call is to a fixed line or to a mobile.

14.5 Some operators, such as Zain, are currently expanding the use of on-net discounts.

²⁴ For example in the UK, Hong Kong, New Zealand and Malta, references cited above.

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- 14.6 The first issue will probably not create a tariff transparency problem although this may be dependent on the interconnection rates sought by the 3rd mobile entrant.
- 14.7 On-net discounts may create a tariff transparency problem; although experience in other countries such as UK, Ireland and Malta is that there are fewer complaints than might be expected.
- 14.8 Some regulators have discussed or required the operators to take measures such as:
- Using a distinctive ringing tone;
 - Providing a free web site or voice response service where potential callers can find which operator serves a particular number (eg Belgium, Channel Islands);
 - Providing a warning beep during call set up if the called number is off-net (eg as used in South Africa).
- 14.9 These measures have do not appear to have been very successful. Even simple and potentially useful measures such as warning beeps tend to be misunderstood in practice and usage of web site or voice response services appears to be lower than expected.
- 14.10 The above assumes that on-net discounts are based on the reality of which operator serves the called number. The alternative is for the operators to reformulate the on-net discount to make it a same number range discount. In this case there would not need to be a change to the billing systems and the problem of reduced tariff transparency would disappear. This approach seems attractive especially when the volume of ported numbers is low.
- 14.11 TRA does not propose to impose specific measures on the operators for tariff transparency initially, but will require the central database supplier to make available a web-based interface where the identity of the called operator may be found for a given number.

15 Winback

- 15.1 Winback is the general name for attempts made by the donor to discourage a specific subscriber from porting. These attempts are normally made either during the course of any contact between the subscriber and the donor to arrange the porting or during calls made by the donor to the subscriber after the donor has become aware that the subscriber is requesting porting.

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- 15.2 The discouragements may take various forms ranging from making derogatory comments about the recipient to offering inducements such as special discriminatory discounts to stay with the donor.
- 15.3 Winback is prohibited in some countries and controlled by codes of practice in others. Some regulators regard winback as an acceptable competitive action²⁵ and others, probably the majority, regard it as anti-competitive²⁶.
- 15.4 TRA considers that not permitting winback provides an incentive for operators to provide consistently higher levels of service and performance. TRA believes that permitting winback would allow operators to establish relatively lower levels of performance and only offer improvements in service and performance when faced with the loss of a subscriber.

16 Other issues

Recipient vs donor led porting

- 16.1 The porting process can either be recipient-led or donor led.
- 16.2 With a recipient-led process, the subscriber contacts the recipient and arranges the new account and requests number portability. The recipient arranges the rest of the transaction with the donor on behalf of the subscriber.
- 16.3 With donor-led portability, the subscriber must contact the donor operator first to obtain a porting authorisation code and then contact the recipient to arrange the new account and give it the code, which is used by the recipient in the transaction with the donor.
- 16.4 Most countries use recipient-led porting because:
- It is a one-stop shop with the subscriber only needing to make one transaction;
 - It avoids contact with the donor, which provides opportunities for winback;

²⁵ For example, the timescale for fixed portability in UK was set originally in discussion with Ofcom to allow time for a winback attempt, but Ofcom now takes a more negative view on winback as one of the reasons for moving to recipient led mobile porting, see discussion in 3.101 to 3.111 of Telephone number portability for consumers switching suppliers - Concluding Statement - 29 November 2007

²⁶ An example is the Malta Communications Authority Statement of Decision on Win Back During and After the Porting Process (December 2006). Also ComReg's Review of Carrier Pre-Selection in Ireland (2003) 03/115

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- The recipient has the incentive to make the process quick and easy whereas the donor has the incentive to make it difficult and unreliable.

16.5 Although recipient led porting was introduced initially for mobile porting in the UK there were problems with authorisation and it was difficult for the recipient to resolve the problems. The system was changed to donor-led porting so that authorisation could be resolved directly between the subscriber and the donor. Ofcom is now requiring the system to be changed back to recipient-led porting because it thinks that recipients will not promote porting if it creates opportunities for winback during the contact with the donor.

16.6 TRA proposes to require recipient-led porting.

Porting times

16.7 Porting times can vary widely: from near instant with fully automated systems; to between 3 and 5 weeks for manual systems. The shortest regulated requirement for mobile porting is in the UK with 2 hours. The European Commission is planning to limit porting times to one day²⁷ but this proposal is under discussion and may be changed. Where parts of the donor operator's authorisation process are manual, allowing more time may provide flexibility for cost savings, for example through batch processing. However, allowing times longer than 2 days does not provide any further savings.

16.8 The following table gives a comparison of mobile porting times in different countries and also indicates the annual percentage of subscribers porting. Porting rates are from early 2007 and are taken from data published by the regulators or the database operators.

²⁷ See Proposal for a Directive of the European Parliament and of the Council amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communication sector and Regulation (EC) No 2006/2004 on consumer protection cooperation Brussels, xxx COM(2007)698: Amendments to Directive 2002/22/EC (Universal Service Directive) Article 30 Paragraph 4

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Country	Porting time	% porting pa
Hong Kong	1.5 days	14%
Spain	6 days	7.8%
Australia	3 hours	7.5%
Ireland	2 hours	6.5%
Sweden	5 days	6.1%
Belgium	2 days	4.6%
Malta	4 hours	3.6%

Table 2: Porting time vs porting rate for mobile

16.9 Fixed portability is partly similar to mobile portability but occurs in a different operational context depending on the access technologies, which may be:

- a competing traditional operator or cable operator with exchange lines to the premises
- an operator that uses local loop unbundling
- an operator with fixed wireless access
- a VoIP operator.

16.10 The porting process for fixed is essentially similar to that for mobile except that:

- in the case of an operator with exchange lines it may be necessary to allow substantial time for the line installation, ie portability may be ordered up to a month before the recipient operator is ready to "port in" the number and provide service and the process needs to allow flexibility over this timing;
- in the case of an operator that uses local loop unbundling, the process needs to be synchronised with the unbundling process.

The time allowed for number portability is not the dominant time factor for the customer in these cases. A further practical factor is that the IT systems for fixed may be older and less well integrated than those for mobile.

16.11 The following are some examples of fixed porting timings:

- In Ireland, validation of the initial porting request must be completed within one day. Eight further days are then allowed for installation by the recipient with porting occurring on day 9. Combined porting and local loop unbundling takes approximately 10 days.
- In Malta, validation of the initial porting request must be completed within three days and one day is allowed for the finalisation of the process. However, the recipient may have a

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variable time of their choosing of up to 20 days between validation and finalisation to allow for installation.

- In UK, single line porting takes a minimum of 4-5 days and multi-line porting with more than ten lines takes 17 days.

16.12 The process for porting special services and premium rate services will depend on the nature of the service and the traffic level. In principle, the time needed for validation and finalisation should not differ from that for fixed numbers but some special service and premium rate service numbers may carry high traffic volumes and peaky traffic demand profiles and require careful planning.

16.13 In the UK, the time for mobile porting was reduced in March 2008 from 5 days to 2 days and did not result in a significant change in the porting rate. Analysis of porting levels for mobile against porting time shown in the table above shows no significant increase in porting levels for times of less than 5 days. These observations suggest that customer demand is insensitive to porting times below 5 days. Nevertheless, if asked, most customers would be expected to want porting to be faster rather than slower. TRA takes the view that porting should be as fast as possible but not so fast that it leads to increases in costs. Allowing for cost saving from working in batches gives an initial target porting time of not more than two days.

16.14 TRA proposes that the mobile process should not take more than 2 days at the date of implementation.

16.15 For the fixed process, TRA proposes that, at the date of implementation of number portability, the initial validation should not take more than 2 days and that the finalisation should not take more than one day. A further variable time may be set by the recipient to allow for installation after initial validation. In the case of porting to an operator that is not dependent on installation, this would give a porting time of less than 3 days. With the migration of the Batelco network to NGN and improvements in the IT systems, it may become possible to shorten these times in the future so that if the recipient operator does not need extra time the fixed process can be completed within 2 days (same as the mobile process). In the case of combined local loop unbundling and number porting, the validation processes should be run in parallel so that porting adds little to the time needed for unbundling. Longer times will be needed for multi-line porting especially where high traffic volumes are concerned.

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16.16 In common with other jurisdictions²⁸ (and Table 2 above), TRA is of the view that there are no overriding practical reasons why number portability for both mobile and fixed services should be not achievable within one working day. TRA therefore proposes that, from 2 years following the implementation date, the time for the porting process for fixed and mobile portability shall not exceed 1 working day (excluding any time required for recipient installations).

16.17 For the special services and premium rate services process, TRA proposes the same limits for validation and finalisation as for fixed but with additional allowances (based on recipient's requirements) for planning for high traffic where necessary.

Authorisation and validation

16.18 Authorisation and validation are the processes by which the person requesting porting is checked to be the subscriber or the authorised representative of the subscriber and unauthorised portings are detected and refused.

16.19 Experience in other countries teaches that validation should not be based on matching names and addresses against subscriber records as there can be many errors in these records and not all pre-pay subscribers may be correctly registered.

16.20 The following elements have been demonstrated in Ireland and Malta to be reliable and effective checks:

- Recording a copy of the identity papers (ID card or passport) of the person requesting porting. This is done as a deterrent.
- Checking possession of the number to be ported by making a test call or SMS to the number or by checking the CLI of a call or SMS from the number.
- Obtaining the account number and matching it against the account number held by the recipient.

16.21 TRA proposes that authorisation and validation should be based on these checks.

Debts and handset subsidies

16.22 The most controversial issue in the porting process is the issue of debts and, for mobile, handset subsidies. Handset subsidies result in minimum length contracts with a penalty for early termination.

²⁸ See EU Telecoms Reform: the 6 Most Important Issues Still Open; European Commission, MEMO/08/551; 02/09/2008 and MEMO/07/458. 13/11/2007

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16.23 When a post-pay subscriber leaves they may have to pay off both their bill for calls and an early termination charge. This problem occurs when a subscriber changes network without number portability. Some operators argue that the donor should not be denied the added leverage of refusing to port the number to help them to ensure that the final bill is paid.

16.24 In the case of mobile, to require a post-pay subscriber to pay off their final bill before allowing their number to be ported is not easily compatible with a fast simple process for the subscriber since payments take time and it may be 2-3 days before all the CDRs for roaming calls have been received.

16.25 There are at least three different positions on this issue:

- The donor is not allowed to refuse porting for any payment related reason;
- The donor is not allowed to refuse porting if the subscriber is not overdue in paying any bill;
- The donor may require final payment or a credit card authorisation for payment before the number is released.

16.26 TRA considers that the issue discussed in this section is a general commercial issue that should not be addressed in the context of this regulation. Debts in relation to these services should be treated in the same commercial manner as any other debts may be treated

Reasons for refusal

16.27 To avoid misunderstandings and to achieve a consistent procedure, the permitted reasons for the donor to refuse a porting should be clearly specified and limited by regulation.

16.28 TRA proposes that the acceptable reasons for refusing porting should be:

- There are errors in the porting request;
- Information, as required by specifications to be prepared, that should be sent is missing;
- The authorisation information is incorrect eg the account number and number to be ported do not match;

16.29 TRA may consider other reasons on their merits in the course of this consultation and any further acceptable reasons will be included in the final regulation.

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Statistics collection and publication

16.30 TRA needs information on the performance of the operators in meeting the requirements for number portability. Most active regulators require reporting. The period for reporting should be monthly so that regulators have good visibility, especially during the early stages of portability. The period can be increased later if everything is working well. If there is a central database, then statistics can be collected independently by the database.

16.31 TRA proposes that the following list of parameters should be reported every three months and that they should be reported for each donor separately.

- Number of porting requests
- Number of refusals
- Number of acceptances
- Number of successful portings within required timescale
- Number of successful portings outside required timescale
- Number of portings not followed through by recipient
- Donor response times at each stage of process
- Two most common reasons for refusal

16.32 Depending on the functions undertaken by the proposed central database, these statistics may be collected and published by the party that operates the central database.

17 Other barriers to competition

17.1 Number portability increases competitiveness but does not create competitiveness, and the effect of number portability can be reduced if there are other barriers to competition. The objective of operators will be to create these barriers as part of their strategy to retain or lock-in their subscribers and TRA is considering carefully which barriers should be permitted and which should be restricted.

17.2 The common barriers are:

- Minimum term contracts with high charges for early cancellation, often linked in mobile networks to handset subsidies. Some regulators do not permit handset subsidies. Others limit the contract length to 12 months;
- Call discounts for longer term contracts;
- Bundling of services with discounts for multiple services;
- Deep on-net discounts;
- Customer loyalty programmes where increasing discounts are earned over time.

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17.3 The existence of minimum term contracts may cause confusion for subscribers because they may not be aware of the term nor the current level of any early termination charge. Thus they may not be in a position to make informed decisions about moving operator. A partial solution is to ensure greater visibility of the contract terms and early termination charges. This will both reduce the potential problems of when subscribers wish to port and enhance consumer pressure to keep the charges and terms reasonable. Improved visibility can be given by printing the end date for any minimum term contract and the current level of termination charge on the subscriber's bill and making the information available on the subscriber's webpage if Internet access is provided to the account.

17.4 TRA proposes to consider these issues further in discussion with the operators after consultation with Consumer and Business Advisory Groups.

18 Lessons from other countries

18.1 Number portability has been implemented in many countries with a wide range of different results. In some countries portability has been successful and for mobile portability some 5% to 10% of subscribers have ported their number per year (see Table 2 above). In other examples the level of porting has been lower.

18.2 The following summarises the main lessons learned from other countries:

- a) Subscribers need to be made aware of the availability of number portability.
- b) The Porting process needs to be well defined with clear documentation and fit easily within the retail system.
- c) The preparation of the specifications can be accelerated and improved if expertise is used and lessons taken into account from other implementations.
- d) The subscriber procedure should be led by the Recipient Operator and not involve the Subscriber having to contact the donor, because the donor does not have an incentive to make this efficient or easy and because the contact provides opportunities for Winback.
- e) The Donor should not be allowed to charge the Subscriber for Porting as such charges act as a strong barrier to porting and some Donors in other jurisdictions have used excessive charges as a deterrent.
- f) Porting times of up to 5 days do not deter subscribers from porting provided that the subscribers can use any

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new handset immediately. However allowing times greater than 2 days for mobile portability may not reduce costs.

- g) Operators may express concerns about the danger of increased bad debts if Subscribers can port before paying the final bill. But paying off the old account before leaving produces a slow process and concerns may be exaggerated. It also requires contact with the donor, which facilitates Winback.
- h) Worries over fraudulent Portings are exaggerated. A check of possession of the number and taking a record of the identity of the requestor is normally an effective barrier to deter fraud.
- i) The Porting process should not include checks on the exact name and address of the subscriber as the information held by the donor may be inaccurate or out of date.
- j) The portability process should be tested thoroughly before launch to avoid problems that can cause an adverse public reaction.
- k) The regulator should require regular reports on the level of Porting and the proportion of Portings achieved on time and without problems, in order to identify and resolve the main causes of any problems.

18.3 TRA has taken full account of these lessons in preparing the proposed implementation plan.

19 Implementation plan

The start of the programme

19.1 For mobile portability TRA has the option to start this work in advance of the award of the licence to the third mobile operator or to postpone the work until the mobile operator has been selected and so can participate in the work.

19.2 The argument for starting the work on mobile in advance of the award of the licence to the third mobile operator is that it will:

- Enable the specifications to be ready earlier;
- The third operator is unlikely in practice to contribute greatly to the content of the initial specifications provided that expert support is used;
- The preparation and availability of the specifications will provide clarity for the third operator about exactly what will be required.

19.3 The argument against is that:

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- The third operator cannot participate directly. However, this does not preclude minor changes being made at a later date;
- There will not be sufficient representation in the discussion of the perspective of the new entrant. This can be counterbalanced if expertise is brought in from other countries and TRA ensures that the results are suitable for users.

19.4 TRA considers that work on mobile portability should start as soon as possible.

19.5 For fixed portability, TRA's view is that the work should start as soon as the regulations are finalised and should include consideration of VoIP services.

19.6 For special services and premium rate services portability this work could start as soon as the regulations are finalised but because of the potential workload, it may be more practical to postpone the start by a number of months.

Management structure and working groups

19.7 TRA proposes to manage the implementation programme in conjunction with the operators through the Number Portability Working Group. Under this group individual task forces will be formed to prepare each of the specifications.

19.8 TRA proposes that four task forces should be formed:

- The mobile porting process task force whose task is to prepare the mobile process specification;
- The fixed porting process task force whose task is to prepare the fixed process specification;
- The routing and charging task force whose task is to prepare the routing and charging specification;
- The central database task force whose task is to prepare the database procurement specification.

19.9 Although it is common practice for task forces to have formal terms of reference, this will not be necessary because the objectives are simple and major issues will have been addressed in the regulation.

19.10 Experience in other countries (eg Ireland, Malta, Jersey) has shown that this work can be accelerated and improved if an expert is used to propose initial drafts and lead the discussions with the operators and the production of the documents.

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Adequate discussion with the operators is necessary to ensure that practical issues are taken fully into account but the time needed can be shortened significantly. TRA expects to fund an expert to lead these groups and act as rapporteur for the documents, using, as a starting point, existing specifications from other countries. A series of at least three 2-day workshop meetings will be needed for each document with the documents being updated during the meetings or shortly afterwards.

19.11 The minimum elapsed time needed will be two months for each process specification but the fixed and mobile processes can proceed in parallel. Experience shows that the operators need time to consider the drafts and make comments; the time cannot easily be shortened below 2 months. Many of the staff at the operators will be learning about number portability for the first time. Attendance at these meetings should be limited to people with the expertise needed to do the work as it becomes difficult to conduct this sort of work in a large group.

19.12 During the meetings it may not be possible to reach consensus on some issues. TRA proposes to attend the meetings and assess the various arguments so that it can propose a solution where there is no consensus. TRA will primarily take account of user interests and aim to ensure that portability is implemented in an effective, secure and user-friendly manner.

The process specifications

19.13 The main issues to be addressed in the process task forces and included in the specifications are:

- Overview of the process
- Account classification
- Porting hours, batch processing and batch limits
- Subscriber handling and initial validation
- Special cases
- Requirements on the Recipient Operator when taking an order
- Checks performed by the central database
- Actions by the Donor on receiving a porting request
- Activation by the Recipient Operator
- Actions by the Donor Operator in closing the old account
- Updating of the central database
- Subsequent Portings
- Portings back to the Block Operator
- Portings where neither Donor Operator nor Recipient Operator is the Block Operator
- Database logs and reporting of late responses

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- Termination of service
- Clarification of Cooling-off periods and Win-back
- Data cleansing and resolution
- Porting Request Form
- List of Messages and their format

The routing and charging specifications

19.14 The main issues to be addressed in the routing and charging task force and included in the specification are:

- Number portability prefixes
- Routing of Circuit Switched Calls
- Routing of SMS
- Routing of Multimedia Message Service (MMS)
- Routing of Other signalling messages
- Subsequent portings
- Pending Messages
- Retail call charging
- Interconnection call charging
- Interconnection SMS related charges
- Interconnection MMS related charges

The database specifications

19.15 TRA proposes to procure the database as a service that will be run by the supplier and provided to the operators. The main issues to be addressed in the database task force and included in the specifications are:

- The Service Requirements (by reference to the process specifications)
- Interfacing with the Operators
- Data Record Structure
- Dimensions & Scalability
- Availability and quality of service parameters
- Disaster Recovery
- Implementation Schedule
- Provision of information to law enforcement organisations
- Logging of activities and archiving of data
- Reporting of statistics
- Availability of a Test platform
- Escrow of the software
- Training
- Documentation
- Conditions of Delivery
- Price
- Penalties
- Reference List of Existing Customers

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- Consultancy support
- Format of the quotation

Database procurement

19.16 When the database specification has been completed, TRA proposes to prepare and issue a Request for Proposals (RFP) and undertake a formal procurement process. This process will be undertaken in conjunction with operators. The procurement process is expected to take a total of 3 months to complete including the preparation of the RFP.

Timeline

19.17 TRA proposes to move ahead with the implementation of mobile number portability without significant delay and proposes the following milestones:

- November 2008: Review of consultation
- January 2009: Publication of regulations
- March 2009: Completion of the main specifications and the RFP for the database
- July 2009: Delivery of the central database
- September 2009: Introduction of mobile and fixed porting

19.18 The proposed implementation programme is illustrated in figure 10.

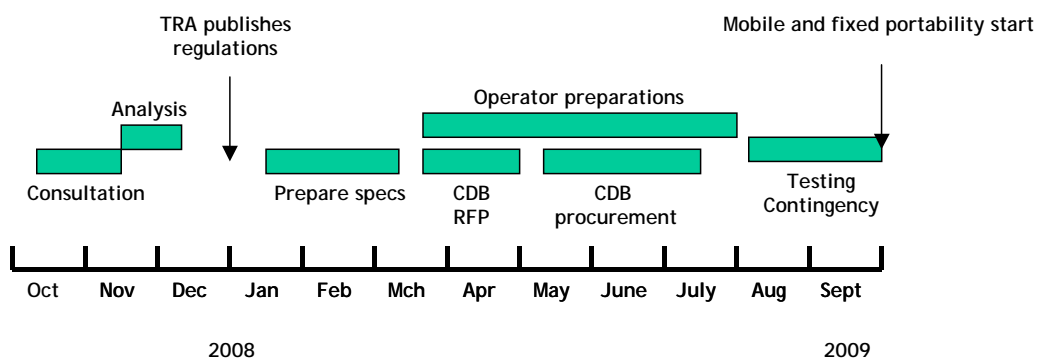


Figure 10: Implementation plan

19.19 The proposed timescales are challenging and TRA trusts that the operators will do their best to meet them in the interests of serving the users better.