Routing calls to ported telephone numbers

Statement

(✂Redacted for publication)

Statement

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Section 1

Summary

Introduction

1.1 Number portability is the facility that allows subscribers to keep the same telephone numbers when they change provider.

1.2 Currently, communications providers use a technical solution commonly known as onward routing to convey calls to fixed and mobile telephone numbers that have been ported. Calls are first routed to the provider which originally held the number and that provider (known as the number range holder or donor provider) forwards (or *onward routes*) the call to the provider currently serving the subscriber (known as the recipient provider).

Ofcom consultation on routing

1.3 We have previously consulted on whether the UK should adopt direct routing – an approach to handling calls to ported numbers under which the originating operator would be able to identify the recipient provider and route the call directly[1] to the recipient. Benefits expected to flow from direct routing include improved routing efficiency of ported traffic, removing range holder dependence, and simplification of the wholesale financial settlements scheme between providers for call conveyance.

1.4 In November 2007, we decided to implement direct routing for all calls using a common database and require a new near-instant mobile porting process.[2] That decision was set aside on appeal by Vodafone Limited supported by other operators to the Competition Appeal Tribunal ("CAT") and remitted back to us.[3]

1.5 On 3 August 2009 we consulted on our assessment of direct routing, and identified three options for realising the benefits of more efficient routing of mobile calls to ported mobile numbers as well as a do-nothing option ("the August 09 Consultation").[4]

1.6 In the August 09 Consultation we assessed the likely costs and benefits of direct routing. Our provisional analysis identified an overall net benefit of £25m over ten years[5] as a result of moving to direct routing, but only in relation to mobile originated voice traffic to ported mobile numbers. Direct routing for other call types was not cost

[1] "Directly", in this context, means conveyed from originator to recipient either over direct interconnects between these networks or using a transit product provided by a third party i.e. conveyed in the same way as a call to a non-ported number.
[2] See *Telephone number portability for consumers switching suppliers*, concluding statement, published on 29 November 2007 at http://www.ofcom.org.uk/consult/condocs/gc18review/statement/statement.pdf
[3] See CAT Judgment, Case Number 1094/3/3/08 dated 18 September 2008 at http://www.catribunal.org.uk/files/Judgment_1094_180908.pdf
[4] See *Routing calls to ported telephone numbers*, consultation on proposals, published on 3 August 2009 at http://www.ofcom.org.uk/consult/condocs/gc18_routing/routing.pdf
[5] In the August 09 Consultation we reported that the NPV for mobile to mobile direct routing was £26m over 10 years and £16m over 7 years. Subsequent to the publication of this consultation, some data errors were discovered and the NPV should have been reported as £25m over 10 years and £15m over 7 years.

justified mainly because of the relatively high implementation costs of direct routing for legacy circuit-switched fixed networks.

Ofcom's conclusion following the August 09 Consultation

1.7 Our conclusions, together with analysis of each of the options on which we consulted in the August 09 Consultation, are explained in section 3. An account of the responses of stakeholders to our August 09 Consultation questions, and our position on each of the responses, is included in this document at annex 3.

1.8 Our analysis since the August 09 Consultation has considered the evidence provided and the views expressed in the responses to the August 09 Consultation. Much of this evidence was focussed on our cost benefit analysis ("CBA"). The CBA is important because it estimates whether there is likely to be a net benefit of implementing direct routing and hence whether regulatory intervention may be justified.

1.9 The case for intervention is weaker as a result of adjustments we have made to the CBA following the August 09 Consultation. These have reduced the base case net present value ("NPV") of moving to direct routing for mobile originated calls to ported mobile numbers to less than £10m over 10 years. This amounts to a small average annual benefit in the range 1p to 2p per year for each mobile phone subscriber in the UK.[6]

1.10 We consider that no regulatory intervention is appropriate at this time because of the following reasons:

- The revised NPV is positive but low.
- By its nature, the CBA reflects forecasts and assumptions. Changes to some of our forecasts or assumptions could turn the NPV negative.[7]
- The potential benefit for consumers (assuming cost savings were fully passed thorough) is small. In a competitive market, we would expect these savings to be passed on although any dilution of those savings would further reduce the benefits to consumers.
- We recognise that there might be further benefits stemming from direct routing (which we have not quantified), but these are likely to be secondary to the substantive matter of routing efficiency.[8]
- Our regulatory principles, aligned with widely-recognised standards of regulatory best practice are that the case for regulation must be clear – where the case is marginal, we prefer not to intervene.

1.11 Therefore, we are not making any changes to the existing regulation of number portability in relation to direct routing. We consider that this decision complies with the principle that regulatory activity should be *targeted only at cases where action is*

[6] Based on 73 million mobile phone subscribers (excluding mobile broadband subscribers).
[7] Our low case scenario detailed in section 4 estimates an NPV of -£26m over 7 and 10 years.
[8] See paragraph A3.43 to A3.47 below.

needed.[9] This decision is also in line with our *bias against intervention*[10] since the case for intervention is not clear at this time.

[9] Section 3(3) of the Act.
[10] See Ofcom's Regulatory Principles at http://www.ofcom.org.uk/about/sdrp/.

Section 2

Introduction and background

Introduction

2.1 In this section, we introduce number portability and set out the context and background to this review of the routing of calls to ported telephone numbers. We also highlight those aspects of the legal framework which we believe to be pertinent to our consideration of this matter.

Number portability

2.2 Number portability is the facility that enables subscribers to keep their telephone number(s) when they switch communications providers. It is recognised as a key facilitator of consumer choice and effective competition in today's competitive communications markets. Number portability enables subscribers to switch between competing suppliers without the cost and inconvenience of having to have a new phone number.

2.3 The UK was one of the first countries to introduce number portability. It was introduced for fixed line operators from 1996/97 and mobile operators from 1999 by the then Director General of Telecommunications using powers granted to him under the Telecommunications Act 1984.

Regulatory framework

2.4 Number portability is "a key facilitator of consumer choice and effective competition in a competitive environment such that end-users who so request should be able to retain their number(s) on the public telephone network independently of the organisation providing the service".[11]

2.5 The EU regulation of number portability is currently set out in Article 30 of Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, as amended by Directive 2009/136/EC[12] (the "Universal Service Directive" or "USD").

2.6 Ofcom has implemented the requirements of Article 30 USD in the UK, prior to its recent amendments, by setting by setting General Condition 18 ("GC18") of the General Conditions of Entitlement pursuant to its powers under sections 45 and 48 of the Communications Act 2003 ("the Act").[13] In particular, under GC 18.1, communications providers are required to provide number portability "as soon as it is reasonably practicable on reasonable terms, including charges, to any of its Subscribers who so requests."

2.7 Since we consulted in August 2009, the EU reached agreement in December 2009 on a number of changes to the common regulatory framework for electronic communications networks and services (commonly described as the EU Telecoms

[11] See Recital 40 of Directive 2002/22/EC.
[12] See Official Journal of the European Union, 18.12.2009, L 337, pages 11-36.
[13] A consolidated version of the General Conditions, as at 16 September 2009, is published at http://www.ofcom.org.uk/telecoms/ioi/g_a_regime/gce/cvogc160909.pdf

Package). Article 30 of the USD has been amended to include a requirement for national authorities to implement 1 working day porting by 25 May 2011. The requirements of the USD do not extend to the routing arrangements. Our decision and further consultation on changes to the mobile porting process is set out in a separate document published today at http://www.ofcom.org.uk/consult/condocs/mnp/.

Routing arrangements for calls to ported fixed and mobile numbers

2.8 In the UK, when a subscriber makes a voice call to a ported fixed or mobile number, that call is first routed to the communications provider which originally held that number (the number range holder or donor provider) and the donor provider then routes the call on to the communications provider to whom the telephone number has since been ported (the recipient or gaining provider). This arrangement is known as onward routing.

2.9 Although onward routing has generally been an effective mechanism in enabling number porting thus far, we have previously identified a number of issues with its continued use. These issues are described in section 3 of our August 09 Consultation at http://www.ofcom.org.uk/consult/condocs/gc18_routing/routing.pdf.

2.10 The alternative solution is direct routing which, in simple terms, comprises the following features.

- the originating provider identifies that the number dialled by the calling subscriber has been ported and to whom, and routes the call direct to the recipient provider as it would any other call to that recipient provider; and

- to facilitate this type of porting solution, communications providers *typically* maintain a common database which holds up-to-date details of ported numbers and their current providers which they can use as a source of routing information.

Ofcom's previous consultations and the CAT Judgment

2.11 We have previously considered the issue of how calls to ported numbers are routed and specifically whether the UK should change from onward routing to direct routing. Until the roll-out of Next Generation Networks ("NGNs") replaces today's circuit-switched telephone networks with packet-based networks, the costs of making changes to routing arrangements for calls to fixed ported numbers on legacy networks had been found to outweigh the benefits, and so we had previously decided against intervention.[14]

2.12 In March 2006, we set out our view that as NGNs were deployed, there would be an opportunity to support an improved approach to number portability and that whilst our preference was for a co-regulatory approach towards an improved solution, we would consider later that year whether such an approach was sufficient or whether regulatory intervention might be required.[15]

[14] Ofcom's policy statement *An assessment of alternative solutions for UK number portability* published on 21 June 2005 and can be found at http://www.ofcom.org.uk/consult/condocs/uk_numb_port/statement/261832.pdf

[15] Ofcom's publication of 7 March 2006 called *Next generation networks: Developing the regulatory framework* can be found at http://www.ofcom.org.uk/consult/condocs/nxgnfc/statement/ngnstatement.pdf

2.13 Also in March 2006, we published the statement, *Number Portability and Technology Neutrality*, concluding a consultation which started in November 2005. This decision modified GC18 to remove the requirement that communications providers had to provide portability in accordance with a defined functional specification. This specification included rules which required that onward routing be used for calls to ported numbers. However, we made no decision at that time which prescribed an alternative approach to routing calls to ported numbers.[16]

2.14 In November 2006, we published a consultation which reviewed the UK number portability regime and identified, amongst other things, policy objectives around protecting subscribers from the effects of network failure and to ensure the efficient use of networks.[17] The consultation proposed a number of changes to GC18 including that:

a) providers of communications services would be required to establish a common database for handling calls to ported numbers by 1 September 2008;

b) mobile providers would be required to achieve direct routing of calls to ported mobile numbers by 1 September 2009; and

c) all other calls to ported numbers would be directly routed by 31 December 2012.

2.15 The consultation also sought views on proposals to reduce mobile porting lead times from five working days to a period of less than one working day unless there was evidence that the costs of implementing this outweighed the benefits.

2.16 Having received and considered responses to this consultation, we published a further consultation document, *Arrangements for porting phone numbers when customers switch supplier – a review of General Condition 18*.[18] In this document and in relation to direct routing, we concluded that it was appropriate to require industry to establish a common database which would enable direct routing, but we did not amend GC18 as we did not consider that the timescales for implementation were sufficiently clear. We therefore sought further views from stakeholders around time-lines for establishing a common database, direct routing or in the absence of such timelines, how else the delivery of a common database for direct routing could be achieved at the earliest practical date.

2.17 In the same document, we concluded that mobile providers should reduce the porting lead time to two working days by 31 March 2008. We also consulted on options requiring the provision of recipient-led near-instant (i.e. not longer than two hours) porting of mobile numbers based on an appropriate common database being in place.

2.18 In November 2007, we published our final statement[19] ("the November 2007 Statement") on the arrangements for directly routing calls to ported numbers, concluding that:

[16] This statement of 30 March 2006 can be found at http://www.ofcom.org.uk/consult/condocs/numport/mod/mod_statement.pdf

[17] A consultation published on 16 November 2006 entitled *Review of GC18 – number portability* found at http://www.ofcom.org.uk/consult/condocs/gc18/gc18r.pdf

[18] Further consultation published on 17 July 2007 which can be found at http://www.ofcom.org.uk/consult/condocs/gc18review/numberportability.pdf

[19] This statement of 29 November 2007 can be found at http://www.ofcom.org.uk/consult/condocs/gc18review/statement/statement.pdf. Corrections to this

a) communication providers would use all reasonable endeavours to establish a common database ready to be populated with data, as soon as reasonably practicable and, in any event, no later than 31 December 2008;

b) the common database would be populated with all ported mobile numbers as soon as reasonably practicable and, in any event, no later than 1 September 2009, and with all fixed numbers as soon as reasonably practicable and, in any event, no later than 31 December 2012;

c) all mobile providers would be required to directly route all calls to ported mobile numbers as soon as reasonably practicable and, in any event, no later than 1 September 2009; and

d) all other calls to ported numbers (fixed and mobile) would be directly routed as soon as reasonably practicable and, in any event, no later than 31 December 2012.

2.19 Further, we concluded that the mobile porting lead times should be reduced to no more than two hours and that the mobile porting process should change from being donor-led to recipient-led. Finally, we concluded that these changes should be made by no later than 1 September 2009.

2.20 An industry programme, known as UKPorting, was set up to implement these decisions. During the period from November 2007 to September 2008 industry undertook and completed a considerable amount of work toward the establishment of a common database.

2.21 Vodafone Limited – subsequently supported by interveners T-Mobile (UK) Limited, O2 (UK) Limited, Orange Personal Communications Services Limited and British Telecommunications PLC - appealed the November 2007 Statement to the Competition Appeal Tribunal ("CAT").

2.22 The CAT handed down its judgment on the 18 September 2008 ("CAT Judgment"). It found that the process by which Ofcom had reached its decision did not allow stakeholders to provide realistic estimates of the likely costs of adopting the modifications to implement direct routing and establish a central database. The CAT set aside the November 2007 Statement and remitted the matter to Ofcom.

2.23 Further details on this appeal can be found on the CAT's website at http://www.catribunal.org.uk/238-657/1094-3-3-08-Vodafone-Limited.html

Ofcom's current review of the routing of calls to ported phone numbers

2.24 Following the CAT Judgment, we instigated separate reviews of how calls to ported telephone numbers are routed and the mobile porting process.

2.25 On 3 August 2009, Ofcom published a consultation document entitled *Routing Calls to Ported Telephone Numbers* (the "August 09 Consultation") which can be found at http://www.ofcom.org.uk/consult/condocs/gc18_routing/.

Statement were published on 28 April 2008 and can be found at http://www.ofcom.org.uk/consult/condocs/gc18review/statement/corrections.pdf

2.26 In this document we articulated a policy objective of ensuring that calls to ported numbers are routed efficiently and sought to quantify the likely savings of avoiding onward routing against the likely costs of direct routing based on the common database solution envisaged under the UKPorting process. In the light of the CAT Judgment, we fully set out our cost benefit analysis ("CBA") and sought stakeholder input on that analysis.

2.27 Our provisional findings showed a positive net present value ("NPV") of £25m over a ten year[20] time horizon but only in respect of mobile originated voice calls to ported mobile numbers.

2.28 Based on this assessment, Ofcom consulted on three options for realising these benefits and a "do-nothing" option. These are summarised below:

Option (1): do nothing

2.29 This option was to leave the rules as they are (prior to our November 2007 Statement, which was set aside in September 2008).

2.30 We said that we did not favour this option because of the risk that industry would not be able to coordinate a collective move to direct routing and that inefficient routing of calls to ported mobile numbers might persist, depriving subscribers of the benefits which would otherwise flow through to them if costs were lower.

Option (2): industry-led initiative to implement direct routing for mobile originated calls to ported mobile numbers

2.31 This option left open the opportunity for the five established mobile operators to agree to collectively implement direct routing within the next three to four years subject to making a firm commitment and an Ofcom progress review point in late 2010/early 2011.

2.32 We explained that we preferred this option over mandating direct routing because industry is better placed than Ofcom to develop an implementation plan and technical specification that aligns with business-as-usual operations and network upgrade plans.

Option (3): changing the routing incentives for calls to ported mobile numbers

2.33 This option involved making changes to the wholesale payment arrangements and making information about ported numbers available, such that mobile operators could decide whether to continue to route calls to the mobile number range holder and pay the conveyance costs incurred by the range holder in onward routing this traffic or invest in the capability to look-up whether a called mobile number has been ported and to whom, and route the call directly, thereby avoiding porting conveyance charges.

2.34 We did not favour this option because of uncertainties and risks of it failing to deliver our policy objective and the shifting of some of the costs of mobile number portability to fixed subscribers.

[20] In the August 09 Consultation we reported that the NPV for mobile to mobile direct routing was £26m over 10 years and £16m over 7 years. Subsequent to the publication of this consultation, some data errors were discovered and the NPV should have reported as £25m over 10 years and £15m over 7 years.

Option (4): mandate direct routing

2.35 In the absence of any industry-led move to direct routing, this option would involve setting a regulatory condition requiring mobile calls to ported mobile numbers to be directly routed.

2.36 We said that aside from Option (2), mandating direct routing might be the most effective in terms of delivering the benefits we identified.

Mobile porting process

2.37 A separate consultation on mobile porting processes called *Mobile Number Portability; Review of the porting process* was published on 3 August 2009. It can be found, along with published responses, at http://www.ofcom.org.uk/consult/condocs/gc18_mnp/. We observed that there were potentially linkages between process and routing requirements but only in certain circumstances, for example, if we required near-instant mobile porting and routing required the establishment of central database of ported numbers. We have published a decision and further consultation on changes to the mobile porting process today. It can be found at http://www.ofcom.org.uk/consult/condocs/mnp/.

Ofcom's statutory duties

2.38 The EU regulatory framework together with the Act and other relevant UK legislation provide a framework of statutory duties and powers within which Ofcom must make its decisions.

Ofcom's general duties

2.39 Section 3(1) of the Act sets out our general duties and provides that our principal duties are:

- to further the interests of citizens in relation to communications matters; and
- to further the interests of consumers in relevant markets, where appropriate by promoting competition.

2.40 Section 3(3) of the Act provides that, in performing our principal duties, we must in all cases have regard to the principles of transparency, accountability, proportionality and consistency as well as ensure that our actions are targeted only at cases in which action is needed.

2.41 Section 3(4) of the Act requires us in performing our principal duties to have regard to a number of factors as appropriate, including the desirability of promoting competition, as well as encouraging investment and innovation in relevant markets.

2.42 Section 3(5) of the Act specifies that in performing our duty of furthering the interest of consumers we must have regard, in particular, to the interests of those consumers in respect of choice, price, quality of service and value for money.

The Community requirements

2.43 In carrying out our functions, we also have to comply with the six Community requirements set out in section 4 of the Act.

2.44 We consider that the following Community requirements are particularly relevant in relation to the routing solution which is chosen to route calls to ported numbers:

- the requirement to promote competition;[21]
- the requirement to promote the interests of all persons who are citizens of the European Union;[22]
- the requirement to adopt a technological neutral approach;[23]
- the requirement to encourage the provision of network access and service interoperability to such extent as we consider appropriate for the purpose of securing –

    (a) efficiency and sustainable competition in the market for electronic communications network, electronic communications services and associated facilities, and

    (b) the maximum benefit for the persons who are customers of communications providers and of persons who make such facilities available.[24]

Requirement to undertake an Impact Assessment and Equality Impact Assessment

2.45 The analysis presented throughout this Statement and the preceding August 09 Consultation satisfies our duty to conduct an Impact Assessment, as required by section 7 of the Act.

2.46 We previously considered whether we were required to undertake a full Equality Impact Assessment for this review. On the basis of our Initial Equality Impact Assessment Screening we determined that this was not required, because any changes to the routing of calls to ported numbers do not raise specific equality issues; they will affect subscribers equally, regardless of background or identity.

[21] This is the first Community requirement, set out in Section 4(3) of the Act.
[22] This is the third Community requirement, set out in Section 4(5) of the Act.
[23] This is the fourth Community requirement, set out in Section 4(6) of the Act.
[24] Section 4(7) and 4(8) of the Act.

Section 3

Ofcom's conclusions

Introduction

3.1 In this section, we explain our conclusions following the August 09 Consultation and the analysis underlying those conclusions. In reaching our conclusions, we have taken full account of the views expressed and evidence submitted by respondents to the August 09 Consultation. A detailed account of the responses of stakeholders to our August 09 Consultation questions and our position on each of the responses is included in this document at annex 3.

3.2 In the August 09 Consultation, we presented four options on the routing of mobile originated calls to ported mobile numbers. They were:

- Option 1: Do nothing.
- Option 2: Industry-led initiative to implement direct routing for mobile originated calls to ported mobile numbers.
- Option 3: Changing the routing incentives for calls to ported mobile numbers.
- Option 4: Mandate direct routing for mobile originated calls to ported mobile numbers.

3.3 Our conclusions on each of these options are explained below:

Option 1: Do nothing

3.4 Under Option 1, there would continue to be no regulation of the routing of calls to mobile ported numbers.

3.5 In accordance with our duty under section 7 of the Act to conduct an Impact Assessment, the CBA is an essential part of our final decision in relation to the routing of calls to mobile ported numbers. The CBA has been updated in light of consultation responses and information gathered post consultation (see section 4 of this Statement). As we explain in section 4, the case for intervention is weaker as a result of adjustments we have made to the CBA. These have reduced the base case NPV for implementing direct routing for mobile originated calls to ported mobile numbers to less than £10m over 10 years. This amounts to a small average annual benefit in the range 1p to 2p per year for each mobile phone subscriber in the UK.[25]

3.6 We consider that no regulatory intervention is appropriate at this time because of the following reasons:

- The revised NPV is positive but low.
- By its nature, the CBA reflects forecasts and assumptions. Changes to some of our forecasts or assumptions could turn the NPV negative.[26]

[25] Based on 73 million mobile phone subscribers (excluding mobile broadband subscribers).
[26] Our low case scenario detailed in section 4 estimates an NPV of -£26m over 7 and 10 years.

- The potential benefit for consumers (assuming cost savings were fully passed through) is small. In a competitive market, we would expect these savings to be passed on although any dilution of those savings would further reduce the benefits to consumers.

- We recognise that there might be further benefits stemming from direct routing (which we have not quantified), but these are likely to be secondary to the substantive matter of routing efficiency.[27]

- Our regulatory principles, aligned with widely-recognised standards of regulatory best practice are that the case for regulation must be clear – where the case is marginal, we prefer not to intervene.

3.7 Therefore, we are not making any changes to the existing regulation of number portability in relation to direct routing. We consider that this decision complies with the principle that regulatory activity should be targeted only at cases where action is needed.[28] This decision is also in line with our bias against intervention[29] since the case for intervention is not clear at this time.

Option 2: Industry-led initiative to implement direct routing for mobile originated calls to ported mobile numbers

3.8 In the August 09 Consultation, we said that we were open to an industry-led solution for direct routing. We recognised that there would be advantages to this approach as it would mitigate the risk of regulatory failure which could be associated with regulatory intervention. We explained that we would only consider an industry-led solution to be a viable approach if a clear commitment was shown from the most senior levels of management in the mobile industry.

3.9 Whist we have had very useful discussions with industry during consultation and subsequent to it, this level of commitment is not currently evident.

3.10 However, some Mobile Network Operators ("MNOs") have made suggestions on alternative lower cost (than a central routing database) solutions for direct routing. At paragraphs 3.18 to 3.22 below (in our conclusions on Option 4) we explain how we have considered and why we have rejected pursuing such a lower cost approach through regulatory intervention.

3.11 We are grateful to industry participants for their suggestions and the evidence submitted on a lower cost approach, and of course it remains open to them to pursue an industry-led solution on the basis of these suggestions or other initiatives.

Option 3: Changing the routing incentives for calls to ported mobile numbers

3.12 Option 3 in the August 09 Consultation proposed changing the routing incentives for mobile originated calls to mobile ported numbers by moving to a wholesale charging system whereby at least some of the costs of routing would be paid by the operator originating the call (rather than the range holder or terminating/recipient operator).

[27] See paragraph A3.43 to A3.47 below.
[28] Section 3(3) of the Act.
[29] See Ofcom's Regulatory Principles at http://www.ofcom.org.uk/about/sdrp/

3.13 We explained[30] that this was likely to result in stronger incentives to route calls to mobile ported numbers more efficiently. Conceptually therefore, this remains an attractive option.

3.14 However, we also explained that there would be difficulties in practice with this approach. In particular, we were concerned that indirect routing would likely remain for calls to mobile ported numbers originated on fixed networks. A change to the system of wholesale payments to mobile ported numbers would be unlikely to result in greater efficiency for this traffic, but would result in increased costs to fixed originating operators as they would have to bear the costs of mobile donor conveyance. If we were only to require this approach for mobile originated calls to mobile ported numbers, there would be a risk of distortions resulting from different wholesale payment arrangements between fixed and mobile originated calls – for example, calls could be re-routed from mobile to fixed networks to take advantage of this arbitrage opportunity.

3.15 Ofcom has not changed its view of this option following the August 09 Consultation, and we have therefore decided not to pursue it.

Option 4: Mandate direct routing for mobile originated calls to ported mobile numbers

3.16 In the August 09 Consultation we said that, if there was not a sufficiently strong commitment to Option 2 from industry, mandating direct routing was likely to be the most effective way of delivering the benefits of direct routing we had provisionally estimated.

3.17 However, as explained in section 4, following responses to our August 09 Consultation and further data analysis, we have since made some adjustments to our CBA. This has resulted in a materially lower NPV for direct routing of less than £10m over 10 years. This assumes the use of the database look-up solution based on that specified by NICC[31] and developed by UKPorting.[32]

3.18 As noted in paragraph 3.10 above, some MNOs suggested that direct routing could be achieved using an alternative solution at significantly less cost than would be required to establish a routing database. In particular, some of the MNOs said that it would be possible to develop a direct routing capability using the existing signalling system used to identify the subscription network of call recipients. This system utilises the Signalling Relay Function ("SRF") in the range holder's network – and hence we refer to it here as the SRF solution.

3.19 Use of the SRF solution for direct routing of calls to mobile ported numbers would be likely to require some changes to existing systems and additional capacity to handle a greater volume of SRF look-up requests. Implementation would therefore involve

[30] See paragraph 5.32 of the August 09 Consultation.
[31] NICC (The Network Interoperability Consultative Committee) is a technical forum for the UK communications sector that develops interoperability standards for public communications networks and services in the UK. See http://www.niccstandards.org.uk/
32 UKPorting was the name given to the independent unincorporated association of communications providers set up to establish a common porting database in compliance with the decisions set out in Ofcom's November 2007 Statement. See http://www.ukporting.com//. The group disbanded following the CAT's decision on Vodafone's appeal of the November 2007 Statement. During the time UKPorting was in place, industry developed technical and other arrangements to implement direct routing.

some additional expenditure by MNOs. Since the August 09 Consultation, we have discussed the SRF solution and its costs with MNOs. We do not have precise or robust cost information, but our discussions have confirmed that it is likely that the solution could be implemented at considerably lower cost than a central database.

3.20 On the basis of information we have received from industry, we have run a low cost solution sensitivity in our CBA based on indicative SRF costs. The results are set out in section 4.

3.21 Given the likely lower cost of the SRF solution, we have considered whether we should pursue it as a regulatory mandate. We have concluded that this is not appropriate for the following reasons:

- There is not unanimous support across industry that an inter-operator SRF look-up solution would be a suitable method to implement direct routing and there is no agreed technical specification for this solution. Therefore, we do not have a comprehensive understanding of the costs of establishing this type of solution and further work in the near term would be of limited value without an agreed technical specification. The positive NPV of this approach, which we have modelled in our CBA, cannot be regarded as fully robust.

- There is a risk that directing industry and Ofcom resources in the pursuit of a speculative efficiency benefit means that other projects which could potentially yield more significant and direct benefits to consumers are forgone.

3.22 On the basis of our analysis we have concluded that regulatory intervention is not justified at the present time.

Compliance with Ofcom's statutory duties

3.23 As we noted in the August 09 Consultation, where eliminating the productive inefficiency associated with onward routing calls to ported numbers by regulatory intervention is *cost justified*, regulatory intervention would be consistent with our primary statutory duties to further the interests of citizens and consumers.[33]

3.24 However, the NPV associated with Option 4 (mandating direct routing) resulting from our revised CBA is significantly lower than the NPV on which we relied in the August 09 Consultation, which suggests that mobile only direct routing is unlikely to be cost effective at this time.

3.25 Therefore, we consider that our decision to adopt Option 1 (do nothing) complies with our duty to have regard to the principle that regulatory activity should be *targeted* only at cases in which action is needed. This is because the consumer benefits[34] that might derive from direct routing, balanced against all the other relevant factors that we have taken into account (including, in particular, the likely costs of implementing direct routing), suggests that the case for intervention is marginal and, therefore, that it is not appropriate to intervene. Our decision is also in line with our *bias against intervention*[35] since the case for intervention is not clear at this time.

[33] See paragraph 2.34 of the August 2009 Consultation.
[34] We have also taken into consideration the benefits discussed in paragraph A3.43 to A3.47 of this Statement which we recognise may be potentially significant but conclude that, on balance, are likely to be secondary to routing efficiency.
[35] See Ofcom's Regulatory Principles at http://www.ofcom.org.uk/about/sdrp/

3.26 We note that industry has brought to our attention a lower cost solution for direct routing. However, given the large element of uncertainty in the costs associated with that solution as well as its likely opportunity costs (both for stakeholders and Ofcom), we consider that it is neither appropriate nor reasonably necessary to require stakeholders to devote resources to explore that solution further.

Section 4

Review of Cost Benefit Analysis

Introduction

4.1 This section covers changes made to the CBA in light of consultation responses and our subsequent analysis.

4.2 In the August 09 Consultation we evaluated the costs and benefits of direct routing relative to the counterfactual of maintaining onward routing. We estimated the annual costs and benefits over an 11 year period (with initial capital costs incurred in 2011) and calculated the NPV of direct routing using the weighted average cost of capital ("WACC") as the discount rate.[36] The benefits of direct routing are the costs of onward routing which could potentially be avoided. The avoidable costs we identified were donor conveyance and transmission costs. The pence per minute ("ppm") estimate for avoidable costs was multiplied by the forecast number of onward routed minutes each year to determine the benefit of direct routing. We identified three types of cost associated with direct routing, i) the cost of building maintaining and operating a database of ported numbers ii) the administrative costs of setting up and running the database and iii) the operator specific costs of adapting systems to incorporate direct routing.

4.3 Stakeholders have provided detailed comments on the CBA and the modelling assumptions set out in the August 09 Consultation. As a result of stakeholder comments we have conducted further formal and informal information gathering exercises in relation to mobile to mobile direct routing. Information was collected from the 5 largest MNOs (Vodafone, T-Mobile, Orange, 3UK and O2).

4.4 In this section we discuss the way in which we have incorporated stakeholder comments and additional evidence in the modelling assumptions for direct routing of i) mobile and ii) fixed calls. Using the revised assumptions we have re-run our CBA. We summarise in annex 2 those comments on the fixed and mobile modelling assumptions which we have not reflected in the revised base case (or discussed as part of the sensitivity analysis).

Stakeholder comments and adjustments to direct routing model for mobile calls

Transmission costs

4.5 In the August 09 Consultation we estimated transmission costs based on the cost of an interconnection link (using the BT price list for an STM-1 link) and assumptions around link utilisation (refer to paragraph A5.23 of the August 09 Consultation[37] for details). We assumed that transmission links were 100% utilised (i.e. carrying maximum traffic) in the busy hour of the day.

[36] For mobile operators we used the pre tax real WACC of 11.5% published in the March 2007 statement on Mobile Call Termination. For fixed operators we used the 'rest of BT' pre tax real WACC of 8.29% as a proxy, published in the May 2009 statement A new pricing framework for Openreach.
[37] http://www.ofcom.org.uk/consult/condocs/gc18_routing/routing.pdf

Stakeholder comments

4.6 Vodafone and T-Mobile commented that the estimate for transmission costs presented in the consultation was too high. Vodafone and [✂] commented that Ofcom's assumption that the links will run at full capacity in the busy hour may be over optimistic (using a lower utilisation assumption would increase the ppm costs of transmission). Vodafone also commented that assuming a reduction in the transmission costs of 3.25% per annum (as per the current wholesale charge control on leased lines) was conservative because any successor product to the leased STM-1 that may emerge in due course would be at a lower price for the period 2012-2021.

4.7 T-Mobile commented that investment in transmission capacity is "lumpy" and the elimination of ported traffic would not be sufficient to make a difference to overall costs (i.e. it would not result in a sufficient reduction in traffic such that links could be cancelled). They noted that the marginal cost of additional capacity is smaller than the savings made by reducing capacity procurement to a level tailored to the precise volumes required. Hence, it is cheaper for T-Mobile to purchase excess capacity (for example using a STM-4[38]) and allow for volume growth than it is to buy 3 STM-1s.[39] T-Mobile commented that they necessarily procure significant amounts of excess capacity to account for projected growth and peak demand and the elimination of ported traffic volumes would never be sufficient to materially alter the procurement of capacity.

Ofcom response

4.8 The CBA covers the time period from 2011 to 2021 and over this time period we would expect MNOs to factor any reduction in transmission capacity due to direct routing into their forecasts. We are estimating long run incremental costs in this assessment (as opposed to short run marginal costs) and therefore it is appropriate to include transmission costs avoided by direct routing in the assessment.

4.9 However, we accept that MNOs' actual transmission costs may not be well represented by the BT list price of an STM-1 link, so we have collected further information from MNOs under Section 135 of the Act in December 2009 (the "s135 request") in order to refine our estimates. We asked MNOs to estimate their actual transmission costs. All MNOs estimated that their actual transmission costs were lower than estimated in the consultation. In order to arrive at an average transmission cost we weighted the estimates by the volume of minutes which each MNO onward routed over the period Q4 2008 to Q3 2009 (this information was also obtained from the s135 request). This resulted in us revising downwards the weighted average transmission cost from 0.068ppm in our August 09 Consultation document to 0.012ppm in the revised base case. The reduction in transmission costs will reduce the avoidable costs of direct routing and thus reduce the NPV of direct routing (assuming all other factors are unchanged).

4.10 We have continued to assume that the cost of transmission will decrease by 3.25% per year in the absence of a more precise estimate for the real asset price trend.

[38] A STM-4 is a 622 Mbit/s transmission link.
[39] A STM-1 is a 155 Mbit/s transmission link.

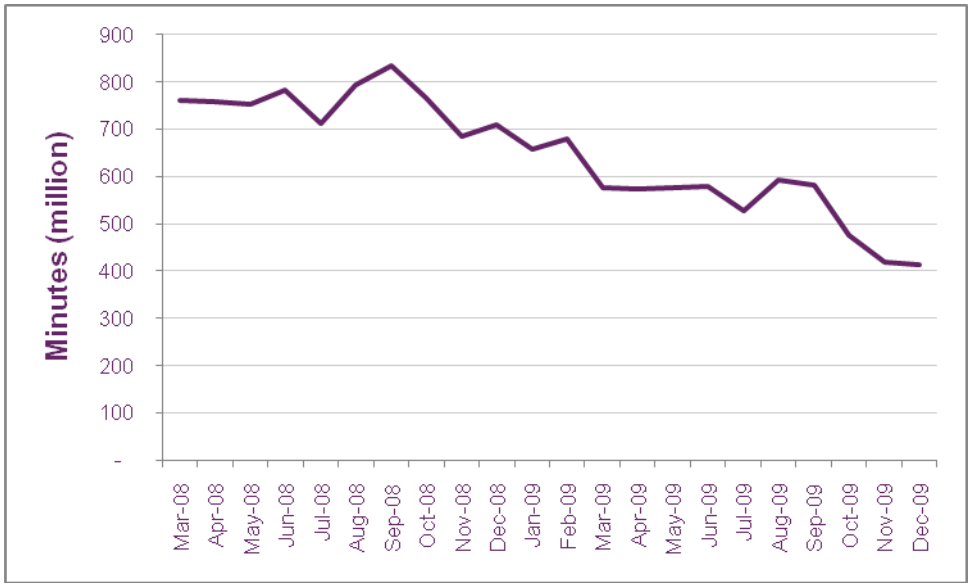
MNP transit costs

Stakeholder comments

4.11 Although MNP transit[40] was not considered in the August 09 Consultation, our subsequent discussions with stakeholders revealed that MNOs use MNP transit to relay a proportion of their onward routed minutes from range holder to recipient. Using MNP transit for ported traffic results in additional costs for MNOs which could potentially be avoided if the traffic were routed by direct interconnect. This is because transit costs could be avoided under direct routing in cases where the originator is directly interconnected with the recipient, but where the range holder currently uses transit to onward route. We have gathered information from stakeholders to determine whether there are costs associated with MNP transit which would be avoidable if direct routing were implemented.

4.12 We obtained information from BT on the volumes and revenues associated with MNP transit over time[41]. The chart below shows the volumes of MNP transit minutes in each month from March 2008 to December 2009:

Figure 1: BT MNP transit minutes



Source: BT/Ofcom

4.13 The volume of MNP transit minutes has declined substantially over the last year. There was a marked decline for two MNOs [✂] who noted that, while MNP transit had been used in the past for a significant volume of traffic to other MNOs, with increased volumes of traffic it had become more cost effective to use direct interconnect. These two MNOs indicated that they only planned to use transit going forward when there was not sufficient capacity on their direct interconnects. They further noted that this situation is no different for non ported traffic i.e. there will be a small proportion of traffic which uses transit even when direct interconnects are in place.

[40] MNP transit is onward routed traffic from mobile range holder to recipient which is conveyed by a fixed operator.
[41] This includes MNP transit for fixed to mobile and mobile to mobile calls to ported numbers.

4.14 Another MNO [✂] noted that, although they used transit currently, they intended to route ported traffic using direct interconnect within the next year in order to avoid the costs associated with transit. A further MNO [✂] noted that they have a long term aim to migrate traffic away from transit but this is unlikely to change volumes significantly in the short term.

Ofcom response

4.15 In relation to the CBA for direct routing we are only interested in capturing costs which would be avoided if direct routing were implemented. In our assessment we have considered the following:[42]

- Overflow routing – we assume that even following the introduction of direct routing, a network may continue to be provisioned such that some traffic will use transit as an overflow route due to capacity constraints on direct interconnections. However, while in onward routing there are two legs which might use transit (originator to range holder and range holder to recipient), with direct routing there is only one leg (originator to recipient). In our calculations for direct routing we have assumed that the amount of traffic to ported numbers using transit between the originator and the recipient would, in aggregate, be approximately equal to the amount of traffic to ported numbers using transit between the originator and the range holder in a world of onward routing. This means that the transit costs incurred for traffic passing between the range holder and the recipient with onward routing are additional (relative to direct routing) and should be captured as avoidable costs in our CBA.

- We have made adjustments where transit costs are incurred currently but MNOs have indicated that they are expected to fall away due to migration towards direct interconnect between the range holder and the recipient network.

4.16 Based on the information provided by BT and MNOs we have estimated that, over the time horizon of our model (2011-2021), around 2.9 billion minutes per year would be routed by MNP transit, which could be avoided if direct routing was implemented (this represents around 43% of 2009 MNP transit minutes). This includes use of MNP transit for fixed to mobile and mobile to mobile calls to ported numbers. To calculate the impact on the NPV for mobile to mobile direct routing we have adjusted the calculation to exclude fixed to mobile calls, which we estimate to be around 15% of total calls to mobile numbers. Therefore we estimate that around 2.4 billion mobile to mobile minutes will be routed by MNP transit per year. We have assumed that this forecast is unchanged over time because, although we might expect onward routing (and hence use of MNP transit) to increase over time as the stock of ported numbers increases, we also note the trend to migrate away from transit towards direct interconnect.

4.17 We have estimated the avoidable costs of transit based on the ppm charge derived from the revenue and volume information provided by BT. This information suggests that the average charge over the last year was [✂]. Clearly this represents the charge levied by BT and does not necessarily equal the avoidable costs associated with providing the service. As MNP transit is not a regulated product, cost information is not readily available. To adjust the charge to more accurately reflect

[42] This analysis is focussed on the 5 large MNOs who we expect to have direct interconnects between themselves by 2012.

the underlying avoidable costs we have [✂[43]], meaning that the average MNP transit cost is estimated to be [✂]. We have assumed that this cost is flat in real terms over time.

4.18 Multiplying the volume of MNP transit minutes by the ppm cost of transit gives an estimate of the total avoidable costs. The present value of the avoidable cost of transit is around [✂] in 2009 prices over the 10 year time period from 2012-2021[44]. The avoidable costs of transit have been included in our revised base case[45]. Since this is an avoidable cost of direct routing which we had not previously identified it increases the NPV of direct routing.

Call Trap[46]

Stakeholder comments

4.19 In the August 09 Consultation we estimated the impact of Call Trap on mobile to mobile calls using actual information from one operator [✂] which was provided in response to the July 2007 Consultation[47] on number portability. This suggested that total ported volumes fell by around 30% on the implementation of Call Trap. This operator has since clarified that this was a percentage reduction observed across all of their ported in traffic, i.e. not just the mobile originated ported in traffic, but also the fixed originated ported in traffic. They further clarified that, in order for total ported in traffic to fall by 30%, mobile originated ported in traffic (the only flow that relates to Call Trap) must in fact have fallen by a higher percentage. Assuming that 30% of ported in traffic originates from fixed (based on our November 2007 Statement[48]), they considered that mobile originated ported in traffic would actually have to have fallen by 43% in order for the total ported in traffic to have fallen by 30%.

Ofcom response

4.20 We informally requested information from another operator [✂] on the reduction in ported in traffic when Call Trap was implemented. This operator considered that the 30% assumption used by Ofcom in the consultation was broadly accurate.

4.21 We have taken an average of the two Call Trap estimates provided ((43%+30%)/2 = 36.5%) and included this in the revised base case.

4.22 The increase in the percentage of minutes which are call trapped (and hence not onward routed) will reduce the NPV of direct routing relative to the base case in the August 09 Consultation (assuming all other factors are unchanged).

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[43] [✂]

[44] It is worth noting that MNP transit costs are incurred in addition to transmission link costs, because a transmission link is still required between the range holder and the transit provider. Where transit is used we have assumed that the cost of transmission between the range holder and the transit provider (BT) is the same as the transmission cost between MNOs.

[45] We note that including the avoidable costs of transit for fixed to mobile onward routed traffic would have a positive impact on the NPV for the 'all calls direct routing' and 'mobile to mobile and fixed to mobile direct routing' configurations. However, the NPV of direct routing for these call configurations is significantly negative and adding avoidable costs of transit for fixed to mobile onward routed traffic will not materially change the NPV. Therefore we have not made this adjustment.

[46] Call trap is when an operator identifies calls made on-net to ported-in numbers and stops them from being inefficiently routed (tromboned) via the range holder.

[47] http://www.ofcom.org.uk/consult/condocs/gc18review/

[48] http://www.ofcom.org.uk/consult/condocs/gc18review/statement/statement.pdf

Methodology for calls where originator and range holder are the same

4.23 In the August 09 Consultation we noted that where the originator and the range holder of a call to a ported number are the same operator, the call is directly routed to the recipient (as an off-net call), rather than onward routed. We assumed that 20% of mobile originated minutes to mobile ported numbers had the same originator and range holder, based on the fact that there are five large MNOs, and the originator of a call to a ported number has a one in five chance of also being the range holder (discussed in paragraphs A5.73-5.76 of the August 09 Consultation).

Stakeholder comments

4.24 Vodafone suggested an alternative methodology based on the porting combinations available. The table below shows that between five different operators there are twenty different porting permutations, where BA indicates a port that has taken place from range holder B to recipient operator A:

Table 1: Porting destinations with five operators[49]

		From (range holder)				
		A	**B**	**C**	**D**	**E**
To (recipient)	**A**	-	BA	CA	DA	EA
	B	AB	-	CB	DB	EB
	C	AC	BC	-	DC	EC
	D	AD	BD	CD	-	ED
	E	AE	BE	CE	DE	-

Source: Vodafone/Ofcom

4.25 Considering the table from the viewpoint of calls originated on operator A, reading across the first row there are four customer porting cases, BA, CA, DA and EA, which will be call trapped (assuming Call Trap is implemented), i.e. a call originating on A to a ported in customer of A. When a customer of A calls a customer of B who has ported in from another network there are also four ported cases of which one, AB, will be 'directly' routed (since A is both originator and donor it knows that B is the recipient operator), and three cases - CB, DB and EB - which will give rise to onward routing since A does not know that the customer has ported and will send the call to C, D and E respectively. A similar proportion will apply to calls from A to the ported customers of other operators, so that in total there are sixteen ported customer off-net destinations of which four (25%) will be directly routed and twelve (75%) onward routed[50].

4.26 Based on this approach Vodafone suggested that it is more appropriate to; 1) deduct the proportion of mobile to mobile calls that are call trapped(i.e. for calls originating on network A that would be BA, CA, DA and EA) from total mobile to mobile calls to ported customers, 2) allocate 25% of the remainder as directly routed off-net calls i.e. where the originator and the range holder are the same (i.e. for calls originating on network A, that would be AB, AC, AD, AE), and 3) treat the balance as onward routed.

[49] Originator configurations are not shown in the table.
[50] As an example, when A is the originator permutations AB, AC, AD and AE in the table are directly routed off-net and permutations BC, BD, BE, CB, CD, CE, DB, DC, DE, EB, EC, and ED are onward routed.

Ofcom response

4.27 Vodafone's approach is more complicated than that set out the in the August 09 Consultation. However, we accept that this methodology (i.e. deducting Call Trap prior to allocating directly routed off-net calls) may result in a more accurate estimate of onward routed minutes.

4.28 Since the August 09 Consultation was published, we have asked MNOs for information on the actual number/proportion of minutes to ported numbers where they are both the originator and the range holder for the period Q4 2008 to Q3 2009 (as part of the s135 request). Four MNOs were able to provide some indication of the proportion of onward routed minutes where they were both the originator and the range holder. The estimates ranged from [✂]. We used this information to calculate a weighted average[51] estimate of 17%.

4.29 We have used this estimate based on actual information for the percentage of minutes where the originator and range holder are the same in the revised base case, rather than using a theoretical estimate of minutes (i.e. the 25% suggested by Vodafone).

4.30 To summarise, our revised approach is to assume that 37%[52] of mobile originated minutes to ported mobile numbers are call trapped (as discussed above), then 17% of the remaining 63% (i.e. 11%) would be directly routed off-net calls i.e. where the originator and the range holder are the same operator. Therefore the percentage of onward routed traffic is 100-37-11 = 53%[53] of total traffic to ported numbers. In the August 09 Consultation we assumed that 50% of traffic to ported numbers was onward routed. Therefore, the revised methodology and estimates will not result in a significant difference.

Avoided costs for calls where originator and range holder are the same

Stakeholder comments

4.31 In the August 09 Consultation we assumed that minutes to ported numbers which were directly routed off-net (i.e. where originator and range holder are the same operator) did not incur any costs which could be avoided if direct routing were implemented i.e. these minutes did not attract additional conveyance or transmission costs relative to non ported traffic. 3UK pointed out that the range holder operator still applies a donor conveyance charge of 0.1ppm to the recipient operator when the originator and range holder are the same. Assuming that costs and benefits ultimately flow through to consumers, 3UK thought it should be concluded that the donor conveyance charge ultimately passes through to consumers and should be treated as a cost in the CBA.

Ofcom response

4.32 We note that a donor conveyance charge is levied by the range holder when they are also the originator of a call to a ported mobile number. Under direct routing this charge would not be levied, but this does not necessarily imply that there are costs which would be avoided under direct routing. We have collected further information

[51] The individual estimates were weighted by the number of minutes onward routed from Q408 to Q309 (including minutes where the operator was both the originator and the range holder).
[52] Rounded to the nearest percentage point.
[53] Rounded to the nearest percentage point.

to determine the level of signalling costs incurred for calls to ported numbers when the originator and range holder are the same operator. As part of the s135 request we asked MNOs to confirm whether incremental costs associated with routing functionality are incurred by the range holder to onward route the call when they are both the originator and the range holder.

4.33 Three MNOs stated that there were no incremental costs. One MNO stated that this was because they perform a look up on all calls to determine the destination of the calls. Similarly, another MNO stated that the implementation of Call Trap requires a look up on every originated call. As these MNOs are already performing a look up on all originated calls there are no additional costs incurred.

4.34 Two MNOs stated that incremental costs were incurred (these MNOs have not implemented Call Trap so may not be performing a MNP look up for all originated calls). One MNO was not able to estimate the incremental costs (although this MNO has confirmed that when they implement Call Trap a look up will be performed on all calls meaning that there will be no incremental costs). The other MNO indicated that the incremental look up costs were "not likely to be significant". Based on this information we consider that the avoided costs are not material for our CBA.

Traffic growth forecasts

4.35 In the August 09 Consultation we based our projections for mobile originated traffic on outputs from the 2007 mobile call termination model. This model suggested that average compound growth in mobile originated traffic would be 1.8% from 2009-2021.

4.36 We forecast fixed originated calls in a manner consistent with the Network Charge Control ("NCC") model which suggests a decline in fixed to fixed minutes of 7.9% (compound annual) and growth of 2.7% (compound annual) for fixed to mobile traffic. The NCC model only forecasts traffic from 2009/10 to 2013/14, for the period beyond the NCC model we assumed that traffic would continue to grow at the same annual rate predicted by the NCC model.

Stakeholder comments

4.37 One confidential respondent commented that the traffic forecasts were not realistic. They thought that the forecast decline in fixed to fixed minutes of 7.9% per annum was too steep.

Ofcom response

4.38 In light of the comments made we have reviewed our traffic forecasts for all traffic types. We include the assessment for mobile and fixed originated traffic in this section since it makes sense to consider traffic in the round.

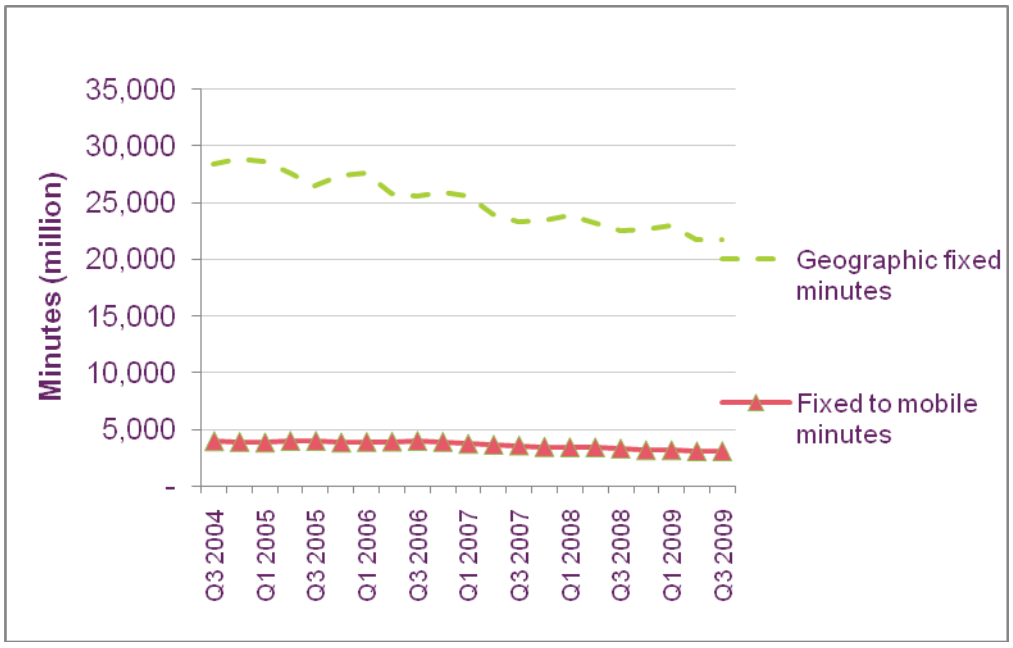
4.39 A new mobile call termination (MCT) model is currently under consultation as part of the wholesale mobile voice call termination review for the period 2011 to 2015.[54] The new MCT model forecasts compound annual growth in mobile originated traffic of 4%

[54] The latest consultation as part of this review is available at http://www.ofcom.org.uk/consult/condocs/wmctr/.

from 2009-2021[55]. This forecast is more up-to-date than that used in the August 09 Consultation, so it is appropriate to incorporate it into our revised base case.

4.40 As a starting point for fixed to fixed and fixed to mobile traffic we have reviewed historic traffic growth over the past 5 years, this is shown in the chart below.

Figure 2: Historic traffic volumes



Source: Ofcom

4.41 Geographic fixed to fixed[56] traffic has declined by 5% (compound annual) over the last 5 years. This is less steep than the decline predicted by the NCC model for the future period 2009/10-2013/14 of 7.9%. The NCC model only includes traffic travelling over the BT network. It is possible that substitution away from the BT network (e.g. to LLU operators) means that the NCC model overstates the reduction in total traffic. In addition, the NCC model only runs to 2013/14. Taking this into account we have assumed that the decline in fixed to fixed traffic will be less steep than predicted in the August 09 Consultation. We have revised the estimate for the compound annual decline in fixed to fixed traffic to 2% over the period 2009-2021.

4.42 Fixed to mobile traffic has declined by 5% (compound annual) over the last 5 years. It is likely that the decline in fixed to mobile minutes reflects the growth of post-pay mobile call packages which include mobile to mobile calls within the all inclusive call bundle. These inclusive call bundle packages may mean the marginal price (i.e. ppm charge) of calling a mobile number is cheaper from a (post-pay) mobile phone than a landline phone (assuming the caller has not exceeded their call allowance), making it more likely that people will substitute from fixed to mobile when calling a mobile number. It is difficult to predict how fixed to mobile calls will continue to evolve in the

[55] The MCT model is subject to consultation.

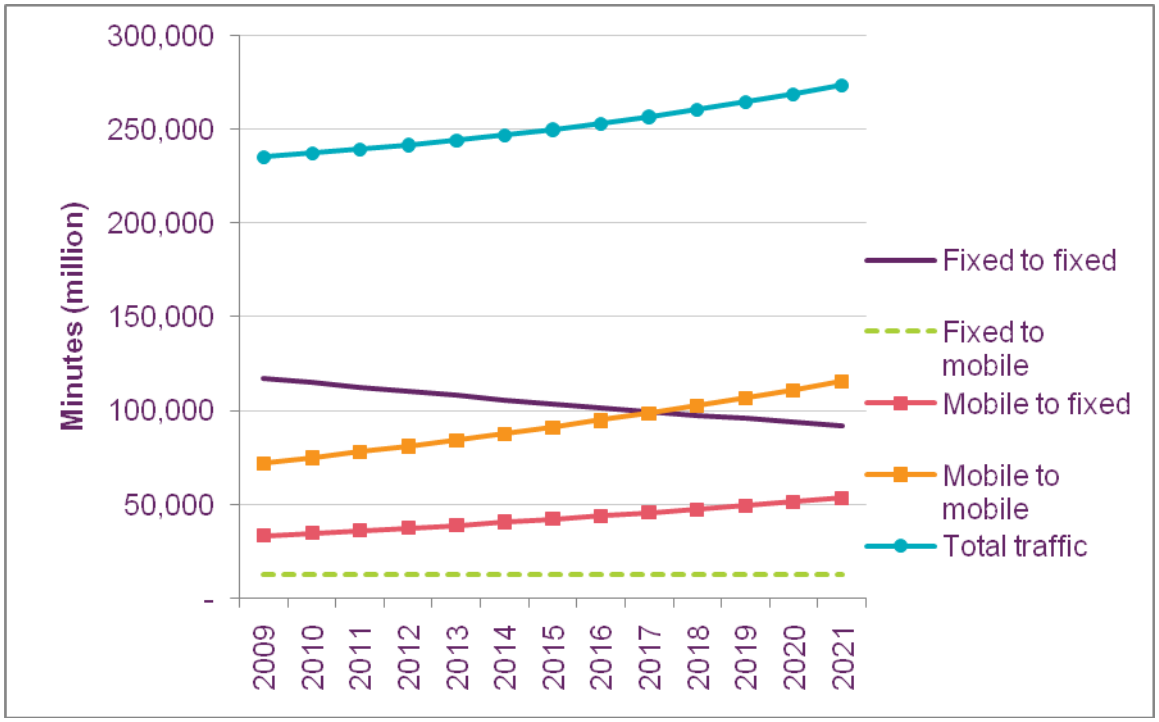
[56] We have not included 'other' fixed calls within the historic analysis. Other fixed calls include premium rate, freephone, special services, directory enquiries and dial-up calls to the internet (amongst others). Dial up internet calls have decreased substantially in the last 5 years as people have switched to broadband and, reflecting this, 'other' call minutes have decreased significantly. Because dial up internet numbers are not ported (and calls are not onward routed) we have excluded 'other' calls from our assessment.

future. Overall, as the mobile phone penetration level is now broadly constant[57], we consider an assumption of average growth of 0% in fixed to mobile calls over the period 2009-2021 could be reasonable.

4.43 In the above cases the projected growth in traffic is a prediction based on reasonable assumptions. Over the last 5 years total traffic[58] grew by 1.5% (compound annual). Using the assumptions outlined above total traffic growth over 2009-2021 would be 1.3% (compound annual) which is broadly in-line with the trend in overall fixed and mobile traffic.

4.44 In the August 09 Consultation we used actual minutes for each traffic category from Q4 2007 to Q3 2008 to form the base year estimate for traffic (paragraph A5.31 of the August 09 Consultation). We have updated this to reflect more up-to-date information so the base year estimate for traffic now reflects actual minutes from Q4 2008 to Q3 2009[59]. The revised growth path for each traffic type is shown below.

Figure 3: Traffic volume projections



Source: Ofcom

4.45 We have included the revised growth projections in our base case.

Projections for onward routed minutes

4.46 In the August 09 Consultation we used a 'bottom up' approach to forecast the volume of onward routed minutes. This involved estimating each type of traffic over time (as discussed above) and making adjustments to arrive at a projection for onward routed

[57] The Communications Market 2009 reported that mobile phone penetration fell from 93% in Q1 2008 to 92% in Q1 2009.
[58] Excluding other fixed as described above.
[59] Note that, where appropriate, we have also updated actual onward routed mobile to mobile minutes to reflect a base year of Q4 2008 to Q3 2009, this information was obtained as part of the December 2009 s135 request.

minutes. We considered that this approach was preferable to an extrapolation based on historic data because it enabled us to model dynamics relating to the growth in ported numbers.

Stakeholder comments

4.47 A number of stakeholders commented that an extrapolation based on actual onward routed minutes to date would be better (or at least should be used for comparison). Vodafone argued that the bottom up methodology was relatively convoluted, relied on a number of assumptions/estimates, and involved a number of steps each of which was prone to uncertainty and error. O2 similarly commented that a simple growth projection for ported traffic would be a reasonable way of projecting growth, and that more than one technique could have been used to compare results.

Ofcom response

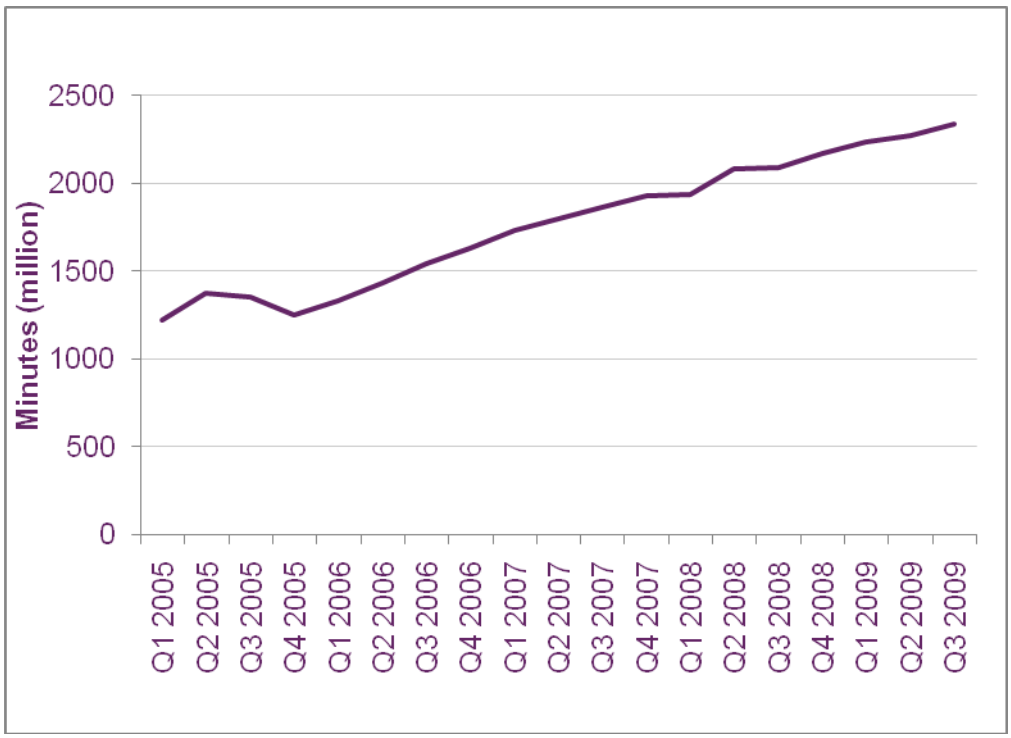
4.48 We have explored the alternative methodology put forward by Vodafone and O2. We had previously collected information on actual onward routed minutes from 2005-2008 in December 2008 through a request under section 135 of the Act. Since the August 09 Consultation was published we have requested further information on onward routed minutes to cover the most recent quarters (up to Q3 2009, as part of the December 2009 s135 request). One MNO was not able to estimate onward routed minutes for pre-pay customers. Based on information provided by other MNOs on the number of pre-pay and post-pay subscribers with a ported number we have assumed that around 90% of onward routed minutes relate to post-pay customers (with the remaining 10% for pre-pay) and we have adjusted the figures provided to include pre-pay (as appropriate).

4.49 The data provided captures minutes onward routed from a mobile range holder to a mobile recipient operator, and therefore it includes fixed originated minutes to mobile ported numbers. Because we are looking specifically at the case of mobile to mobile direct routing, we have adjusted the onward routed minutes to exclude fixed to mobile ported traffic. Based on market intelligence gathered by Ofcom we estimate that fixed to mobile minutes are around 15% of total minutes terminating on mobile networks. Using this as an approximation we have reduced the onward routed volumes by 15% to exclude fixed to mobile ported traffic.

4.50 The actual volumes of onward routed mobile to mobile minutes are shown in the chart below[60].

[60] The chart includes minutes to ported numbers where the originator and the range holder are the same operator.

Figure 4: Historic mobile to mobile onward routed minutes



Source: Ofcom/Operators

4.51 Two MNOs implemented Call Trap over 2005/6 (meaning that some minutes previously onward routed were now trapped as on-net calls) which might explain the dip in onward routed minutes over this period (3 MNOs currently have Call Trap implemented).

4.52 We have used the historic information to carry out a simple linear projection[61] of onward routed minutes under two scenarios[62]:

- Scenario 1: Adjusted to strip out minutes where the originator and the range holder are the same operator (estimated at 17% of onward routed minutes as discussed above).

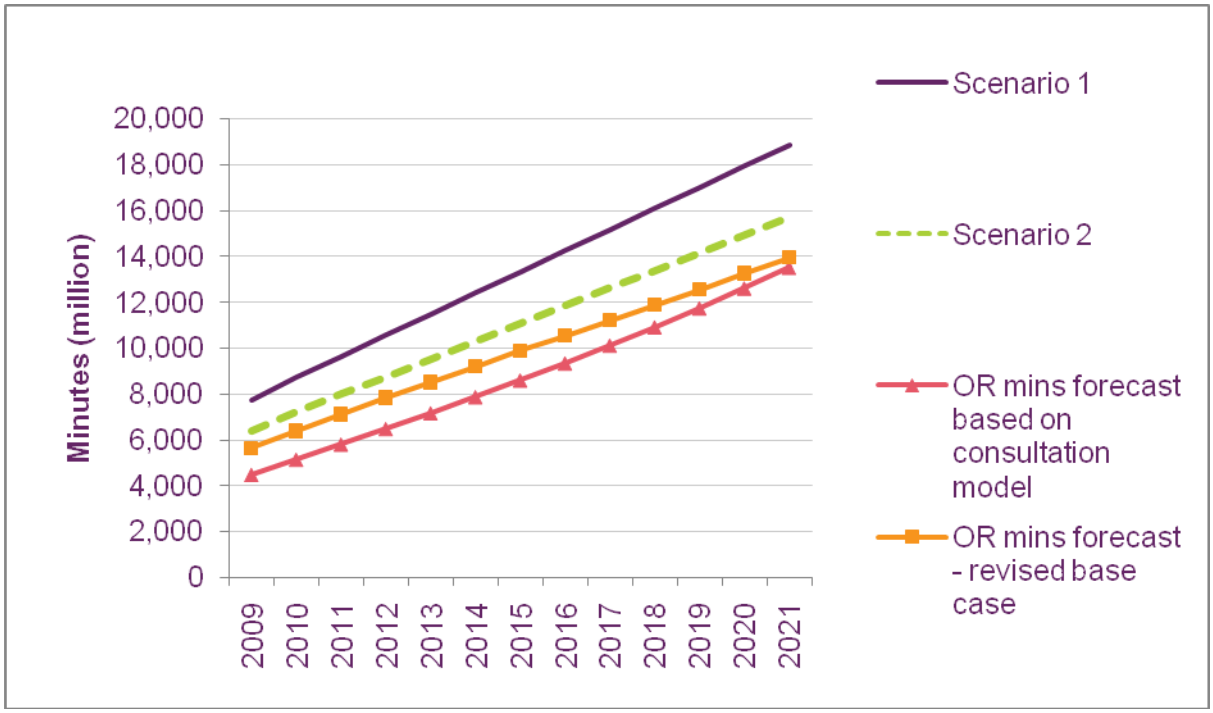
- Scenario 2: Adjusted to i) assume that all 5 operators Call Trap and ii) strip out minutes where the originator and range holder are the same operator (as above)[63]. We noted in the consultation that 3 operators currently use Call Trap and a further operator plans to do so. We have adjusted the onward routed minutes reported by the two operators who have not implemented Call Trap to reflect the possible reduction in minutes if they did so.

4.53 The projection of onward routed minutes under each scenario is presented below, along with: i) the projection presented in the August 09 Consultation based on the

[61] This was done using the forecast function in Excel which uses a linear regression methodology.
[62] Note that the scenarios exclude fixed to mobile onward routed minutes.
[63] In this case the adjusted onward routed minutes are calculated as follows: Adjusted onward routed mins = (total onward routed mins *(1- % which are fixed to mobile))*(1 - % which are call trapped - % where originator and range holder are the same operator). The call trap adjustment is only applied to operators who have not already implemented call trap.

'bottom up' approach[64] and ii) the 'bottom up' projection which reflects the revised base case assumptions.

Figure 5: Projections mobile to mobile for onward routed minutes



Source: Ofcom

4.54 The graph shows that the revised 'bottom up' projection for the Statement yields a slightly lower forecast path for onward routed minutes than scenario 2. Clearly scenario 1 which assumes that only 3 operators Call Trap until 2021, results in a higher estimate of onward routed minutes. Overall we still consider that the bottom up approach to forecasting minutes provides the best base case assumption. In the sensitivity analysis section below we have run scenarios using onward routed minutes from scenarios 1 and 2 to show the impact on the NPV. We note that even if we were to use a projection based on similar assumptions around Call Trap as our revised base case (i.e. scenario 2), it would not lead to a sufficiently significant increase to the NPV to alter our conclusions.

Calls to ported numbers versus non-ported numbers

Stakeholder comments

4.55 In the August 09 Consultation we assumed that ported and non ported numbers received, on average, the same number of minutes. 3UK commented that in their experience ported numbers actually received more calls and minutes than non ported numbers.

[64] Note that this projection is based on the assumptions set out the in the August 09 Consultation and does not reflect the revised assumptions presented in this statement.

Ofcom response

4.56 To investigate this we requested further information on the average call minutes received by ported in and non-ported numbers as part of the s135 information request.

4.57 Only one operator was able to provide an estimate of the average minutes received by ported in and non ported numbers. [✂].

4.58 It is possible that customers with ported in numbers receive more minutes than those with non-ported numbers. However, as we only have evidence from one MNO it is not possible to be certain. Our extrapolation of onward routed minutes based on historic data would capture this effect (since, unlike the bottom up model, it is based on actual minutes and does not assume that people with ported numbers receive on average the same number of minutes as people with non ported numbers). From Figure 5 it can be seen that scenario 2 produces a higher path of onward routed minutes. However, the resulting impact on the NPV is limited when compared to our base case (as shown in Table 7) and would not be sufficient to alter our conclusion.

Percentage of subscribers porting per year

Stakeholder comments

4.59 In the August 09 Consultation we estimated the percentage of subscribers porting each year based on a market research survey on switching and porting from December 2008[65]. Vodafone commented that Ofcom should have used actual information on the number of ports per year.

Ofcom response

4.60 Since the August 09 Consultation was published we have collected information from Syniverse on the actual number of ports per month. From December 2008 to November 2009 there were 2.4 million ports. At June 2009 we estimated that there were around 73 million mobile subscribers (excluding mobile broadband only subscribers). This suggests that 3.3% of mobile subscribers ported in the last year. This is lower than the estimate in the consultation (6.3%) which was based on the market research survey.

4.61 We have adopted the revised level of porting into our analysis. A lower level of porting will reduce the number of onward routed minutes over time so this will reduce the NPV of direct routing relative to the base case in the consultation (assuming all other factors are unchanged).

4.62 We have continued to assume that the percentage of people porting each year is constant over time. However, it is possible that the percentage of people porting over time may vary. For example, the improvements to the porting process set out in "Changes to the Mobile Number Porting Process" (published alongside this Statement at http://www.ofcom.org.uk/consult/condocs/mnp/) may result in more people porting in the future. In the sensitivity analysis section below we consider the impact on the NPV from a +/- 20% variation in onward routed minutes relative to the base case.

[65] TNS, *Omnibus Survey,* December 2008

Percentage of subscribers switching provider per year

Stakeholder comments

4.63 In the August 09 Consultation we estimated the percentage of people switching provider each year at 14%, based on the December 2008 market research survey. Vodafone commented that since the consultation was published lower alternative estimates of mobile switching have been published. Two alternative estimates have been identified:

1) The Communications Market Report 2009[66] – estimated the percentage of consumers who have switched mobile provider in the last year at 8% (at Q1 2009); and

2) The Consumer Experience Report 2009[67] – estimated the percentage of consumers who have switched mobile provider in the last year at 11% (at July 2009).

Ofcom response

4.64 All the estimates are based on survey data and we would expect some variation in the results due to sample variation. However, it does appear that the estimate used for the August 09 Consultation is at the higher end of the range. Instead of relying on one estimate we have therefore taken the mean of the three values presented above, which is 11%, and incorporated this into the revised base case.

4.65 In the August 09 Consultation the percentage of people switching each year affected the estimate of the percentage of subscribers porting each year. However, this is no longer the case because (as described above) the percentage of people porting each year has been measured directly from actual ports. That said the percentage of people switching does still feature in our model which predicts the percentage of total subscribers with a ported number in each year which, in turn, is used to project the volume of onward routed traffic[68].

4.66 The net impact of decreasing the percentage of people switching each year on the base case NPV is negative (keeping all other factors constant at the consultation base case values).

Costs of implementing mobile to mobile direct routing (including operator specific, central database and administrative costs)

4.67 In the August 09 Consultation we estimated the costs of implementing direct routing based on a central database solution (CDB). This solution had been discussed by UKPorting members prior to that group disbanding in 2008. As such, there was a specification against which operators could estimate their own implementation costs, and information was available about the CDB build costs.

Stakeholder comments

4.68 A number of MNOs commented that a CDB solution was not the only option, and lower cost alternatives were available for a mobile to mobile direct routing solution.

[66] http://www.ofcom.org.uk/research/cm/cmr09/CMRMain_4.pdf, p259
[67] http://www.ofcom.org.uk/research/tce/ce09/research09.pdf, p100
[68] These calculations are described in paragraphs A5.44 to A5.64 of the August consultation.

T-Mobile noted that SMS is already currently directly routed by MNOs and that an SRF look-up solution could be implemented at low cost to achieve a direct routing solution for mobile to mobile calls[69]. This solution would only incur operator specific costs and would avoid the cost of setting up a database and running an administrative porting programme office.

Ofcom response

4.69 We asked MNOs to estimate the costs to direct routing mobile to mobile calls based on a specification outlined by T-Mobile in an informal information request.

4.70 3 MNOs were able to provide a quantitative cost estimate based on the specification. These MNOs suggested that the incremental capital costs would be between [✂].

4.71 In relation to operating costs [✂].

4.72 We have assumed the costs for the two MNOs unable to provide cost information based on the responses provided by other MNOs. We estimate that the incremental capital costs for these MNOs would be around [✂]. This means the total capital costs of the alternative specification are around £8.5m[70].

4.73 The average incremental operating costs for the MNOs who provided information was £0.08m per year. We have assumed that the two MNOs unable to provide information will incur the average ongoing cost of £0.08m per year. This means the total ongoing costs are estimated to be £0.42m per year (or around 5% of the initial capital outlay).

4.74 For the reasons set out in section 3, we have concluded that we will not pursue the SRF approach as a regulatory mandate, and therefore we have not used the alternative solution in our revised base case, but retained the cost estimates based on the CDB solution. However, we have included the alternative solution in a sensitivity scenario (see Table 7) to capture the impact on the NPV if this solution were adopted.

Operator specific operating costs (CDB solution)

4.75 In the August 09 Consultation we noted that operators were not able to provide sufficient information to accurately estimate operator specific operating costs. We calculated the ratio of operating to capital costs for relevant assets in the 2007 MCT model and applied this ratio to the capital cost figures supplied by operators to estimate operating costs. The operating to capital cost ratio was 13%. Further details on the methodology are set out in paragraphs A5.92-A5.94 of the August 09 Consultation.

4.76 As noted above, over recent months we have developed a new MCT model. We have updated the ratio of operating to capital costs to reflect more up-to-date information in the new model. The resulting ratio remains 13% when rounded to the nearest percentage point. The ratio is applied to both mobile and fixed operator operating costs.

[69] Such a solution would rely on using signalling enquiries to obtain routing information from the range holder to direct route calls to ported mobile numbers rather than using a local cache downloaded from a central database.
[70] Where the cost estimate was provided as a range we have taken the midpoint of the range.

Discount rate

4.77 In the August 09 Consultation we used an estimate of the mobile industry WACC as the discount rate. We used the pre tax real WACC published in the 2007 MCT Statement of 11.5%. As noted above, a new MCT model is currently under consultation as part of the wholesale mobile voice call termination review for the period 2011 to 2015. The range for the pre-tax real cost of capital in the new MCT model is 6.5% to 8.8% with a base case value of 7.6%. This base case value represents our best estimate of the cost of capital for an efficient mobile operator at this point in time, therefore we have incorporated it into our revised base case.

Forecast for donor conveyance costs

4.78 In the August 09 Consultation we assumed that the donor conveyance costs were constant from 2018 onwards. This was an omission and we have updated this assessment so the evolution of conveyance costs from 2019-2021 reflects the projections in the 2007 mobile call termination model. We have used the same methodology used to calculate conveyance costs from 2009-2018 in the August 09 Consultation (set out in paragraphs A5.15-5.16 of the August 09 Consultation). This results in slightly lower values for the donor conveyance costs in 2019-2021, which has a very small negative impact on the NPV.

Impact on the NPV for mobile to mobile direct routing

4.79 The revised assumptions discussed above are summarised in the table below, along with the revised base case NPV for mobile to mobile direct routing. The assumptions not mentioned in the table below remain at the base case values set out in the August 09 Consultation.

Table 6: Revised mobile assumptions and revised base case NPV[71]

	Original assumption	Revised assumption
% of subscribers who port per year	6.3%	3.3%
% of subscribers who switch per year	14%	11%
Transmission costs	0.068ppm	0.012ppm
Avoidable costs of transit	NA	[✂]
Proportion of traffic call trapped	30%	37%
% of calls when originator and range holder are the same operator	20% of minutes to ported mobile numbers	17% of (minutes to ported mobile numbers net of call trapped minutes)
Growth forecast for mobile originated calls (2009-2021)	1.8% per year	4% per year
Mobile industry pre tax real WACC	11.5%	7.6%
Forecast for donor conveyance costs over 2019-2021	Follows evolution suggested by 2007 MCT model up to 2018, then constant at the 2018 value	Follows evolution suggested by 2007 MCT model

[71] NPVs are rounded to the nearest million.

NPV (7 year horizon)	£15m[72]	£1m
NPV (10 year horizon)	£25m[73]	£9m

4.80 The revised assumptions have significantly reduced the base case NPV for mobile to mobile direct routing. Based on the revised assumptions direct routing yields less than £10m of net benefit over 10 years and £1m net benefit over 7 years.

Sensitivity testing – mobile to mobile calls

4.81 We recognise that there is uncertainty around the input values used in our CBA model so we have created some sensitivity scenarios in order to show how changing specific inputs will affect the NPV. We have conducted the following analyses:

a) we have conducted sensitivity analysis changing one input at a time, while holding the other inputs constant at the 'base' values. We refer to this exercise as the 'individual sensitivity scenarios'. The approach taken is to vary each input by +/-20% unless we have better information. Most of the inputs are associated with forecast values projected out to 2021 and the sensitivity testing shifts the entire forecast path for the input.

b) we have constructed low case and high case scenarios by taking the inputs and varying them simultaneously. As a result, the range of NPVs between the low and high cases is significantly wider than for the individual sensitivity scenarios.

c) we have created some consolidation scenarios which consider the possible impact on the CBA of the Orange and T-Mobile joint venture (JV).

Individual sensitivity scenarios

4.82 The individual sensitivity scenarios allow us to identify the key inputs to which the NPV is most sensitive. The results are presented in the tables and chart below for the base case time horizon of ten years (the first table presents sensitivities where we have information about the high/low value and the second table presents +/- 20% sensitivities for parameters where we do not otherwise have a priori high and low values). For the pre tax real WACC we have used a low value of 6.5% as a sensitivity, which is the low value from the range currently being consulted on in the wholesale mobile voice call termination review. For the high WACC sensitivity, we have used 11.5% for consistency with the WACC used in the August 09 Consultation.[74]

[72] In the August 09 Consultation we reported that the NPV for mobile to mobile direct routing was £16m over 7 years. Subsequent to the consultation publication some data errors were discovered and the NPV was revised down to £15m.
[73] In the August 09 Consultation we reported that the NPV for mobile to mobile direct routing was £26m over 10 years. Subsequent to the consultation publication some data errors were discovered and the NPV was revised down to £25m over 10 years.
[74] Alternatively, we could have used the top of the range for the pre-tax real WACC currently being consulted on as part of the wholesale mobile voice call termination review – which is 8.8%. A smaller upper value for the WACC sensitivity would have a commensurately lower impact on the NPV.

Table 7: Individual sensitivity scenarios - where we have information on the high/low value[75]

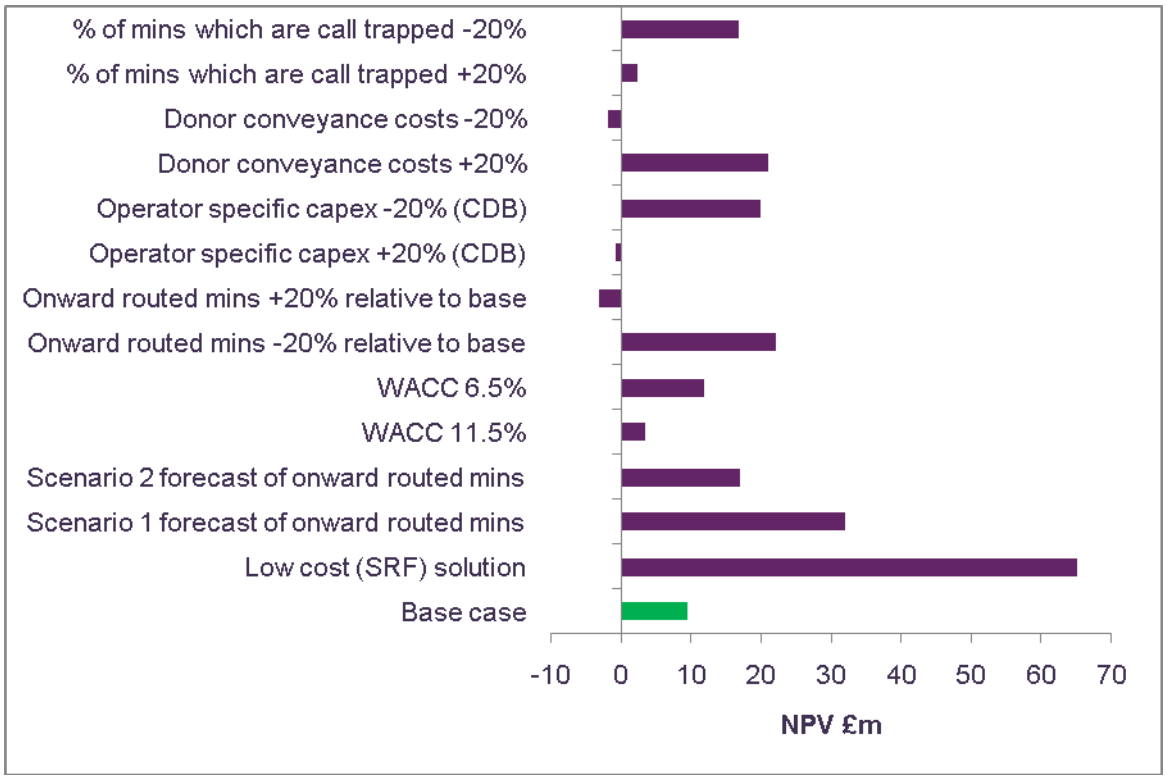
Input	Sensitivity analysis	
	NPV £m	Change relative to base case £m
Base case NPV	9	
Low cost solution for implementing direct routing (described above)[76]	65	+56
Projection of onward routed minutes based on scenario 1[77] (described above)	32	+22
Projection of onward routed minutes based on scenario 2[78] (described above)	17	+8
Pre tax real WACC high value 11.5%	3	-6
Pre tax real WACC low value 6.5%	12	2

Table 8: Individual sensitivity scenarios - using +/-20% relative to the base case[79]

	NPV £m	Change relative to base case £m	NPV £m	Change relative to base case £m
Base case NPV	9			
	+20% change relative to base case		-20% change relative to base case	
Onward routed minutes[80]	22	13	-3	-13
Donor conveyance costs	21	+11	-2	-11
Operator specific capex (based on CDB solution)	-1	-10	20	+10
% of minutes which are all call trapped[81]	2	-7	17	+7

[75] All £m values are rounded to the nearest million.
[76] We have assumed that the ongoing operating costs for the SRF solution are around 5% of the total estimated industry level capital costs for the SRF solution. There may be additional signalling costs associated with the SRF solution which we have not captured in this scenario. This means the NPV could be overstated.
[77] In this scenario the volume of traffic using MNP transit remains at the base case value as described above. The forecast for onward routed minutes affects the amount of traffic attracting donor conveyance and transmission costs.
[78] In this scenario the volume of traffic using MNP transit remains at the base case value as described above. The forecast for onward routed minutes affects the amount of traffic attracting donor conveyance and transmission costs.
[79] All £m values are rounded to the nearest million.
[80] In this scenario the volume of traffic using MNP transit remains at the base case value.

Figure 9: NPV £m for all sensitivity scenarios



Low and high case scenarios

4.83 The sensitivity scenarios capture the impact of changing one input at a time. We have also created a 'low case NPV' and a 'high case NPV' by changing the five key inputs simultaneously.

4.84 In the construction of the low and high case scenarios we have used actual information for the plausible low and high values of the inputs where this is available. Where we do not have better information, we regard +/-20% as a reasonable variation in input values to construct the low and high cases. Although larger variations in the input values are possible, the low and high cases involve simultaneous variation in the values of five inputs. In practice, the greater the variation in each input value, the less likely that such simultaneous variation would occur at the assumed low and high values away from the base case.[82]

4.85 The 'low case' scenario is created by setting the key inputs to the values that imply lower benefits and higher costs. The 'high case' scenario reflects input values that yield larger benefits and lower costs. The results are set out in the table below:

[81] In this scenario the volume of traffic using MNP transit remains at the base case value.
[82] We have not attempted to construct probability distributions for each input value, but we generally consider it reasonable to regard the probabilities as being larger in the region of the base case value and lower for values further away (e.g. in the tails of the distribution).

Table 10: Low and high case NPV scenarios for mobile originated calls to mobile ported numbers (based on 7 and 10 year horizon)[83]

Scenarios	Inputs and NPV £m	
	Value of input in high case scenario	Value of input in low case scenario
Costs of implementation	Low cost (SRF) solution	Operator specific capex +20% (based on CDB solution)
Onward routed minutes	Projection of onward routed minutes based on scenario 1[84] (described above)	-20% relative to base
Pre tax real WACC	6.5%	11.5%
Donor conveyance costs	+20% relative to base	-20% relative to base
% of minutes which are call trapped	-20% relative to base	+ 20% relative to base
NPV (7 years)	**80**	**-26**
NPV (10 years)	**111**	**-26[85]**

4.86 Achieving a significantly positive NPV relies on using a low cost solution to implement direct routing. As noted earlier, the low cost solution (the SRF approach) has not been developed and there is no agreed specification for it. Therefore, the cost estimates we have used in the 'high case' scenario are quite speculative (albeit that they were developed on the basis of information gathered from MNOs[86] on an informal basis as explained above).

T-Mobile/Orange Joint Venture[87]

4.87 Vodafone noted that the T-Mobile/Orange joint venture (JV) might impact on the CBA for direct routing, since a volume of minutes that was previously onward routed off-net (i.e. from customers who have ported from Orange to T-Mobile and from T-Mobile to Orange) could effectively now be on-net minutes. We have considered how the JV might impact on the number of ports and costs of implementing direct routing below.

Impact on the number of subscribers with a ported number

4.88 We have identified three possible impacts on the number of subscribers with a ported number:

[83] NPVs are rounded to the nearest million.
[84] In this scenario the volume of traffic using MNP transit remains at the base case value as described above. The forecast for onward routed minutes affects the amount of traffic attracting donor conveyance and transmission costs.
[85] The 7 and 10 year NPVs are both £26m when rounded to the nearest million.
[86] Only 3 MNOs were able to provide quantitative cost estimates.
[87] On 1 March 2012 the European Commission Competition Directorate cleared the T-Mobile/Orange joint venture, subject to certain conditions. See http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/208&format=HTML&aged=0&language=EN&guiLanguage=en

- The percentage of total subscribers with a ported number decreases at the point of the merger;
- The probability of unporting[88] increases;
- The level of switching in the market reduces.

4.89 Each potential impact is considered in turn.

4.90 As shown in the table below, with five different operators in the market there are twenty different porting permutations, where BA indicates a port that has taken place from range holder B to recipient operator A:

Table 11: Porting destinations with five operators

		From (range holder)				
		A	**B**	**C**	**D**	**E**
To (recipient)	**A**	-	BA	CA	DA	EA
	B	AB	-	CB	DB	EB
	C	AC	BC	-	DC	EC
	D	AD	BD	CD	-	ED
	E	AE	BE	CE	DE	-

Source: Vodafone/Ofcom

4.91 If we assume that A and B are T-Mobile and Orange then a JV of these operators means that two of the permutations (AB and BA) no longer represents a port[89]. Assuming that each operator has 20% of subscribers and there is an equal probability of porting to each operator, this means that 10% (i.e. 2 out of 20) of the potential ported customers will cease to be ported at the point of the merger. This effectively means that the stock of porters is decreased by 10% at the point of the JV.

4.92 In addition, there will be three rather than four alternative destinations for a repeat porter meaning that the probability of unporting (i.e. a porter who returns to the original range holder) will rise from 25% to 33% (assuming that a repeat porter has an equal probability of picking the original range holder and each of the alternative operators).

4.93 It is also possible that the level of switching in the market will reduce if T-Mobile and Orange merge. If we assume that T-Mobile and Orange effectively become one operator (offering the same deals and packages) there is a possibility that fewer offers in the market place will lead to fewer subscribers switching. The impact on switching activity is clearly difficult to predict. A simple assumption is that the reduction in the number of large operators from 5 to 4 could reduce the number of people porting by 20%.

4.94 We have presented a scenario[90] which combines the 3 effects on ports and porting mentioned above. Because it is likely that the JV will decrease the volume of ported minutes (due to the reduction in the number of ported customers discussed above) we have not presented a scenario where ports and porting are unaffected by the JV.

[88] Unporting arises when a previous porter decides to ports again back to the original range holder.
[89] We assume that minutes between these operators are effectively on-net.
[90] In this scenario the volume of traffic using MNP transit remains at the base case value.

Impact on costs of implementing direct routing

4.95 Ex ante, it is difficult to determine how a JV might affect the costs incurred to implement direct routing. This will depend on:

- the systems and processes used;
- the extent to which the T-Mobile and Orange networks are integrated post JV; and
- how quickly any integration happens.

4.96 We have considered two scenarios: 1) there are no cost savings arising from the JV (both companies incur the full costs associated with direct routing) and 2) the operator specific costs of implementing direct routing are halved for the T-Mobile/Orange combined entity[91].

4.97 The NPVs for the scenarios discussed above are presented in the table below for a 10 year time horizon. The inputs not noted in the table remain at the base case values.

Table 12: JV scenarios[92][93]

Porting	Costs			
	NPV £m	Change relative to base case £m	NPV £m	Change relative to base case £m
Base case	**9**			
	Costs of implementing direct routing are halved for the combined entity		Cost of implementing direct routing are unchanged	
Stock of porters decreases by 10% Probability of unporting increases to 33% % of people porting per year decreases by 20%	10	0	-2	-11

4.98 Relative to the base case the T-Mobile/Orange JV could increase the NPV marginally or decrease it by £11m. Since the effect of the JV on the costs and benefits of routing is uncertain, we have not revised our base case to include only four mobile networks. Moreover, from the results reported above it can be seen that the possible changes to the NPV would be insufficient to alter our conclusion that the NPV is not large enough to warrant mandating direct routing.

[91] In this scenario we are using the operator specific costs associated with the CBD solution. There is no change to the CDB costs or the porting programme office costs.
[92] £m values are rounded to the nearest million.
[93] NPVs are rounded to the nearest million.

Stakeholder comments and adjustments to quantitative assumptions for direct routing for fixed calls

APCC

Stakeholder comment

4.99 In the August 09 Consultation we used the average porting conveyance charge (APCC) as a proxy for fixed donor conveyance costs. We used BT's average APCC as a proxy for the market, and estimated that BT's weighted average APCC was 0.042ppm (see paragraphs A5.17-A5.18 of the consultation). Two fixed operators commented that the estimate was too low based on their own experience.

Ofcom's response

4.100 BT has revised its APCCs since the information used in the August 09 Consultation was collected. As a result BT's weighted average APCC has increased to 0.107ppm[94]. We have rerun the original base case presented in the August 09 Consultation using the revised APCC figure (all other inputs remain at the base case for the consultation):

Table 14: NPV using revised value for APCC[95]

	Base case in consultation (10 year NPV £m)	Revised value for APCC (10 year NPV £m)
Fixed to fixed	-137	-102

4.101 Although the revised higher value for the APCC has a large impact on the NPV, the NPV still remains significantly negative.

Transmission costs

Stakeholder comments

4.102 As discussed above in relation to mobile operators, in the August 09 Consultation we estimated transmission costs based on the BT list price for an STM-1 link assuming that transmission links were 100% utilised in the busy hour of the day. Several MNOs commented that in reality link costs were significantly lower. A fixed operator suggested that 75% utilisation might be a more sensible assumption (using a lower utilisation assumption would increase the ppm costs of transmission).

Ofcom response

4.103 As transmission links use the same infrastructure for both mobile and fixed calls it seems reasonable to assume the underlying costs are the same. We believe that the transmission costs incurred by fixed operators will not exceed those of mobile operators on the basis that the fixed network operators handle large volumes of traffic (including mobile transit traffic) and should be able to achieve costs equal to, if

[94] We have also made a change to the methodology used to estimate the average APCC. Instead of using the volume of incoming minutes which BT terminated for an operator as a proxy for the proportion of traffic which BT is likely to onward route for that operator, we have directly estimated the number of onward routed minutes to each operator.
[95] NPVs are rounded to the nearest million.

not lower than, mobile operators. We have obtained actual transmission cost estimates from MNOs and we have used the average estimate (0.012 ppm) in the revised base case for both fixed and mobile calls. Because the revised estimate for transmission costs is lower than that assumed in the consultation (0.068ppm) it will have a negative impact on the NPV for direct routing (all other factors held constant).

Call trap

4.104 In the August 09 Consultation we assumed that 30% of fixed to fixed calls to ported numbers would be call trapped. We did not have actual information on fixed operator Call Trap and the assumption was based on information provided for mobile operators.

Stakeholder comments

4.105 One fixed operator commented that the 30% assumption was an overestimate because there are more fixed (than mobile) networks and Call Trap is not as effective across all fixed networks even when implemented. The operator thought that an assumption of 10% would be more reasonable.

Ofcom response

4.106 We still lack detailed information on Call Trap for fixed operators. In light of the stakeholder comment we have included the 10% Call Trap assumption for fixed operators in the revised base case[96]. The lower estimate for Call Trap means that more minutes are onward routed which will increase the NPV of direct routing (all other factors held constant).

Traffic forecasts

4.107 As noted above one respondent thought that the decline in fixed to fixed traffic volumes was too steep. We have revised our projections for traffic volumes in light of this comment and our conclusions are set out in the mobile section above.

Percentage of subscribers porting per year

4.108 In the August 09 Consultation we did not have specific information on the number of fixed subscribers who port each year so we used mobile porting as a proxy (see paragraph A5.66 of the August 09 Consultation). As noted above, we have revised the assumption for the percentage of mobile subscribers who port each year. We still do not have specific information on the number of fixed subscribers who port each year, but given that mobile and fixed switching levels are around the same (at 11% of subscribers each year – see below) and absent better information we have assumed that the percentage of people who port their fixed number is approximately the same as the percentage who port their mobile number. Therefore we have revised the percentage of fixed subscribers porting each year to be the same as for mobile (3.3%).

4.109 The net impact on the base case consultation NPV for fixed to fixed direct routing of changing the percentage of subscribers porting per year from 5.4% to 3.3% is negative (keeping all other factors constant).

[96] While we are not sure that 10% is the correct value, using a lower estimate for call trap will increase the NPV for fixed to fixed direct routing (all other things equal). We note that even with a lower estimate for call trap the NPV for fixed to fixed direct routing is still significantly negative.

Percentage of subscribers who switch per year

4.110 In the August 09 Consultation we estimated the percentage of people switching provider each year at 12%, based on the Consumer Experience Report 2008. Since the August 09 Consultation was published, two alternative estimates of fixed switching have been published as follows:

1) The Communications Market Report 2009[97] – estimated the percentage of consumers who have switched fixed provider in the last year at 10% (at Q1 2009); and

2) The Consumer Experience Report 2009[98] – estimated the percentage of consumers who have switched fixed provider in the last year at 11% (at July 2009).

4.111 As set out in the mobile calls section above, instead of relying on one estimate we have taken the mean of the three values presented above, which is 11%, and incorporated this into the revised base case.

4.112 The net impact on the base case consultation NPV for fixed to fixed direct routing of changing the percentage of switchers per year from 12% to 11% is negligible (keeping all other factors constant).

Impact on the NPV for fixed to fixed direct routing

4.113 We have created a revised base case NPV which incorporates the revised assumptions discussed above. The revised assumptions are summarised in the table below, along with the revised base case NPV. The assumptions not mentioned in the table below remain at the base case values set out in the August 09 Consultation.

Table 15: Revised fixed to fixed direct routing assumptions and revised base case NPV[99]

	Original assumption	Revised assumption
APCC	0.042ppm	0.107ppm
Transmission costs	0.068ppm	0.012ppm
Call Trap	30%	10%
Growth forecast for fixed to fixed minutes (2009-2021)	-7.9% per year	-2% per year
Growth forecast for fixed to mobile minutes (2009-2021)	+2.7% per year	0% per year
% of subscribers who port per year	5.4%	3.3%
% of subscribers who switch per year	12%	11%
NPV (7 year horizon)	**-£130m**	**-£128m**

[97] http://www.ofcom.org.uk/research/cm/cmr09/CMRMain_4.pdf, p259
[98] http://www.ofcom.org.uk/research/tce/ce09/research09.pdf, p100
[99] NPVs are rounded to the nearest million.

NPV (10 year horizon)	-£137m	-£138m

4.114 As can be seen in the table above, with the revised assumptions the NPV is still significantly negative.

Impact on the CBA for other call type configurations

4.115 In the consultation we considered five call type configurations as follows:

a) all calls (fixed and mobile originated and terminated traffic);

b) mobile originated calls to ported mobile numbers only;

c) fixed originated calls to ported fixed numbers only;

d) fixed and mobile originated calls to ported fixed numbers i.e. all calls terminating on fixed networks; and

e) mobile and fixed originated calls to ported mobile numbers i.e. all calls terminating on mobile networks.

4.116 We have set out above a number of modelling assumptions which we have revised as a result of consultation responses and additional information gathered, and calculated a revised base case NPV for mobile to mobile and fixed to fixed direct routing. Below we set out the revised NPVs for all the call type configurations, including those not discussed in detail (i.e. configurations a, d and e above). The NPVs are calculated using the revised assumptions which are listed in Tables 6 and 15 above (the revised fixed and mobile assumptions are employed simultaneously). All inputs not listed in Tables 6 and 15 remain at the base case values set out in the August 09 Consultation.

Table 16: NPV for each call type configuration[100]

Call type configuration Direct routing for:	Base case NPV[101] £m Consultation assumptions		Base case NPV £m Revised assumptions	
	7 Years	10 Years	7 Years	10 Years
All calls	-120	-111	-162	-164
Mobile to mobile	15	24	1	9
Fixed to fixed and mobile to fixed	-205	-215	-229	-254
Fixed to fixed	-130	-137	-128	-138
Mobile to mobile and fixed to mobile	-84	-90	-104	-108

Conclusions

4.117 Based on our revised analysis all call type configurations have base case NPVs which are either negative or, where they are positive (as for mobile to mobile ported

[100] NPVs are rounded to the nearest million.
[101] The NPVs for some call type configurations are lower than reported in the August 09 Consultation because post publication some data errors were discovered and corrected.

traffic), they are of small magnitude. On balance, we do not consider that there is a case for regulatory intervention at the current time for any call type configuration.

Annex 1

August 09 Consultation questions

A1.1 Below is a list of the questions we asked in our August 09 Consultation by section:

Section 3 Rationale for change and the policy objective

Question 3.1: Do you agree that there is a problem in the way mobile originated calls to ported mobile numbers are routed? If not, why not?

Question 3.2: Do you agree with our assessment of the issues associated with onward routing?

Section 4 Assessing the level of the inefficiency

Question 4.1: Do you agree with our proposed approach for assessing the net benefit? If not please explain why not.

Question 4.2: Do you agree that we have identified the relevant cost drivers resulting from a move to direct routing? If not please explain why not.

Section 5 Policy options

Question 5.1: Do you agree with our assessment of doing nothing?
If not, please explain why.

Question 5.2: Do you consider that an industry agreed solution is likely to emerge that would deliver direct routing no later than 2012? If not, please explain your reasons. Would you be supportive of such a solution?

Question 5.3: What steps do you consider Ofcom should take to ensure that such an industry commitment is serious? Do you agree with the proposed steps set out by Ofcom or are there additional measures that should be taken?

Question 5.4: What steps do you consider should be taken to ensure that any industry solution that emerges does not foreclose the opportunity for other mobile operators to participate in the short term or longer term?

Question 5.5: If there was a firm commitment to an industry-led solution, what role would you expect Ofcom to play?

Question 5.6: Do you agree with Ofcom's proposal for a backstop to mandate direct routing in the event that an industry initiative fails? Do you agree that reviewing the situation in late 2010/early 2011 is appropriate before deciding on the need to mandate?

Question 5.7: Do you agree with our assessment of Option (3)? Please set out your reasons.

Question 5.8: If Ofcom was to take Option (3) forward, what would be the costs involved in (i) making changes to wholesale billing systems and (ii) other costs? Please explain the basis of your estimates.

Question 5.9: Do you agree with Ofcom's assessment that mandating direct routing for mobile originated calls to ported mobile numbers is likely to be the most effective way of removing routing inefficiencies? If not, what other factors that we should take into consideration, and why are they relevant to our analysis?

Question 5.10: Do you agree that if Ofcom were to mandate direct routing, the obligation should be designed in a way that would avoid mobile operators having to use direct routing where the scale of ported traffic is not sufficient to justify the up-front investment to implement direct routing?

Question 5.11: Do you agree that by framing the obligation in a way that obliges mobile operators to route calls to mobile ported numbers in the same way as non ported traffic should avoid the risks of any unintended consequences? If not, please comment on how this obligation could best be framed.

Question 5.12: Do you agree that the obligation to provide information on ported mobile numbers should apply to all mobile network operators from the start and not just the five incumbent MNOs? Do you agree that if there is a central database of ported mobile numbers, this should contain all ported mobile numbers including those of newer entrants who would not be obliged to implement direct routing from the start?

Question 5.13: What do you consider to be an appropriate timescale for implementation of direct routing from the point at which Ofcom issues a final decision? Please provide a full and detailed explanation as to why you agree or disagree with the 2012 target date proposed by Ofcom.

Section 6 Next steps

Question 6.1: Do you agree that it is appropriate for Ofcom/industry to appoint a qualified independent third party to work with industry to develop a provision technical specification for direct routing? If not, please state why.

Question 6.2: Do you agree with the criteria for selecting an independent expert/consultancy? If not, please state what different/additional skills or qualities this independent party should bring?

Question 6.3: If you would like to recommend suitable experts/consultancies to Ofcom, please do so, on a confidential basis.

Question 6.4: Do you agree that three months is an appropriate period of time to produce a provisional technical specification from which stakeholders can derive reasonable accurate cost estimates? If not, explain why and detail what you consider to be an appropriate time scale.

Question 6.5: Do you agree that a further three months is a sufficient period of time to derive cost estimates based on the provisional technical specification? If not, please explain why and detail what period you think would be appropriate.

Question 6.6: Do you agree that the conditions we have set out as being necessary to make this process successful in its aims are appropriate?

Question 6.8: Do you agree with Ofcom's proposed next steps following responses to this consultation? If not, how do you think Ofcom should proceed to bring this assessment of calls to ported numbers to a final decision?

Annex 5 Direct routing CBA model

Question A6.1: Do you have any comments on the assumptions used in the CBA?

Annex 2

Stakeholder comments on Routing Calls to Ported Numbers CBA

Introduction

A2.1 This annex summarises stakeholders' comments on the CBA which have not been reflected in the revised base case (discussed in section 4). Comments on the mobile CBA assumptions are covered first, followed by comments on the fixed CBA assumptions.

Comments on mobile modelling assumptions

Call trap

Stakeholder comments

A2.2 In the August 09 Consultation we assumed that all 5 large MNOs would have Call Trap implemented by 2012 (paragraph A5.71 of the August 09 Consultation). 3UK commented that it was unknown whether one MNO would have implemented Call Trap by 2012 thus the NPV of direct routing could be understated.

Ofcom response

A2.3 In the August 09 Consultation, we assumed that 5 operators would have Call Trap by 2012, even though it is possible that one operator may not have implemented it. We used sensitivity analysis to capture the impact of variation in the Call Trap assumptions. We still consider that it is appropriate to assume that all five operators implement Call Trap in the base case. We capture possible variation to this assumption through the sensitivity analysis.

Mobile conveyance costs

Stakeholder comments

A2.4 In the August 09 Consultation we estimated mobile conveyance costs based on the Analysys estimate of donor conveyance costs produced in 2007, forecast forward based on assumptions in the 2007 MCT model (see paragraphs A5.14-5.16 of the August 09 Consultation). Vodafone provided two alternative suggestions:

- Incorporate the Analysys methodology *within* the 2007 MCT model so that the forecast conveyance costs are produced directly from the call termination model.
- Use the 'new' MCT model currently under consultation as part of the wholesale mobile voice call termination review for the period 2011 to 2015. .

A2.5 O2 also suggested using the updated MCT model.

Ofcom response

A2.6 We note that there might be some merit in using the Analysys methodology within the MCT model to forecast donor conveyance costs over time. However, we (and Vodafone) also note that this model is now out of date and a new model is being produced as part of the review of wholesale MCT.

A2.7 Vodafone has attempted to calculate the donor conveyance costs using the Analysys methodology within the 2007 MCT model. Based on the numbers produced by Vodafone we have rerun the August 2009 direct routing mobile to mobile base case and we calculate that this would reduce the NPV by around £4m (relative to the August 09 Consultation base case). Given that we are no longer proposing to implement direct routing this does not impact on our final conclusions.

A2.8 We agree that using the new MCT model (on which we are consulting) to estimate the donor conveyance costs might be preferable, and we did consider updating the MCT model inputs to forecast donor conveyance costs. However, we decided not to for the following reason. The 2010 MCT model is designed to give a unit cost of termination estimate for 2014/15. There are a number of one off adjustments to the new MCT model (relative to the 2007 version) for the year 2009/10 which means that there is a structural break in the path for unit costs of termination. This structural break means that the updated path for unit costs is not appropriate to use to forecast the donor conveyance costs from 2007. Vodafone suggested that using the new MCT model would reduce the donor conveyance costs relative to those adopted in the consultation. This would further lower the NPV of mobile to mobile direct routing.

Stakeholder comments

A2.9 Vodafone further commented that the Analysys method for deriving donor conveyance costs is based on average not incremental costs (i.e. the costs are modelled on a LRIC+[102] rather than a pure LRIC model). They thought that a pure incremental cost approach might be more appropriate and would lead to lower donor conveyance costs.

Ofcom response

A2.10 It is not clear whether a pure LRIC calculation would produce a lower donor conveyance cost than a LRIC+ one (it would depend on the level of spare capacity in the network, as without spare capacity incremental investment would be required for onward routed traffic). However, if the pure LRIC calculations lead to a lower donor conveyance cost, as suggested by Vodafone, then this will further lower the NPV of mobile to mobile direct routing.

Porting model

Stakeholder comments

A2.11 In the August 09 Consultation we assumed that people with ported numbers received, on average, the same number of calls as people with non ported numbers (paragraph A5.29 of the August 09 Consultation). O2 suggested that the percentage of customers with ported numbers may be overstated because more

[102] The mobile call termination model is LRIC+ because the common network costs are implicitly allocated to services based on routing factors.

post-pay than pre-pay numbers are ported, and post-pay users use their mobile phones more than pre-pay customers.

Ofcom response

A2.12 As discussed in section 4 we have presented an alternative method of projecting onward routed minutes based on an extrapolation of the historic trend. Such an approach avoids estimating porting over time (and assumptions about the number of calls received by people with ported versus non ported numbers). Using this alternative method results in a higher path of onward routed minutes (as shown in Figure 5). However, the resulting impact on the NPV is limited when compared to our base case (as shown in Table 7) and would not be sufficient to alter our conclusion.

Stakeholder comments

A2.13 O2 commented that subscribers who have switched their number once are more likely to do so again, so reporters[103] and unporters[104] are likely to switch more frequently than the total population of mobile subscribers. This contradicts the assumption in the August 09 Consultation that reporters and unporters switch with the same frequency as the total population (paragraph A5.52 of the August 09 Consultation).

Ofcom response

A2.14 It is possible that reporters and unporters have a higher propensity to switch than the general population. This would have a negative impact on the NPV of direct routing (a higher number of reports and unports results in a lower number of people porting for the first time, which means a lower growth in the volume of onward routed minutes). As noted above, in section 4 we have presented an alternative approach to estimating onward routed minutes which avoids the need for assumptions about unporters and reporters.

Stakeholder comments

A2.15 In the August 09 Consultation we assumed that a constant percentage of subscribers switch each year (paragraph A5.57 of the August 09 Consultation). O2 commented that Ofcom's market research showed that fewer mobile customers switched in the year ending Q1 2009 than in previous years[105], which might suggest that switching is actually declining over time.

Ofcom response

A2.16 As noted in section 4, we have revised down our estimate for the number of people switching each year based on more recent data. We do not have enough evidence to suggest that switching will continue to fall in the future. However, if switching did continue to fall this would reduce the NPV of direct routing. As noted above, in section 4 we have presented an alternative approach to estimating onward routed minutes which does not require assumptions on switching over time.

[103] Reports are people who have previously ported and port again but not back to the range holder.
[104] Unports are people who have previously ported and port again back to the original range holder.
[105] Figure 4.78, in The Communications Market 2009. Available at http://www.ofcom.org.uk/research/cm/cmr09/CMRMain_4.pdf

Stakeholder comments

A2.17 In the August 09 Consultation (paragraph A5.44) we distinguished between abandon ports (people who have previously ported but abandon their number) and stop ports (people who have previously ported but decide they want a new number when they switch provider again). Vodafone considers that this distinction is erroneous because both of these aspects can be captured within the single abandon port figure.

Ofcom response

A2.18 The market research on porting conducted for Ofcom[106] suggested that some people actively want to change their number when they switch provider, and allowed us to estimate the percentage of people who actively want to change their number when they switch. We consider that changing number as part of the switching process is distinct from people who simply abandon using their number e.g. because they move abroad. We consider that including both of these aspects is appropriate.

CDB costs

Stakeholder comments

A2.19 Vodafone noted that the CDB specification produced by UKPorting was rushed due to pressing timescales and an incomplete specification was sent to prospective suppliers in the request for quotation. They considered that modifications to arrive at a fully functioning CDB would have added to the cost.

Ofcom response

A2.20 The CDB cost estimates were based on information submitted to UKPorting from third party providers and we have no evidence to suggest that they were biased downwards. As noted in the August 09 Consultation, in the event that we had decided to proceed with mandating direct routing further work on costing would have been undertaken in conjunction with industry in order to obtain a more accurate view of costs.

Stakeholder comments

A2.21 A confidential respondent considered that the cost drivers for CDB cost estimates were incorrect. The respondent observed that the database vendors had only been asked to provide pricing for a porting database capable of handling the totality of fixed and mobile numbers, while in the CBA calculations Ofcom had also estimated the costs for databases for 4 alternative options corresponding to the call type configurations for direct routing. The respondent considered that the cost estimates used by Ofcom were arbitrary. The respondent further proposed that as well as availability/resilience, there are three principal drivers to the cost of a numbering database, namely the volume of numbers to be loaded, the number of transactions changing the contents, and the number of transactions to read the content. The respondent thought that the volume of calls utilising direct routing was not a driver since the database is downloaded into individual communication provider networks.

[106] TNS, *Omnibus Survey*, December 2008

Ofcom response

A2.22 In order to derive the CBD costs we obtained cost information provided to UKPorting by potential database vendors. This data included the costs of the CDB, including a breakdown of the costs, and a number of options that were considered during the evaluation of the proposal. Using this data, we evaluated the likely cost of the database for five different arrangements of ported traffic.

A2.23 We used three drivers to evaluate the costs of different CDB configurations. These were: the provision of real time versus batch download capability, different database availability levels depending upon whether real time access was required or not, and the porting throughput.

Stakeholder comment

A2.24 The confidential respondent also queried the £7m (over 10 years) difference in the costs derived by Ofcom between the mobile to mobile database and the fixed to fixed database, and a smaller (£2m) difference between the cost of the fixed to fixed database and the combined fixed to fixed and mobile to fixed database.

Ofcom response

A2.25 The former difference is primarily a result of the assumption that the database used by fixed operators includes a real time query capability (and has a corresponding high availability requirement) while the mobile operators would always use non real-time download access to the database and thus neither need the real time capability nor the higher level of availability. The smaller cost difference between the fixed to fixed database and the combined fixed to fixed and mobile to fixed database is because both databases have a real time query capability and a corresponding higher level of availability.

Operator specific costs

Stakeholder comments

A2.26 Vodafone commented that parallel running of onward routing and direct routing might lead to additional compliance costs. In the event that mobile to mobile direct routing were implemented some calls (for example, calls from fixed lines and smaller operators) would still be onward routed. Given that mobile operators pass some traffic between themselves via transit operators it may be necessary to build controls to ensure that only legitimate onward routing occurs.

Ofcom response

A2.27 The controls required and magnitude of any compliance costs that would be incurred is not certain. However, their addition would lower the NPV of direct routing. Given that we are no longer proposing to implement direct routing this does not impact on our final conclusions.

Stakeholder comments

A2.28 Vodafone commented that the incomplete specification of the CDB (discussed above) would mean that there are additional unrecognised areas of operator expenditure, meaning that the operator specific costs are understated.

Ofcom response

A2.29 It is not clear to us that the CDB was underspecified, however, as noted in the consultation, in the event that we had decided to proceed with mandating direct routing further work on costing would have been undertaken in conjunction with industry in order to obtain a more accurate view of costs.

Stakeholder comments

A2.30 3UK commented that some of the operational costs for onward routing will fall away if direct routing is implemented. For their network, 3UK considers that there are no ongoing operating costs to support direct routing which are incremental to the existing arrangements to support the MNP process.

Ofcom response

A2.31 It is possible that some volume related operating costs associated with onward routing will fall if direct routing is implemented (outside the donor conveyance, transit and transmission costs which we have explicitly considered). We have incorporated a scenario (based on the alternative SRI/SRF solution to direct routing) with much lower capital and operating costs associated with direct routing in the sensitivity analysis section.

A2.32 We also note that onward routing would still be required for some calls types (e.g. fixed to mobile calls) even if direct routing for mobile to mobile were implemented. Therefore, the operating costs associated with onward routing would not fall away entirely. Vodafone has also noted that some costs may increase e.g. compliance costs discussed above.

Mobile originated traffic growth forecast

Stakeholder comments

A2.33 Vodafone considered that the average compound growth for mobile originated traffic was 1.375%, not 1.77% used by Ofcom (paragraph A5.32 of the August 09 Consultation).

Ofcom response

A2.34 The small difference in the growth rate would not affect the NPVs materially. As noted in section 4 we have revised the traffic growth rates.

Period of evaluation

Stakeholder comments

A2.35 In the August 09 Consultation we calculated the NPVs for direct routing over a 7 and 10 year time horizon. Vodafone thought a shorter time period might be more appropriate. They made the following comments:

- Uncertainty increases over time which means the values of the inputs in the final years of the analysis are little more than guesstimates.
- Including the time allowed to develop the solution specification prior to implementation (estimated to occur in 2011) the 10 year NPV actually covers a period of 13 years, and the 7 year NPV a period of 10 years.

- A shorter period may be more reflective of the asset replacement cycle [✂].
- The mobile industry generally uses a shorter period for project appraisal.
- In the November 2007 Statement on number portability Ofcom used a 9 year benefit assessment for mobile to mobile porting.

Ofcom response

A2.36 Providing the analysis builds in the correct reward for risk (i.e. has the correct discount rate[107]), the appropriate investment horizon is the lifetime of the asset(s). The operator specific investment was assumed to have a lifetime of 10 years (based on information from the 2007 mobile call termination model) and the CDB was assumed to have a lifetime of 7 years [✂] – therefore we presented the NPV over both 7 and 10 years. We do not believe it is appropriate to shorten the evaluation period because time is allowed upfront to develop the specification prior to implementation. This does not shorten the asset lifetime. Furthermore, uncertainty in the input values is captured within the sensitivity analysis.

Stakeholder comments

A2.37 A confidential respondent commented that there is no particular known life for the operator specific investment, but it is known that the CDB had a [✂] year operation cycle. The respondent further commented that it would be simpler to calculate a 7 year NPV, and the 10 year NPV figure is misleading because there remains an asset value in the common database at that point in time.

Ofcom response

A2.38 In calculating the 10 year NPV we did not assume that the CBD was fully replaced at the end of year [✂], rather we assumed that additional reinvestment capital costs would be incurred for years [✂] (based on an annuitized value of the initial costs and the asset life). Therefore the 10 year NPV does not include residual asset value after the end of year 10. Asset information in the 2007 mobile call termination model suggests that some of the operator specific investment to implement direct routing would have a lifetime of 10 years. As noted above, we believe it appropriate to present a time horizon of both 7 and 10 years.

Comments on fixed modelling assumptions

Operator specific costs

Stakeholder comments

A2.39 A confidential respondent commented that the estimated costs for mobile to fixed direct routing are too high. The respondent commented that MNOs send their mobile to fixed calls via transit networks and leave it to the transit network to determine the destination of the call. In the event that direct routing was implemented, the transit network would still be used to carry out the call routing query. In their view, the incremental cost of a query in the transit network was small because the fixed costs of interfacing to the database are sunk.

[107] Based on the consultation responses, operators appear broadly content with the discount rate used in the CBA.

Ofcom response

A2.40 The costs of implementing mobile to fixed direct routing were based on information provided by operators and not estimated by Ofcom. It is possible that the costs provided by MNOs were biased upwards. However, even with substantially lower cost estimates the NPV of direct routing for all calls and calls terminating on fixed networks (i.e. the call type configurations impacted by the cost of implementing mobile to fixed direct routing) would remain negative.

Stakeholder comments

A2.41 Virgin Media suggested that a further source of costs was the capital costs incurred by each operator in modifying their IT solutions to operate the database.

Ofcom response

A2.42 It is possible that some operators did not include these IT costs within the estimates provided to Ofcom in the December 2008 s135 information request. This would further decrease the NPV for fixed to fixed direct routing.

Stakeholder comments

A2.43 Two confidential respondents commented that the operator specific costs were overestimated. [✂] made the following comments:

- The Mason report[108], created in 2004 to assess the costs and implementation issues of a central database solution for number portability in the UK, provided higher quality cost data because it was constructed based on a considerable interaction with the major industry players.
- There may have been different interpretations placed on the relevant questions in the December 2008 s135 information request and this could mean that cost estimates were upwardly inflated (e.g. because communication providers did not engage with vendors to determine the best/most cost effective direct routing solution but based their estimates on the UKPorting specification).
- Developments in the market and technology since 2004 might have decreased the costs of implementing direct routing.

A2.44 [✂] thought that we should have considered lower cost alternatives to a CDB solution which would provide a more cost effective means of achieving direct routing.

Ofcom response

A2.45 The Mason report is now out of date and it would not be appropriate to use this cost data for our analysis when more up to date information is available. In any case, the Mason report conclusion is consistent with our finding that fixed to fixed direct routing is not cost justified[109].

[108] Available at http://www.ofcom.org.uk/consult/condocs/uk_numb_port/uk_numb_port_cons/mason/mason_report.pdf

[109] The Mason report (2004) estimated that the 10 year NPV of an all call query CDB was -£200.6m (the focus of the Mason study was fixed number portability).

A2.46 As noted above, we used the all call query CDB as our starting point for estimating the costs of direct routing because there was a specification (developed by UKPorting with considerable industry interaction) against which operators could estimate their implementation costs, and information was available on the associated CDB costs. Industry was fully engaged with the UKPorting work and had been extensively consulted. We accept there might be alternative solutions with lower costs, but it is not clear that such cheaper alternatives would be agreeable to all industry participants. As the first respondent concedes, "[✂] is utterly confident that with the current state of deployment of TDM versus NGN technologies, the NPV for direct routing from fixed networks remains negative."

A2.47 No operator put forward any detail on an alternative solution for fixed to fixed direct routing or provided alternative cost estimates. We accept that further work would be required to form a more accurate view of costs, and lower cost solutions might be possible. However, given the very low probability of a positive NPV we do not consider it appropriate to pursue this further at this time.

Discount rate

Stakeholder comments

A2.48 A confidential respondent was supportive in principle of using the WACC as the discount rate, but noted that the WACC reflects the overall cost of capital which would include the market risk associated with new market launches. The respondent considered that infrastructure initiatives such as implementing direct routing did not involve market risk and there might be a case for using a marginally lower cost of capital to reflect this. The respondent noted that a lower WACC is used for Openreach in the Openreach Financial Framework[110] to reflect the lower risks involved.

Ofcom response

A2.49 The Openreach WACC is specific to the profile and risks of that business and it is not clear that it would be a good proxy for the risks associated with implementing direct routing. However, we note that even if the Openreach WACC were used (i.e. 7.4% in pre tax real terms[111]) were used for fixed operators the NPV for all calls and calls terminating on fixed networks would remain negative.

[110] See http://www.ofcom.org.uk/consult/condocs/openreachframework/statement/annexes.pdf p158.
[111] The pre tax nominal WACC is 10.1% and inflation is assumed to be 2.5% per year. The real rate is calculated as (1.101/1.025)-1 = 7.4%.

Annex 3

Detailed responses to the consultation

Introduction

A3.1 In the August 09 Consultation we asked stakeholders to consider a number of questions which are listed at annex 1. We received thirteen responses in all, two of which were confidential. Non-confidential versions of the responses we received are published on our website.[112]

A3.2 Respondents to the August 09 Consultation included ten communications providers, one solution vendor, one telecoms technology consultant and one individual consumer.

A3.3 In this annex, we summarise the views of respondents to the August 09 Consultation and the questions we asked and set out our responses to those views expressed by stakeholders.

A3.4 Many respondents made detailed comments on our costs benefit analysis. These are discussed in detail in section 4 and annex 2.

Consultation questions

Question 3.1: Do you agree that there is a problem in the way mobile originated calls to ported numbers are routed? If not, why not?

Stakeholder comments

A3.5 3UK maintains that the current arrangements distort competition to the detriment of consumers and newer entrants. It recognises the inefficiencies of the current onward routing system and the disincentives to remove those inefficiencies placed on call originators by the commercial schemes associated with the system. 3UK believes that history shows that industry consensus is unlikely and that reform will only result from firm regulatory intervention.

A3.6 T-Mobile believes that the problem with onward routing is that operators do not receive their own termination rate on calls to ported-in numbers. This creates arbitrage risks, undermines the regulated mobile termination rates and leads to other unintended consequences such as disputes and wider effects on competition. Onward routing creates these systematic risks that could be avoided if a system of direct routing were implemented. However, T-Mobile does not consider that Ofcom has demonstrated an economic basis for a move to a direct routing system or at least not one based on a central database.

A3.7 Unlike T-Mobile, Vodafone maintains that onward routing is not inappropriate or inefficient in itself, anymore than using a transit operator to route calls rather than directly interconnecting. It is simply a case as to whether the alternative to onward routing, direct routing, is a cheaper solution. Vodafone concludes, like T-Mobile, that Ofcom's assessment in its August 09 Consultation is incorrect and that a direct

[112] See http://www.ofcom.org.uk/consult/condocs/gc18_routing/responses/

routing solution using a central database solution will increase costs and reduce the consumer benefit. O2 shares a similar view to that expressed by Vodafone.

A3.8 [✂] maintains that onward routing itself is not a problem to be fixed. The issue is whether direct routing may be a more efficient and preferred long term solution.

A3.9 BT maintains that onward routing has been the UK's number portability approach for many years and it generally works effectively. It maintains that the main problem with the existing mobile number portability process has been expanding it to accommodate new entrants in reasonable timescales and at reasonable cost.

A3.10 Vigin Media's view is that a direct routing system is more efficient for routing calls from mobile networks to ported mobile numbers but questions whether this can be introduced in a cost effective manner.

A3.11 C&W agrees that the routing of traffic to ported mobile numbers is sub-optimal but disagrees with Ofcom's approach of trying to optimise particular traffic flows which risks unnecessary segmentation and will ultimately cost industry far more. C&W goes on to say that the whole concept of having a number range holder is sub optimal and that whilst an economic case for an overall move to direct routing cannot be justified at this time, C&W believes that the case will be made as technology evolves.

A3.12 [✂] believes that the current porting regime for fixed telephone numbers drives inefficient behaviour by both originating and donor providers, resulting in unnecessary costs being incurred and a less than optimal interconnection structure between UK fixed operators.

A3.13 Syniverse agrees that improvements could be made to the current regime to address donor failure and deliver potential efficiency improvements. Changes could also be made to accommodate routing of international originated voice and SMS.[113]

A3.14 John Horrocks observes that direct routing should be viewed as supplementary to onward routing not an alternative. The current UK situation, which John Horrocks describes as "complex and confused compared to other countries" has arisen because the original UK regulatory requirement sought to promote operator competition leading to a technical and charging solution to support a porting concept isolated between donor/range holder and recipient. The introduction across Europe of number portability as a user right should have prompted a reassessment of the wholesale charging arrangements to incentivise originators to route directly based on the availability of information based on ported numbers. Instead, the UK has expanded a historical specific solution into a general solution in circumstances which John Horrocks maintains are now inappropriate.

Ofcom response

A3.15 As a technical means of routing calls to ported numbers, we agree that onward routing is not necessarily inefficient of itself, although we would expect a direct routing scheme to be cost effective where traffic volumes reach a point that the implementation costs of a new scheme are lower than the avoidable conveyance costs of the existing scheme. Our revised cost benefit analysis detailed in section 4, confirms that there is some doubt as to whether this point has actually been

[113] "Short Message Service or SMS", a service which allows the exchange of short text messages between mobile phone devices.

reached in relation to mobile to mobile traffic as well as all other traffic types. It seems to be the case that a central database solution is not cost effective although a positive NPV for direct routing may be reached if a lower cost solution can be found.

A3.16 As several respondents point out, the wholesale financial settlement schemes associated with both fixed and mobile onward routing are a cause of industry concern.

A3.17 For example, in mobile, 3UK in particular has long expressed dissatisfaction with the "donor passes all"[114] scheme which it views as having deprived it of significant mobile termination rate revenues and therefore disadvantaged its business. Similarly in fixed, a dispute has recently been filed by C&W[115] in relation to the application of the apparent "recipient paid" scheme whereby, unlike mobile, the recipient seemingly receives its own termination rate for calls to ported in non-geographic phone numbers.

A3.18 We also note that issues are not limited to the difference in termination rates. The amount of porting conveyance charges payable by the recipient to the range holder for onward routing calls to ported numbers has also been the source of disputes amongst fixed and mobile operators.[116]

A3.19 Further, BT observes that mobile number portability is further complicated by the need to access the web based system operated by Syniverse to establish mobile portability arrangements. BT and other respondents also suggested that for new entrants, the process of establishing and agreeing bilateral porting arrangements (technically and commercially) with competitors may be characterised as a slow and costly process.

A3.20 We recognise the issues which surround the current onward routing arrangements. Some of them may diminish over time such as the size of the differential in average mobile termination rates as set out in our mobile call termination publication at http://www.ofcom.org.uk/consult/condocs/mobile_call_term/statement/CTMAmendment2009final.pdf on the adoption of revised SMP Services Conditions following the CAT's directions of 2 April 2009. However, overall we conclude that regulatory intervention to achieve direct routing is not cost justified at this time.

[114] "Donor passes all" was described in Oftel's *Mobile Number Portability Determination Requests Explanatory Document* published at http://www.ofcom.org.uk/static/archive/oftel/ind_info/numbering/mnpdetre.pdf as a method for establishing the level of termination charge rate to be paid to the recipient operator for terminating a ported call whereby the recipient operator receives the termination rate of the donor network operator.
[115] See case number CW/01037/10/09 published in our Competition and Consumer Bulletin at http://www.ofcom.org.uk/bulletins/comp_bull_index/comp_bull_ocases/open_all/cw_1037/
[116] See case number CW/01030/07/09 concerning a dispute between Opal Telecom and BT about BTs Average Porting Conveyance Charge (APCC) at http://www.ofcom.org.uk/bulletins/comp_bull_index/comp_bull_ocases/open_all/cw_01030/ and CW/00952/04/07 concerning disputes between H3G and each of O2, Orange and T-Mobile about donor conveyance charges at http://www.ofcom.org.uk/bulletins/comp_bull_index/comp_bull_ccases/closed_all/cw_952/.

Question 3.2: Do you agree with our assessment of the issues associated with onward routing?

Stakeholder comments

A3.21 3UK generally agrees with Ofcom's assessment and the recognition of the disincentives that the current system places on call originators in the form of "donor passes all" and donor conveyance financial schemes.

A3.22 In relation to consumer protection from donor network commercial or technical failure, 3UK maintains that to the extent this relates to MNP and consumers' rights to exercise their choice using MNP, direct routing remains a key protection and should remain part of Ofcom's policy objective. 3UK is concerned that customers who port away from new entrant businesses could be left with no inbound service in the event of commercial failure and do not consider that such businesses would necessarily represent an attractive takeover opportunity. In any event, under the current arrangements customers could be left without service for weeks.

A3.23 3UK cites examples of service outages which arise as a result of donor reliance and also highlights the limited international roaming reach of new entrants leading to a lesser ability of customers, who port in new entrant allocated numbers to an established mobile operator, to receive international SMSs than non ported subscribers of the established mobile operator. A central database, accessible to international providers, could mitigate this problem.

A3.24 BT recognises the potential issues associated with the differences between onward and direct routing such as efficiency, loss of number and service should a provider collapse, quality of service and inter-operability. Scottish and Southern Energy also agrees that the issues set out in Ofcom's August 09 Consultation are unlikely to get easier over time if onward routing is maintained.

A3.25 Virgin Media agrees with Ofcom's assessment that the key issue is efficiency and that other issues such as commercial/technical failure and quality of service should not be factored into any cost benefit analysis.

A3.26 C&W believes that Ofcom's decision not to include other benefits of direct routing (aside from routing efficiency) is correct but only because Ofcom has focussed on mobile to mobile calls leaving other call types e.g. fixed to mobile, fixed to fixed etc subject to the same underlying concerns. However, these other benefits could be included in a framework to assess direct routing for all calls.

A3.27 C&W believes that Ofcom has again approached the subject of a common numbering database from a porting standpoint rather than overall numbering efficiency. Whilst this might not be a relevant issue in mobile numbering, the technical treatment of geographic numbering has reached its limit meaning that blocks of numbers in geographic areas will inevitably become exhausted leading to overlay codes[117], which may be less desirable amongst consumers and therefore potentially harmful to competition, or result in costly and unpopular number changes. C&W believes that the only way to avoid this is to move away from allocating blocks of numbers to one where providers can be assigned sufficient numbers to meet their market demand. A pre-condition to this is direct routing of

[117] "Overlay codes" can be described as the practice of introducing a new area code by applying it onto a geographic area that is already occupied by one or more existing area codes, resulting in two (or more) area codes serving the same area.

individual numbers, which in turn, requires a common numbering database. Such a system dispenses with special treatment for number portability since the concept of consumers needing numbers from another provider's number range becomes redundant.

A3.28 C&W believes that other benefits are applicable to direct routing for all calls. Establishing bilateral portability arrangements can be a difficult process in both fixed and mobile markets. Direct routing would require routing prefixes to be built on originating networks. Adding a message hub to any central database (a capability offered by major database vendors) could enable the increasingly complex web of bilateral arrangements to be dispensed with. Combining these, a new entrant could just contract with the database provider and activate routing prefixes in other networks using business-as-usual processes, resulting in the new entrant's customers being able to port to/from any other communications provider.

A3.29 C&W also comments that the market exit of a range holder could be managed more effectively and efficiently under a direct routing scheme than under current arrangements whereby the range holder may be required to maintain a service platform or engineer costly transfers of number ranges to other platforms in order to maintain service for exported customers.

A3.30 Vodafone, O2 and T-Mobile whilst supporting Ofcom's focus on efficiency and cost effectiveness, maintain that the real and straightforward reason why the mobile industry has persisted with the current onward routing scheme is because the incremental benefits of direct routing have not merited the effort. In reality, O2 maintains that operators do not have unlimited access to capital and therefore cannot undertake all projects with a positive NPV even over just a few years. It has to prioritise its projects to those which are operationally vital, strategically important or otherwise yield a payback within a year. Implementing direct routing does not meet any of these requirements. O2 believes that Ofcom must recognise that there is an opportunity cost if direct routing is required in the form of other projects which would be displaced. O2 and T-Mobile believe it highly unlikely that the benefits of direct routing would exceed those of other projects.

A3.31 Further O2 believes that Ofcom's interest in direct routing over recent years created such regulatory uncertainty that there was no possibility of industry voluntarily changing the current system.

A3.32 As regards the arguments made by Ofcom concerning the disincentive effects on direct routing of the wholesale interconnection pricing scheme, O2 and T-Mobile observe that the position, over the forward looking basis of Ofcom's proposals, is very different from that of the past due to the charge controls on mobile termination rates. T-Mobile also notes the historic reduction in the donor conveyance charge.

A3.33 Vodafone, whilst agreeing that commercial arrangements are likely to have a bearing on incentives, believes that the critical factor is not termination rates or conveyance charges but the absence of any technical means for the originator to discover the identity of the current terminating operator. This is not something which any operator can establish unilaterally. In this regard, Vodafone agrees that there is a possibility of coordination failure but this could only be ascertained where the collective benefits of a move to direct routing clearly outweighed the costs of persisting with onward routing.

A3.34 O2 is not persuaded that individually, mobile operators are not incentivised to realise any net savings from implementing direct routing since each operator is an

originator, donor and recipient for different calls. O2 maintains that Ofcom presents no evidence to support its speculation that operators might fail to co-ordinate the introduction of direct routing.

A3.35 T-Mobile welcomes Ofcom's more balanced assessment of the risks of commercial or technical failure. But, whilst accepting the disruption which might occur, T-Mobile maintains that any direct routing may continue to rely on the range holder network; placing reliance on a central database concentrates the risk in an additional piece of infrastructure and, as C&W notes above, a mobile only solution will still leave a substantial minority of traffic as well as non-voice services (such as SMS) liable to disruption. Further, T-Mobile maintains that Ofcom provides no evidence to support its assertion that onward routing might compound service quality issues as networks move through a period of interworking between legacy and IP[118] based technologies. Vodafone made similar observations to T-Mobile about commercial/technical failure and welcomed the fact that Ofcom had not sought to include these secondary benefits in its policy objective or cost benefit analysis.

A3.36 T-Mobile disagrees that the implementation by some operators of Call Trap[119] demonstrated the case for direct routing. The use of this benchmark is not, in T-Mobile's view, comparable insofar as Call Trap was typically implemented by operators at a time when donor conveyance charges were eight times their current level and involved relatively small costs. Moreover, avoiding a charge to route traffic to yourself is very different from avoiding a charge for a service that is necessary to complete a call.

A3.37 [✂] said that it welcomed the fact that Ofcom did not seek to justify a switch to direct routing on the grounds of commercial/technical failure, quality of service and service inter-operability/inter-working. [✂] broadly agrees with Ofcom's assessment of the issues and policy objective and that the key issue concerns the cost of implementing direct routing versus the inefficient/wasted costs of onward routing.

A3.38 [✂] believes that implementation timescales can have a critical impact on the scale of benefits. Where this period is too short then the adopted solution may be sub-optimal or the operator incurs costs in displacing or otherwise disrupting other projects. Syniverse also made a similar observation about longer timescales enabling operators to better manage and minimise costs.

A3.39 [✂] believes that direct routing could also lead to an increase in operational efficiency by lessening the impact of an added level of complexity which exists within billing systems as a consequence of the current onward routing solution.

A3.40 Syniverse said that accepting that there are some issues with onward routing it has nevertheless proved its viability. Syniverse notes that there may be additional benefits of moving to direct routing including call set-up times and dispensing with donor reliance.

A3.41 [✂] does not agree with Ofcom's assessment and expressed its disappointment that Ofcom is not making any proposals about the direct routing of calls to or from fixed networks. [✂] set out what it believes are flaws in Ofcom's cost benefit

[118] "Internet Protocol or IP" is the packet data protocol used for routing and carriage of messages across the internet and similar networks.
[119] "Call Trap" is when an operator identifies calls made on-net to ported in numbers and stops them from being inefficiently routed (trombone) by the range holder.

analysis around the costs of direct routing, Ofcom's calculation of average porting conveyance charges and the impact on BT of termination rate differentials.

A3.42 [✂] agrees with Ofcom's assessment of the issues but believes Ofcom has ignored potential problems where former recipient operators (who are not the range holder) fail to properly remove ported numbers from their networks. Where such operators have implemented Call Trap, calls originating on these networks will not onward route through the relevant range holder and fail.

Ofcom's response

A3.43 We note that most respondents supported Ofcom's assessment of the issues associated with onward routing in particular the focus on the costs of direct routing versus the avoidable costs of onward routing.

A3.44 We have carefully considered the various comments made by stakeholders about our assessment of other potential advantages of direct routing around commercial/technical failure, quality of service and service interoperability/inter-working which we discussed in paragraph 3.19 *et seq* of the August 09 Consultation. We have also considered other potential, but un-quantified, benefits raised by respondents. Our overall conclusion remains unchanged insofar as we rate these issues as likely to be secondary to the substantive matter of routing efficiency. Our CBA has therefore only quantified the benefits arising from the avoided costs of onward routing if direct routing were adopted.

A3.45 We understand and agree with C&W's comments about the likely broader benefits of a common numbering database, including the prospect that such a system could allow allocation of geographic numbers to meet demand more efficiently than is possible now. We consider that a direct routing solution for interconnected fixed networks using such an approach could become viable if and when next generation core network technology is adopted widely by network operators. While the timescale of such adoption is currently uncertain, we would encourage network operators to consider the benefits of incorporating direct routing capability into their next generation network designs. We remain open to suggestions as to how we could help secure an outcome in which the routing of interconnected calls in next generation fixed networks will use this approach. In the meantime our priority is to improve efficient use of existing geographic numbers in order to delay or forestall the need for action to increase the supply of geographic numbers, such as the introduction of overlay codes. We are currently considering a number of initiatives to achieve this aim, including our recent proposal[120] to extend conservation measures to 336 additional areas. We plan to publish a statement on this proposal shortly.

A3.46 We have considered [✂] criticisms of our assessment of the costs and benefits for direct routing calls from or to fixed networks. Whilst [✂] may view the creation of a database to be too costly and over-engineered, we note this was a NICC standard for a common numbering database. We are not aware that an alternative solution, of the type described by [✂] has been agreed by industry as appropriate to support direct routing or that it has been technically specified. Whilst sharing files via a

[120] See *Conserving geographic numbers*, proposal to implement number conservation measures in additional geographic areas including modifications to the National Telephone Numbering Plan, dated 30 November 2009 at http://www.ofcom.org.uk/consult/condocs/conserve/conserving.pdf

secure FTP site[121] might be cheaper than establishing a central database it is not clear to us what operator specific costs would be incurred in using these files to effect routing and what billing changes would need to be made. Our CBA indicates that the total costs of implementing and running an alternative direct routing solution for calls to ported fixed numbers would need to be a very small fraction of the NICC/UKPorting derived base case costs in order to produce a positive NPV.

A3.47 Whilst we recognise that BT and other parties may gain or lose as a result of termination rate differentials for calls to ported fixed numbers, these are not relevant to an assessment of the relative productive efficiency of direct routing as against onward routing.

Question 4.1: Do you agree with our proposed approach for assessing the net benefit? If not please explain why not.

Stakeholder comments

A3.48 3UK believes that Ofcom's approach is likely to have underestimated the benefits by as much as £37m over ten years. 3UK maintains that Ofcom's estimate of volumes of onward routed minutes is underestimated because subscribers with ported mobile numbers receive, on average, 20% more call minutes than those with non ported numbers. The actual minutes to ported numbers is further underestimated because of Ofcom's assumption that all five mobile network operators will have implemented Call Trap by 2012. 3UK believes that it is likely that the actual NPV will have higher values at the beginning of the period under consideration. 3UK further notes that Ofcom's model assumes that 20% of mobile to ported mobile minutes are not onward routed because these are calls originating on the range holder's own network. 3UK observes that the donor still applies a donor conveyance charge on this traffic which should be included in our cost benefit analysis.

A3.49 C&W disagrees with Ofcom's approach because the principle benefit of direct routing for all traffic types concerns numbering efficiency. C&W refers to the additional benefits set out in paragraphs A3.28 and A3.29 above. C&W proposes that Ofcom create a holistic cost benefit analysis of direct routing to yield the full benefit or use option pricing theory in its evaluation. Accepting that Ofcom has not adopted the approach proposed by C&W to date, it agrees that the model used by Ofcom adopts the correct approach to evaluating the benefits of avoiding the range holder.

A3.50 O2 agrees with Ofcom's approach but has concerns over some of the key inputs which it believes skew the results. In particular, O2 believes that Ofcom's model forecasts a much higher number of porting customers than is likely or credible and, consequently, overestimates the forward looking volume of ported minutes.

A3.51 T-Mobile also broadly agrees with Ofcom's approach (although noting that it does not capture the benefit of removing the systemic risks of the current system detailed in paragraph A3.6) but believes that Ofcom has overestimated the likely benefits. In particular, T-Mobile disagrees with Ofcom's assessment of saved transmission costs because the costs are much lower than Ofcom estimates and, in any event,

[121] File Transfer Protocol (FTP) is a protocol used to exchange and manipulate files over Internet Protocol (IP) based networks such as the Internet. A FTP site allows permitted parties to access and share files/information.

the elimination of ported traffic would not translate into any material change to the procurement of transmission capacity.

A3.52 Vodafone also broadly agrees with Ofcom's approach but, like O2 and T-Mobile, believes that the likely benefits are overstated. Like O2, Vodafone believes that the volume of onward routed traffic developed in Ofcom's model is not soundly based and results in a significant over estimate and, like T-Mobile, believes that actual transmission costs are much lower than Ofcom estimates.

A3.53 BT, Virgin Media and [✂] broadly agree with the approach taken by Ofcom to assess the likely benefits of direct routing.

Ofcom's response

A3.54 We note that, whilst respondents have different views on the inputs and assumptions used in our CBA model and whether this leads to overestimates or underestimates in our overall NPV, most agreed with the approach we took to our assessment of likely benefits of avoiding onward routing. We set out the changes we have made to the CBA in the light of consultation responses and subsequent analysis in section 4. Other comments which have not been reflected in the revised base case or discussed in our sensitivity analysis are summarised in annex 2.

A3.55 We have responded to the C&W's substantive comments about numbering efficiency in paragraph A3.45 and note that, insofar as our assessment considers the benefits of avoiding the range holder, C&W considers our approach to the evaluation of the benefits to be correct.

Question 4.2: Do you agree that we have identified the relevant cost drivers resulting from a move to direct routing? If not please explain why not.

Stakeholder comments

A3.56 3UK believes that Ofcom's approach is likely to have overestimated the costs. In particular, 3UK maintains that it is not aware of any operator specific operating costs of direct routing that would be incremental to the existing arrangements that support the current solution. 3UK observes that it is implicit in Ofcom's assessment that some of the existing costs of supporting onward routing will remain to support fixed originated traffic and resilience.

A3.57 3UK believes that operator specific and common database capital and operating expenditure is based on the over-engineered NICC specification. 3UK maintains that it has consistently advocated adopting a commercial off-the-shelf solution instead which it believes would significantly lower these costs. Further, Ofcom's cost estimates also exclude synergies between a common database for direct routing and a messaging hub for porting.

A3.58 C&W agrees that Ofcom has identified the correct costs in principle although it is not clear whether Ofcom has taken full account of the industry resources required to reach industry agreement and opportunity costs of foregone commercial activities.

A3.59 O2, BT, [✂], Syniverse, T-Mobile and [✂] all agree or broadly agree with Ofcom's assessment of cost drivers of a direct routing central database solution. Virgin Media also identified operator specific capital costs of modifying IT systems to operate the database.

A3.60 [✂] believes Ofcom's assumption that direct routing between fixed networks requires the establishment of a central database is wrong and that it should, at the very least, consider alternative solutions. [✂] maintains that direct routing between fixed operators could be achieved much more cheaply through an effective system of information exchange, for example, through the swapping of files via a secure FTP site.

A3.61 Vodafone maintains that whilst Ofcom's explanation of the relevant cost drivers is perfectly reasonable, its approach, having determined that universal direct routing did not "cost-in", should have been to reconsider the solution for other traffic configurations that might cost less than a central database approach.

Ofcom's response

A3.62 We note the general agreement over our identification of the relevant cost drivers and observe the suggestion from some mobile respondents that, having determined that a universal 'all call' central database solution was not cost effective, that we should have examined lower cost direct routing solutions for mobile (whether a cheaper 'off-the shelf-solution' rather than the NICC database specification or a cheaper alternative to a central database solution).

A3.63 We respond to comments made by several MNOs about cheaper alternative technical solutions, which we have set out in more detail at paragraphs A3.264 to A3.268 below, in section 3 and consider lower cost solutions for implementing mobile only direct routing in our CBA sensitivity testing and scenarios in section 4.

A3.64 We have responded to [✂] substantive point about a cheaper method of establishing direct routing between fixed operators in paragraph A3.46 above.

Question 5.1: Do you agree with our assessment of doing nothing? If not, please explain why.

Stakeholder comments

A3.65 3UK agrees with Ofcom's position in the August 09 Consultation that a "do nothing" option may not be appropriate given the level of inefficiency and disincentives of the current scheme and the financial arrangements which surround it.

A3.66 BT largely agrees with Ofcom's assessment but disagrees with its conclusion. Given the relative benefit to consumers appears to be quite small, BT believes the "do-nothing" option has significant merit.

A3.67 C&W expresses a similar view to BT noting the modest benefit to consumers. It adds that "do-nothing" enables the mobile industry to devote its resources to something which generates more benefit. This view is also expressed by O2. C&W highlights its own preferred option which is to defer any changes until they are feasible for all traffic configurations.

A3.68 [✂] broadly agrees with Ofcom's assessment in the August 09 Consultation that if it were to adopt a "do nothing" approach there is likely to be a coordination failure preventing the mobile industry from collectively moving to direct routing in the future.

A3.69 In addition to the incentive issues which Ofcom identifies, [✂] notes that a direct routing project does not generate any direct commercial advantage to a specific

operator by allowing it to acquire or retain customers or increase their usage. Projects which achieve these aims will be prioritised by operators in a competitive market. Further, there is an added disincentive in engaging in projects which require coordination with multiple parties (particularly competitors) with inherent complexity and compromise. [✂] concludes that moving away from onward routing will not be achieved without regulatory intervention. Scottish and Southern Energy shares the view that a continued coordination failure is likely in the mobile industry if Ofcom does nothing.

A3.70 Syniverse and [✂] generally agree with Ofcom's assessment. Syniverse believes that unless economic conditions and/or technical capabilities change significantly, doing nothing is unlikely to achieve routing efficiency.

A3.71 T-Mobile does not agree with Ofcom's reasons as to why direct routing is unlikely to be introduced absent intervention.

A3.72 Vodafone disagrees with Ofcom's assessment. It maintains that the cost effectiveness of direct routing is not proven and it is certainly not cost effective for a central database solution. The fact that operators have not implemented a solution (which would have been unlikely given Ofcom's interventions in this area since 2006) that might well have increased costs cannot be inferred to be a current coordination failure.

Ofcom's response

A3.73 Our review of our provisional assessment, set out in section 4 of this Statement, confirms that mobile only direct routing is unlikely to be cost effective at this time.

A3.74 Even if a move to mobile only direct routing might have been cost effective for MNOs at some point previously, we conclude that it is probable that a number of factors may have contributed to inhibit any such change. These factors include our own interventions over the last few years to establish a common database solution but also the financial incentives around onward routing and a preference, on the part of competing operators, to focus their resources on projects likely to give them a commercial advantage.

Question 5.2: Do you consider that an industry agreed solution is likely to emerge that would deliver direct routing no later than 2012? If not, please explain your reasons. Would you be supportive of such a solution?

Stakeholder comments

A3.75 3UK does not support such a solution. It believes reform will only be possible through firm regulatory intervention with decisive deadlines and directives because other mobile operators do not share the same incentives as 3UK and newer entrants to improve the system. 3UK would nevertheless commit to taking an active role in implementing an industry solution if this turns out to be the preferred option.

A3.76 BT is neutral on such a solution but believes achieving consensus among the mobile operators may not be easy. BT says that it would be surprised if the majority of mobile operators would consider that the benefits to them or consumers would be sufficient to implement direct routing voluntarily especially given the risks of undertaking such a project and alternative investments that could be made. O2 says that it believes an industry agreed solution is unlikely for the reasons highlighted by BT.

A3.77 C&W has profound concerns about this approach. It does not believe that the effects of direct routing can be ring-fenced to the mobile community and that fixed operators might need to directly route calls to ported mobile numbers. C&W believe that it is inevitable (and entirely rational) that the mobile operators will devise and adopt the lowest cost direct routing solution for networks using mobile technology. The consequence of this might be that it becomes either technically or economically unfeasible for fixed or non-GSM[122] operators to use this mobile only direct routing approach. C&W strongly objects to Ofcom's proposal that fixed operators be unable to actively participate in the development of any solution.

A3.78 C&W could only support a co-regulatory approach if it utilised open technical standards such as those developed by NICC and the commercial arrangements for access were endorsed by Ofcom. [✂] makes a similar observation that any serious industry solution should have buy in from a body such as NICC.

A3.79 [✂] has no objection to an industry solution but does not believe such an outcome to be likely given the absence of discussions to date and historic difficulties in industry coordination on this issue. [✂] believes there is insufficient commercial incentive for operators to take this initiative. It also believes that there is little material difference between the industry-led option and the Ofcom mandated solution in terms of impact on operators.

A3.80 Scottish and Southern Energy believe an industry-led outcome to be unlikely without some Ofcom intervention given the absence of cross-industry working to implement major projects in the telecoms market.

A3.81 [✂] maintains that any industry solution must emerge from a wider set of stakeholders than just the established mobile operators.

A3.82 T-Mobile believe that regardless of whether an industry agreed solution or mandated solution is adopted, whether direct routing can be delivered by 2012 depends on the solution to be implemented. A solution that requires only incremental change to existing infrastructure could probably be delivered before 2012 whereas a central database solution would take longer. T-Mobile supports a proposal that industry is given time to investigate and implement an alternative solution to deliver direct routing.

A3.83 Absent any change in the interim to either the appropriate rate for termination charges for calls to ported numbers or donor conveyance charges, Virgin Media does not believe that an industry agreed solution is likely to emerge before 2012.

A3.84 Vodafone believes that it is too early to say given that the cost effectiveness of a direct routing solution has yet to be established. If such a solution were possible then provided it generated sufficient benefit to make the diversion of resources worthwhile then Vodafone would, in principle, support it. Any timetable should be set to optimise the industry and consumer benefit.

Ofcom's response

A3.85 Our review of our provisional assessment, set out in section 4 of this Statement, shows that a mobile only direct routing solution is unlikely to be cost justified and therefore consideration of an industry agreed solution is not something we would actively pursue at this time.

[122] Global System for Mobile communications

Question 5.3: What steps do you consider Ofcom should take to ensure that such an industry commitment is serious? Do you agree with the proposed steps set out by Ofcom or are there additional measures that should be taken?

Stakeholder comments

A3.86 3UK believes that if Ofcom is minded to adopt an industry-led solution then it must set strict deadlines together with an option of imposing financial penalties for failing to meet those deadlines.

A3.87 C&W suggests that a legally binding Memorandum of Understanding between involved mobile operators and Ofcom setting out the deliverables and covering wider stakeholder engagement would be necessary. C&W is unsure about the sufficiency of CEO commitments not least since successors would not be bound by such voluntary undertakings.

A3.88 O2 and Vodafone maintain that Ofcom need not be concerned about this based on current evidence.

A3.89 [✂] broadly agrees with Ofcom's proposed steps save the involvement of CEOs which it maintains would not be closely involved in such projects and would potentially add in some delay. Securing the commitment of the functional director should suffice for these purposes.

A3.90 Scottish and Southern Energy maintain that industry should agree to the application of a General Condition specifying the high level objectives around the implementation of the required solution. This would afford industry the flexibility on how the objective is to be delivered in detail together with the comfort that all parties are bound to play their part.

A3.91 Syniverse refer to approaches taken in other countries whether incentives or deadlines which, if not met, carry financial penalties or result in the imposition of further regulations.

A3.92 T-Mobile considers that industry is unable to commit to the delivery of a central database solution within the proposed timescales, in particular absent a robust business case. Like O2, T-Mobile believes the question of industry commitment to be largely irrelevant.

A3.93 Nevertheless, T-Mobile would support Ofcom undertaking a role to coordinate and drive industry. Ofcom should also engage NICC/TSG which is, in T-Mobile's view, the appropriate forum to identify and progress a realisable routing solution.

Ofcom's response

A3.94 Our revised CBA supports the view that mobile only direct routing is unlikely to be cost effective and therefore seeking industry's commitment to an 'industry-led' solution, in the manner set out in the August 09 Consultation, is no longer appropriate.

Question 5.4: What steps do you consider should be taken to ensure that any industry solution that emerges does not foreclose the opportunity for other mobile operators to participate in the short term or longer term?

Stakeholder comments

A3.95 3UK considers that this is a relevant concern and believes that mandating direct routing more readily addresses concerns about foreclosure. But if Ofcom were minded to adopt an industry-led approach then in addition to competition law, Ofcom should consider a specific provision within an amended GC18 to ensure there is no possibility of foreclosure to other mobile operators. Syniverse also believes that any regulatory requirements should clearly state that the solution should be open to new entrants.

A3.96 BT maintains that Ofcom should ensure that any solution developed by the established mobile operators be designed at the outset in such a way that other companies can have access to it if they wish or become obliged to use it due to port volumes.

A3.97 C&W disagrees that participation should be restricted to mobile operators and argues that fixed operators should not be excluded. Scottish and Southern Energy agrees with this view and that Ofcom should ensure that any industry governance arrangements enable, not only those directly impacted by any regulatory obligation, but also other parties to register legitimate interests and engage in the project. C&W and [✂] believe that ensuring that any technical solution be developed under NICC and that commercial arrangements are endorsed by Ofcom should ensure that foreclosure does not arise.

A3.98 [✂] believes the management of stakeholders to be a critical issue for Ofcom and is one which is equally relevant under either an industry-led or mandated solution. A lack of certainty around who can participate, what their obligations are and how disagreements will be resolved will be a significant inhibitor to the agreement of an industry-led solution. If established mobile operators are given the freedom to agree a solution of their own choosing without being bound by other operators' views then there is some prospect of swift progress. If however, established operators are required to compromise their preferred solution by accommodating the requirement of other parties in ways which they would otherwise not choose to do, then there is likely to be little incentive to commit to such a plan. Ofcom must establish clear lines of accountability if it wants meaningful progress and should not overlook the fact that dealing with disagreements between industry participants is likely to be the single greatest challenge.

A3.99 T-Mobile considers that this issue reflects a fundamental difficulty of requiring only a subset of industry to implement a solution which ought to be applied consistently among all competitors. Partial implementation may overcome some arbitrage opportunities but create others and, for this reason, T-Mobile prefers a solution where the direct routing of all calls to ported mobile numbers is required (i.e. including fixed) or at least all mobile operators (i.e. including smaller and new entrant mobile operators).

A3.100 T-Mobile points out the practical problems in solution expansion. Those who share the costs of establishing a new solution will want new joiners to contribute. Determining the level of this contribution is difficult and potentially a barrier to entry for some. Those who do join will understandably want to ensure that their needs are considered but any governance arrangements may limit their influence.

Commercial negotiations with new entrant competitors can therefore be difficult to resolve and result in allegations that established operators are acting anti-competitively and that new entrants are seeking to free-ride and exercise undue influence.

A3.101 For these reasons, T-Mobile strongly believes that any direct routing system should include new entrants from the outset. But if Ofcom were nevertheless to mandate direct routing between established operators only, then it should provide clear guidance to industry on how these kinds of issue should be resolved. T-Mobile suggests that simplest approach would be to apply the principle of proportionality and allocate cost shares and degree of influence to usage. This would send a clear signal that established operators accept responsibility for bearing most of the cost of the new system and that new entrant operators accept that they will have little influence over it. The technical and funding/governance structure should be set so as to not create unnecessary barriers to entry.

A3.102 Vodafone maintains that the issue under consideration is a change to the routing of porting traffic and extending the scope of any solution to other operators will either increase or decrease the benefits depending on whether the savings from re-routing the additional traffic is more or less than the cost of extending the scheme. Vodafone suggests that the simpler the solution the better the chance of minimising the cost of extension.

Ofcom's response

A3.103 We note the concerns raised by respondents but, as concluded earlier, do not consider an industry-led solution to be something we should actively pursue absent the emergence of a clear benefit to change to direct routing.

A3.104 Were an industry-led approach to emerge at some future time, we would expect interested parties not to be foreclosed and recognise that there may a role for some form of facilitation process. Any technical standards may require development through the NICC as appropriate.

Question 5.5: If there was a firm commitment to an industry-led solution, what role would you expect Ofcom to play?

Stakeholder comments

A3.105 3UK believes that Ofcom must remain as close as possible to the implementation process through to delivery.

A3.106 BT believes that Ofcom should as far as possible leave it to the companies concerned but might expect Ofcom to set milestones to track delivery, resolve disagreements and ensure that the interests of small players and potential new entrants are represented such that subsequent access to any solution could be concluded on reasonable terms. C&W and Syniverse make similar observations to BT around ensuring future access to the solution.

A3.107 [✂] maintains that if there was a commitment to an industry-led solution then the initial role for Ofcom would be to determine the ground rules as outlined in paragraph A3.98. If Ofcom decides to allow the established mobile operators to progress a mutually agreeable solution then it should do no more than satisfy itself that operators are meaningfully engaged and resolve disagreements where required. If Ofcom decides that wider participation is required then it will need to

have much more involvement in managing the process and expect disagreements. [✂] believes that existing and potential mobile operators would not readily agree a single solution and Ofcom's involvement would be no different to formal regulation.

A3.108 Scottish and Southern Energy maintains that were Ofcom to follow the approach it describes in paragraph A3.90 then its role might include formal powers such as being able to agree or veto variations to industry plans at a "steering group" level. But if Ofcom were to decide on an industry-led solution as described in its August 09 Consultation then Ofcom would be right to expect to play a facilitation role and that repeated interventions at a detailed level are likely.

A3.109 T-Mobile would expect Ofcom to provide support in identifying a lower cost solution.

A3.110 Vodafone maintains that were such a situation to arise then it would hope Ofcom would assist by removing any regulatory uncertainty that may arise.

Ofcom's response

A3.111 We note the comments made by respondents. We acknowledge that were industry to commit to developing its own solution for direct routing we may be able to provide a supporting or facilitation function where appropriate.

Question 5.6: Do you agree with Ofcom's proposal for a backstop to mandate direct routing in the event that an industry initiative fails? Do you agree that reviewing the situation in late 2010/early 2011 is appropriate before deciding on the need to mandate?

Stakeholder comments

A3.112 3UK, Syniverse and [✂] agree with Ofcom's proposal. Syniverse believes that operators will be incentivised to avoid further regulation and have more latitude to devise their own solution.

A3.113 BT maintains that Ofcom could consider action if it observed a lack of commitment that jeopardised the project delivery date.

A3.114 C&W disagrees with mandating a mobile only solution. However if Ofcom decides that direct routing of mobile to mobile calls should be in place by a given time, then it is appropriate to set a regulatory mandate. C&W maintain that to avoid uncertainty this should be done from the outset i.e. mandate option rather than industry-led.

A3.115 Vodafone and O2 do not agree with Ofcom's proposal since they believe that Ofcom has not satisfied the tests to amend GC 18 and mandate direct routing.

A3.116 [✂] maintains that the threat that regulation will follow anyway is the greatest disincentive to any self-regulatory approach. There is no need for a mandatory backstop since Ofcom can always intervene at a later date if it chooses to do so.

A3.117 Scottish and Southern Energy maintains that, left to itself, there is little prospect of an industry-led solution emerging that would deliver the required arrangements. Waiting until 2010/2011 seems too long to wait and see if this option was working.

A3.118 T-Mobile does not agree with Ofcom's proposal and sees little difference between the industry-led option and the mandating option as to Ofcom's control over the

solution to be delivered or the timing. Moreover, it is unclear to T-Mobile how such a backstop would assist implementation. It is highly unlikely that industry would be deliberately allocating resources to a project for as long as possible, rather any delay is more likely to be due to a fundamental issue with the project. Imposing aggressive deadlines is likely to compound problems rather than enable effective project delivery.

A3.119 In any event, T-Mobile (like O2 and Vodafone) does not consider that Ofcom will be able to justifiably mandate a central database solution and therefore any effort to determine a deadline is premature. If an adequately low cost alternative to onward routing can be identified, then industry can procure this of its own accord without intervention.

Ofcom's response

A3.120 We consider that, in the light of our refined CBA, it is not appropriate to seek to intervene in this way at this time.

Question 5.7: Do you agree with our assessment of Option (3) [changing the routing incentives for calls to ported mobile numbers]? Please set out your reasons.

Stakeholder comments

A3.121 3UK believes Ofcom's concerns around this option are misplaced and that, combined with Option 4 (mandating direct routing), a modified version of Option 3 would ensure timely reform and the right incentives for efficiency.

A3.122 3UK believes that Ofcom correctly recognises the disincentives on call originators of the current financial schemes associated with calls to ported mobile numbers – "donor passes all" of mobile termination rates and donor conveyance. But, 3UK maintains that Ofcom should not rely on these factors to fade away over time but take appropriate action now to encourage efficient routing rather than wait a few years before requiring the calls be directly routed. 3UK reminds Ofcom that, had its previous decision not been appealed, mobile originated calls to ported mobile numbers would now be directly routed. Ofcom's August 09 Consultation demonstrates that its original decision to mandate direct routing of calls to ported mobile numbers was correct and therefore any further delay in incentivising efficient behaviour is unwarranted.

A3.123 As regards Ofcom's concerns about shifting the burden of onward conveyance costs onto fixed and mobile originators, 3UK notes that it is recipient operators who have been bearing this burden especially new entrant operators like 3UK who have a net in-flow of ported traffic. Further the donor passes all arrangement has allowed originators and donors to also avoid paying the legitimate mobile termination rate of the recipient operator. By contrast, originators pay and other mobile operators receive a higher termination rate than they would otherwise be entitled to where calls are made to numbers ported out from an operator with a higher termination rate.

A3.124 Whilst Ofcom's proposals rely on an assumption that the effect of these financial distortions will reduce by 2011, 3UK maintains they will nevertheless remain significant until direct routing is fully in place for all calls to ported mobile numbers.

A3.125 For these reasons, 3UK maintains that Ofcom should create the right incentives for efficiency in advance of a move to direct routing (whether or not mandated) by requiring that for all onward routed calls to ported mobile numbers:

i) The fixed or mobile originator, instead of a recipient, shall pay to a donor operator the donor conveyance charge;

ii) The fixed or mobile originator shall pay to a donor operator, the recipient operator's termination rate; and

iii) The donor operator shall pay to a recipient operator the recipient operator's termination rate instead of the donor operator's termination rate.

A3.126 3UK recognises that these changes would require mobile operators to implement means by which information about ported mobile numbers can be shared for billing reconciliation or alternative routing purposes. 3UK maintain that this could be achieved by using the "SRI[123] look up" technique already used for routing SMS or modifying the bilateral file exchanges between donors and recipients such that information is available to all operators. 3UK suggests that this could be achieved using the existing Syniverse central system and making information available using simple FTP downloads. Changes to wholesale billing systems for invoicing ported traffic can be obtained from either of these means.

A3.127 3UK estimates it would cost in the region of £60k to £80k to implement these changes on its network inside three months and that changes to the Syniverse system could be made within a reasonable amount of time and cost.

A3.128 3UK believes that these charging principles will be required for onward routed fixed originated calls to ported mobile numbers as part of any mobile only direct routing solution to prevent any arbitrage opportunities arising from price differences between the two routing mechanisms.

A3.129 As regards transferring some of the burden of paying onward conveyance costs from the mobile to fixed operators, 3UK maintains that Ofcom should have regard to the falling cost to fixed operators of calls to mobiles (whether ported or not) as well as the financial distortions set out above.

A3.130 BT maintains that this is the least attractive option for the reasons set out by Ofcom in the August 09 Consultation and believes that this course of action should be rejected.

A3.131 C&W agrees in principle that there should be a shift of the additional charges involved in onward routing calls to ported numbers away from donors and recipients to originators.

A3.132 However, C&W considers it would be unacceptable for the burden of portability to fall on the originator for calls to mobile numbers while remaining on the recipient for calls to geographic and non-geographic numbers. C&W therefore considers that fixed operators should not be responsible for meeting part of the cost of mobile number portability while bearing all the cost of fixed number portability. C&W nevertheless notes that a change to the incentives is probably desirable and necessary in due course but part of a holistic rather than a partial routing solution.

[123] MAP Send Routing Information

C&W maintains that Ofcom rejects Option 3 because of the possible consequences for fixed operators yet Ofcom's preferred solution suffers from the same problem.

A3.133 John Horrocks believes Ofcom's argument for dismissing Option 3 is misplaced because, from first principles, it is quite reasonable for the originating operator to pay the additional porting conveyance costs on all calls whether from/to fixed or mobile operators. There is no need to isolate porting costs and charges between fixed and mobile considering the trend toward fixed-mobile substitution and convergence.

A3.134 Like 3UK, John Horrocks also observes that the payment by fixed operators of donor conveyance charges is relatively insignificant compared to the charges for terminating calls to mobile numbers. Also, again as observed by 3UK, John Horrocks notes that applying the same financial scheme for all calls to ported numbers, whether from or to fixed or mobile, would solve the arbitrage problem.

A3.135 John Horrocks accepts that there may be some costs to modify billing systems but that range holders can decide whether or not it is cost effective to charge under the new arrangements or negotiate simpler bill estimations.

A3.136 John Horrocks concurs with Ofcom's evaluation of the benefits of Option 3 and, overall, he believes Option 3 to be the best one.

A3.137 O2 does not believe that Option 3 would be practicable.

A3.138 [✂] believes that the key operational issue around option 3 is the exchange of ported numbers which it believes may well require some form of database to enable ported numbers to be efficiently exchanged and updated. [✂] believes that Ofcom is incorrect in assuming that the establishment of such a database for Option 3 would be any less difficult than that required for either Option 2 or Option 4.

A3.139 The principal distinction is whether operators would be required to use this database to route calls directly (under Options 2 and 4) or choose to do so under Option 3. Under the latter, the originating operator would be incentivised to route directly in order to avoid the costs of donor conveyance which [✂] assumes would be added to the termination charge which it pays to the donor operator. [✂] considers that the originator's decision would result in a commercial impact on the donor and recipient which is impossible to predict.

A3.140 [✂] is uncomfortable with an arrangement whereby the revenue (derived from either its own or donor's termination rate) which one operator received (as a recipient) would be determined by the decision of another operator (the originator) over which it had no control. Moreover, as a donor, the operator would not know what volume of traffic it would expect to have to transit and what level of conveyance charge it would receive. At the moment this is more predictable than it would be if originators could choose whether to send all or none of its traffic over a donor network.

A3.141 [✂] would not therefore choose Option 3 as its preferred option but would not be entirely opposed to it if Ofcom wanted to consider it further.

A3.142 Scottish and Southern Energy and [✂] agree with Ofcom that it would be inappropriate for fixed operators to bear further costs for onward conveyance of calls to ported mobile numbers.

A3.143 Syniverse also agrees with Ofcom's assessment noting that these changes could have a significant impact on existing commercial models.

A3.144 In relation to calls to fixed ported numbers [✂] maintains that it would be fair and reasonable to require the originating operator to pay any fixed average porting conveyance charges to offset the costs incurred by the fixed range holder if the originating operator failed to use the ported information to establish direct routing to the recipient provider's network as described in paragraph A3.60.

A3.145 T-Mobile does not consider that deliberately changing the economic signals is necessarily appropriate or possible. T-Mobile considers that Ofcom should allow industry to investigate lower cost alternatives to a central database solution to enable it to adopt a solution of its own accord.

A3.146 T-Mobile does not consider that, on a forward looking basis, the current donor conveyance charge or mobile termination rate arrangements are responsible for preventing a move to direct routing. Therefore T-Mobile disagrees with the view that these need to be changed to create incentives for direct routing. Moreover, T-Mobile does not consider that the legal framework provides for the donor conveyance charge to be changed as proposed; that a revised donor conveyance charge arrangement would create adequate incentives or that each network building its own database of ported numbers to publish/use is likely to be the most efficient solution.

A3.147 Virgin Media is strongly opposed to Option 3 and views it to be disproportionate and inappropriate. This is because it would involve fixed operators bearing the costs of onward conveyance for calls to ported numbers where they will be unable to avoid these costs by switching to direct routing given the absence of Next Generation Networks[124] and the high costs of direct routing using legacy TDM[125].

A3.148 Vodafone agrees with Ofcom's conclusion that Option 3 should not be pursued but believes that the reason why this is so, is because it is not proven that direct routing is cost effective. Setting incentives to pursue the wrong outcome is inappropriate.

Ofcom's response

A3.149 Option 3 in the August 09 Consultation proposed changing the routing incentives for mobile originated calls to mobile ported numbers by moving to a wholesale charging system which would ensure that the costs of routing would be paid by the operator originating the call (rather than the range holder or terminating/recipient operator).

A3.150 We explained that this was likely to result in stronger incentives to route calls to mobile ported numbers more efficiently.

A3.151 However, as detailed in section 4 of this Statement, our revised CBA supports the view that mobile only direct routing is unlikely to be cost effective and therefore changing routing incentives is not likely to produce the intended outcome.

A3.152 We also set out in the August 09 Consultation that there would be difficulties in practice with this approach. In particular, we were concerned that indirect routing would likely remain for calls to mobile ported numbers originated on fixed networks.

[124] IP based core networks which can support a variety of existing and new services, typically replacing multiple, single service legacy networks.
[125] Time-Division Multiplexing.

A change to the system of wholesale payments to mobile ported numbers would be unlikely to result in greater efficiency for this traffic, but would result in increased costs to fixed originating operators as they would have to bear the costs of mobile donor conveyance. If we were only to require this approach for mobile originated calls to mobile ported numbers, there would be a risk of distortions resulting from different wholesale payment arrangements between fixed and mobile originated calls – for example, calls could be re-routed from mobile to fixed networks to take advantage of this.

A3.153 Ofcom has not changed its view of this option following the August 09 Consultation and we have therefore decided not to pursue it.

Question 5.8: If Ofcom was to take Option (3) forward, what would be the costs involved in (i) making the changes to wholesale billing systems and (ii) other costs? Please explain the basis of your estimates.

Stakeholder comments

A3.154 3UK estimates it would cost in the region of £60k to £80k to implement these changes on its network.

A3.155 BT's initial view is that the costs to cascade the charge to the originator are likely to be significant especially if required on a per call basis.

A3.156 C&W and Virgin Media maintain that from a fixed network standpoint it would be impossible to audit or determine their interconnect bills for terminating calls to mobile numbers without recourse to a database of ported numbers.

A3.157 C&W do not believe that it would be practicable to use a database to validate bills accurately since the status of the number may be different between the point at which the call was made and when billing verification takes place. Further the cost of developing such a database would be significant. Therefore, C&W believes it would either have to accept the donor conveyance charge as presented (a considerable sum) or direct route. The first approach represents a large commercial risk whereas the second is shown by Ofcom's own analysis to be uneconomic at this time.

A3.158 T-Mobile believes the costs are likely to be substantial for the range holder to bill the originator the relevant charges since it would need to know that the incoming call requires onward conveyance at the point of billing. It would be necessary to change the call record flow within each network, create new billing systems, links between them and a reconciliation system to govern them. Virgin Media similarly observes that a network would need to run a differential charging system which would likely require a significant IT overhead.

A3.159 T-Mobile does not expect that the costs of this billing development to be outweighed by the additional income from the originator or that range holders would invest in such systems in order to incentivise a third party to avoid a cost. T-Mobile believes that the benefits of range holders investing in Option 3 are self-defeating.

A3.160 T-Mobile further believes that there would be further substantial cost incurred by range holders and recipients in publishing information on ported numbers which would need to be maintained to an agreed standard in order to enable call originators to make routing decisions. Likewise, originating operators would incur implementation costs if they wished to avoid these new porting conveyance charges

in order to download, consolidate and reconcile the published ported number information and integrate it into their networks.

Ofcom's response

A3.161 We note the comments made by respondents regarding the costs of implementing Option 3 but, for the reasons given in paragraphs A3.149 to A3.153 above, have decided not to pursue this option.

Question 5.9: Do you agree with Ofcom's assessment that mandating direct routing for mobile originated calls to ported mobile numbers is likely to be the most effective way of removing routing inefficiencies? If not, what other factors should we take into consideration and why are they relevant to our analysis?

Stakeholder comments

A3.162 3UK agrees with Ofcom's assessment.

A3.163 BT welcomes the fact that Ofcom has given the mobile operators the opportunity to propose their own solution without intervention which is likely to be more optimal than an Ofcom imposed solution. However, if Ofcom rules out Option 1 and remains convinced of the need for action, then retaining an option to intervene may be appropriate.

A3.164 C&W believes that a mandate to direct route is the best way to overcome routing inefficiencies. But, C&W believes it is a mistake to mandate direct routing of one call type at an early stage which limits benefits, leads to multiple routing approaches with greater overall cost implications.

A3.165 O2 is firmly of the view that amending GC18 to mandate direct routing fails to satisfy the statutory tests set out section 47 of the Communications Act 2003.

A3.166 [✂] maintains that, as a matter of fact, direct routing would remove the inefficiencies of onward routing. Moreover, mandating direct routing would ensure these inefficiencies are removed.

A3.167 [✂] believes that the key question is whether the costs do, in fact, outweigh the benefits and if so whether mandating direct routing would be a more efficient option than the others. [✂] also noted that timescales are also a relevant consideration as outlined in paragraph A3.38.

A3.168 Scottish and Southern Energy are in favour of a mandated solution but one which provides industry with appropriate flexibility in determining how the requirements are to be achieved.

A3.169 Syniverse agrees with Ofcom's assessment and further recommends that Ofcom considers access to ported number databases by overseas operators and SMS gateway vendors who might be willing to pay for this facility.

A3.170 [✂] agrees with Ofcom but notes that the mobile only NPV is relatively meagre. [✂] believes Ofcom should also consider:

i) the benefits of improved use of the numbering scheme and the avoidance of re-numbering;

ii) the benefits of accommodating direct routing of all call configurations as well as national SMS and MMS[126]; and

iii) the accommodation of non-geographic fixed portability.

A3.171 T-Mobile does not agree with Ofcom's assessment because:

i) Ofcom has substantially over-estimated the benefits in its provisional analysis;

ii) There are likely to be substantially lower cost alternatives to a central database;

iii) There are significant benefits in ensuring that all operators or, at least, all mobile operators use direct routing;

iv) Absent an agreed specification of the system it is not possible to accurately measure the likely costs;

v) Absent an agreed specification it is not possible to estimate the likely implementation timescales and therefore it is inappropriate to set deadlines at this stage;

vi) Ofcom should not bind industry to an inflexible timescale that prevents industry from procuring a solution according to best practice and which may lead to an increase in costs and reduced benefits.

A3.172 T-Mobile concludes, like O2, that there is currently an insufficient basis for Ofcom to mandate a direct routing solution. Moreover, whilst accepting Ofcom's legitimacy in ensuring timely delivery where it has a mandate to do so, T-Mobile does not accept that Ofcom can sensibly apply deadlines for the delivery of a technical project or that estimated implementation timelines can be determined before any solution is agreed. If Ofcom is determined to intervene to mandate a solution and to set fixed delivery deadlines then these must conform with procurement practice to ensure effective delivery.

A3.173 Virgin Media believes that a mandated direct routing solution for mobile originated calls to ported mobile numbers should only be undertaken if the cost benefit analysis clearly shows a substantial NPV. Virgin Media believes that Ofcom's provisional analysis shows a small NPV which is insufficient.

A3.174 Vodafone disagrees with Ofcom because, the case that direct routing is more cost effective than onward routing, has not been made. Furthermore, Vodafone is confident that a central database solution would increase costs and reduce customer benefits rather than achieve Ofcom's policy objective.

A3.175 Vodafone notes that it has not been established whether any lower cost alternative may emerge which is demonstrably less than the reasonably assessed minimum benefits.

Ofcom's response

A3.176 Our revised CBA supports the view that mobile only direct routing is unlikely to be cost effective and therefore seeking to mandate direct routing, in the manner set out in the August 09 Consultation, is no longer appropriate.

[126] Multimedia Messaging Service

A3.177 We recognise that it is plausible that an alternative lower cost direct routing solution might emerge which could produce a higher NPV. This is discussed at paragraphs A3.624 to A268 below.

Question 5.10: Do you agree that if Ofcom were to mandate direct routing, the obligation should be designed in a way that would avoid mobile operators having to use direct routing where the scale of ported traffic is not sufficient to justify the upfront investment to implement direct routing?

Stakeholder comments

A3.178 3UK believes that Ofcom should implement the changes in Option 3 to create the right economic signals for smaller operators to join up to a direct routing solution. In any event smaller providers would have the obligation of providing their ported out numbers to a common database.

A3.179 BT agrees that the direct routing solution should only be used when newer entrants determine that they have reached a scale where they can secure the benefits of direct routing. BT also believes that it should be possible for a solution to be designed in a way that other parties can use it on reasonable terms without either contributing up-front or "freeloading" subsequently.

A3.180 C&W, Syniverse, [✂], Scottish and Southern Energy and Virgin Media all agree with Ofcom's approach. C&W notes that Ofcom must be alert to commercial arrangements which penalise latecomers or smaller mobile operators.

A3.181 T-Mobile disagrees with the implementation of a direct routing system that does not include all operators for four reasons.

i) Any mobile to mobile direct routing solution must include all mobile operators if it is to eliminate arbitrage otherwise any benefits of the new system will quickly disappear.

ii) T-Mobile believes that accession by new members to any system created by a group of established operators will inevitably result in protracted and resource consuming negotiation and delay.

iii) T-Mobile does not believe that there will be substantial costs for new entrants to download information from a system to which they already upload.

iv) T-Mobile remains unconvinced about Ofcom's rationale for discriminating between new entrants and established providers. It believes that the costs to new entrants of joining the system need not be disproportionate. That aside, discrimination would exist in the charging structure whereby established operators would have to pay a donor conveyance charge for calls from new entrants whereas new entrants would not be required to pay this charge to established operators. T-Mobile asserts that this is not only discriminatory but will also distort competition between them.

Ofcom's response

A3.182 Given that our further assessment of leads us to conclude that it is no longer appropriate to mandate direct routing, we have not given further consideration to this question.

Question 5.11: Do you agree that, by framing the obligation in a way that obliges mobile operators to route calls to mobile ported numbers in the same way as non ported traffic, this should avoid the risks of any unintended consequences? If not, please comment on how this obligation could be best framed.

Stakeholder comments

A3.183 3UK agrees with Ofcom, but notes that a consequence could be that at least one transit operator would need to be able to directly route calls on behalf of an operator that uses a transit service to route calls to non-ported numbers. This would depend on the technical solution that is finally agreed.

A3.184 BT seeks clarification that any proposal should be framed to ensure that any obligation only applied to or from 07 mobile numbers as specified in the National Telephone Numbering Plan.

A3.185 C&W strongly agrees with this principle. However, it is concerned about how Ofcom would enforce this as it would be easy to obfuscate the origin of traffic.

A3.186 In principle, [✂] believes that if Ofcom concludes that direct routing represents the most efficient means of routing mobile originated calls to mobile terminated ported calls, then it should apply to all such calls. Although Ofcom believes that the current ported volumes of some operators do not justify the upfront investment costs of direct routing, [✂] is not clear what level of analysis has been conducted to substantiate this.

A3.187 [✂] believes that the costs of maintaining direct and indirect routing for mobile only calls is sub-optimal and inefficient not least because operators would have to maintain dual billing capabilities which would add cost and complexity for no benefit. So the current indirect billing arrangements would have to be maintained between two established operators (as donor and recipient) for the benefit of a small operator (and small volume of traffic) who had not invested in direct routing.

A3.188 The continuation of onward routing for calls from fixed will perpetuate the existence of dual processes in any event. However, Ofcom has shown that fundamental differences for fixed originating networks make direct routing more expensive in a way which would not be true for a new entrant mobile network.

A3.189 [✂] concludes that Ofcom should consider whether smaller operators should be encouraged or incentivised to build the most efficient method of routing ported calls into their networks at the earliest stage. [✂] suggests that Ofcom should consider an end-date by which time all mobile operators must have implemented direct routing. It might also consider whether mobile operators who choose not to implement direct routing pay the donor conveyance costs of onward routing. More immediately, Ofcom must consider what level of input smaller operators should have into a direct routing process which they may not use for a period of time.

A3.190 Scottish and Southern Energy, Syniverse and [✂] generally agree with the approach suggested by Ofcom.

A3.191 T-Mobile considers that all traffic (fixed and mobile) should be directly routed in order to ensure that operators receive their own termination rate and to avoid arbitrage opportunities. To the extent that Ofcom pursues a limited implementation of direct routing then the possibility of new arbitrage opportunities will be created.

T-Mobile notes Ofcom's conclusions for calls originating on fixed and to the extent that a cheaper solution can be found then its application to fixed operators should also be considered.

A3.192 However, if Ofcom persists with a mobile only solution then it should define the scope of the traffic subject to this principle in detail. At present, the obligation does not match Ofcom's proposals but T-Mobile does agree with the principle of Ofcom's approach.

Ofcom's response

4.118 We do not consider it appropriate to pursue an option to mandate direct routing of calls to ported numbers and for this reason we have not considered further how any obligation to directly route calls should be framed.

Question 5.12: Do you agree that the obligation to provide information on ported mobile numbers should apply to all mobile network operators from the start and not just the five incumbent MNOs? Do you agree that if there is a central database of ported mobile numbers, this should contain all ported mobile numbers including those of newer entrants who would not be obliged to implement direct routing from the start?

Stakeholder comments

A3.193 3UK, Scottish and Southern Energy and Syniverse agree that this would be required so that established mobile operators are able to route directly calls to those numbers that they port in from other mobile operators. Syniverse further notes that a process will be required to populate the central database and resolve any discrepancies as well as implementing a process to update porting data.

A3.194 BT finds it difficult to see why an obligation to populate the database (at a cost) should fall on new entrants who do not route using the database with the benefits accruing to established mobile operators. BT believes that this is best left to commercial negotiation.

A3.195 C&W accepts the logic of including porting data for all mobile operators rather than just those subject to a direct routing obligation. However, since the web of porting arrangements between new entrants is incomplete, when a new entrant wishes to direct route as an originator, they will need to ensure that the IRNs[127] of all recipients are routable from their network and across any intervening transit networks.

A3.196 [✂] maintains that if established operators are to be obliged to route all ported mobile calls directly (and other operators have a choice) then it will clearly be necessary for all mobile operators to provide details of their ported numbers.

A3.197 Without access to these numbers via the centralised database, existing operators (as originators) would have to continue to route traffic to the original range holder perpetuating the onward routing inefficiency which Ofcom seeks to remove. Depending on how the obligation is worded, established operators could be placed in breach of their direct routing obligation.

[127] Intermediate Routeing Numbers, used for routeing circuit switched calls from the interrogating network to the recipient network.

A3.198 [✂] believes that Ofcom should not allow smaller operators to have undue influence over the design of the specification just because they will be required to upload numbers. Those required to look up the database to route calls by virtue of their traffic volumes should determine the specification.

A3.199 Further, if established operators do not have direct interconnects with smaller operators (and use a transit provider instead) they will not be able to route calls directly to them. Ofcom should be mindful of this when drafting any obligation.

A3.200 [✂] believes that the database should enable all numbers to be individually routed.

A3.201 T-Mobile maintains that it is essential that any direct routing solution applies at least to all mobile operators to ensure that operators receive their own termination rate on calls to ported numbers. All operators should therefore use the solution and all numbers should be included.

A3.202 T-Mobile does not believe that there is a cost/efficiency reason for excluding new entrants from any direct routing solution.

Ofcom's response

A3.203 Given that our further assessment leads us to conclude that it is no longer appropriate to mandate direct routing, we have not given further consideration to this question.

Question 5.13: What do you consider to be an appropriate timescale for implementation of direct routing from the point Ofcom issues a final decision? Please provide a full and detailed explanation as to why you agree or disagree with the 2012 target date proposed by Ofcom.

Stakeholder comments

A3.204 Given that UKPorting covered much of the commercial and technical ground required for a project of this type, 3UK believes a period of twelve months is entirely reasonable.

A3.205 Notwithstanding BT's view that the benefits of moving to direct routing are unlikely to be sufficient to be attractive to mobile operators, if Ofcom decides to proceed with mobile only direct routing then BT recommends that the established mobile operators agree milestones with Ofcom. Ofcom and industry should also note that a move to direct routing is likely to impact BT's Number Portability transit product set although BT would not expect this to jeopardise a 2012 date unless overlooked. BT further suggests that the realism of a 2012 end date be tested early on, perhaps facilitated by an independent third party.

A3.206 Insofar as C&W believes that a mobile only solution should not be introduced at all, if this decision were to be taken C&W believes 2012 to be a reasonable target.

A3.207 O2 maintains that it would not be able to undertake any work on direct routing until its programme to replace its HLRs completes in the first half of 2011.

A3.208 [✂] believes that 18 months would be the minimum realistic period for implementing direct routing. Further [✂] observes that the point at which implementation begins must consider when operators can realistically begin to work on the project and this, in turn, hinges on when operators make decisions on their

project roadmaps. So, if Ofcom were to decide to implement direct routing in 2010, operators may not be able to begin work on the project until 2011 followed by an 18 month implementation period.

A3.209 [✂] would urge Ofcom not to include a date on the face of the regulation itself which is too inflexible given the variables and unknowns of such a project and could lead to adverse effects both on operators and consumers. For similar reasons [✂] believes that industry, not Ofcom, should set interim milestones.

A3.210 Syniverse maintains that 2012 seems reasonable provided operators can begin the implementation soon.

A3.211 [✂] observes that a longer implementation period allows costs to be reduced. Publishing ports early would give networks the flexibility to choose routing options. Cost penalties for onward routing would help speed implementation.

A3.212 T-Mobile notes that timetable proposed by Ofcom is little different to that under UKPorting. In fact, UKPorting had the advantage of an agreed NICC specification and therefore a longer period may be required than previously. T-Mobile therefore believes 2012 to be wholly unachievable for a central database solution. Moreover, T-Mobile maintains that a delivery time can only be known when the solution to be delivered is known, an observation shared by Virgin Media.

A3.213 T-Mobile notes that absent a robust NPV or overriding public interest concern to warrant the implementation of a central database or direct routing generally, it fails to understand the urgency which Ofcom appears to attach to its implementation. Even if a robust NPV were found that justified the implementation of direct routing, the urgency of realising any gains must be set against the necessity to plan the implementation properly. T-Mobile urges Ofcom not to assume that setting aggressive deadlines leads to a more positive outcome. It should adopt a more pragmatic approach to ensure that industry does not procrastinate.

A3.214 Vodafone views the detailed issues of timetables, obligations of non-participating operators etc must await the emergence of a cost effective least cost solution.

Ofcom's response

A3.215 As explained in this Statement, we have decided not to proceed to a decision which requires the implementation of direct routing. Therefore the question of implementation timing falls away.

Question 6.1: Do you agree that it is appropriate for Ofcom/industry to appoint a qualified independent third party to work with industry to develop a provisional technical specification for direct routing? If not, please state why.

Stakeholder comments

A3.216 3UK, Scottish and Southern Energy and Syniverse agree with this. [✂] also agrees but believes that most of this work has been done through NICC and UKPorting and should not be lost. Virgin Media believes that solution design has been completed by industry consensus within NICC.

A3.217 BT agrees that there is likely to be a role for a third party if Ofcom proceeds with Option 2 or 4. It further believes that part of this role should be to assist and represent the interests of newer and potential entrants.

A3.218 C&W does not oppose this but believes the role would have to be tightly defined. It should not be to develop a technical specification which is the remit of NICC but could have a role in facilitating/project managing the process. The third party's relationship with Ofcom should also be carefully considered.

A3.219 O2 disagrees on the grounds that it does not believe that the routing of traffic to ported mobile numbers is in need of reform.

A3.220 [✂] believes that it may be beneficial to have an independent third party assisting with this work although any remit (and costs) must be focussed and limited. Operators themselves will have to provide the principle technical input.

A3.221 [✂] believes that any role should be restricted to facilitation and administrative coordination to document discussions and draw them into some meaningful and useful form. This type of impartial task is not easily performed by one operator in a group.

A3.222 [✂] does not believe that this role should be an 'expert technical adviser' but a role, working for the operators, to assist them in fulfilling their obligations.

A3.223 T-Mobile supports Ofcom's proposal to develop a technical specification but does not believe this should relate to a central database solution since the costs of this are too high and believes that there already established forums for technical experts to identify and agree a lower cost alternative.

A3.224 T-Mobile believes that Ofcom should ask NICC to work on a lower cost direct routing solution and identify appropriate technical standards.

A3.225 T-Mobile agrees that once this has been done it would be appropriate for Ofcom/industry to appoint a third party to develop this specification if the solution requires delivery by a third party vendor. However, as the technical solution proposed by T-Mobile would not require an external vendor, the development work can be undertaken by each network operator.

Ofcom's response

A3.226 As explained in this Statement, we have decided not to proceed with either Option 2 or 4 as set out in our August 09 Consultation and therefore it is not necessary to appoint an independent third party to work with industry.

Question 6.2: Do you agree with the criteria for selecting an independent expert/consultancy? If not, please state what different/additional skills or qualities this independent party should bring.

A3.227 3UK and BT agree with Ofcom's criteria. Syniverse also agree noting that any party must be unaffiliated with any operator and must not have a conflict of interest e.g. bidding on supplying the mobile operators with equipment and services.

A3.228 C&W and [✂] also agree but would add in a requirement to understand the process of technical standardisation. Scottish and Southern Energy suggest that the optimal approach may be a combination of NICC and a project management consultancy.

A3.229 [✂] maintains that the party concerned should not have their own 'agenda'. This may be difficult amongst a limited pool of telecoms consultants who are likely to have their own views on any specification based on previous experience. The role

must not be to advise on the best solution but to assist industry in reaching that solution themselves.

A3.230 [✂] maintains that operators must have full involvement in the selection process especially if they are expected to pay for the services provided. 3UK believe that stakeholders should have the opportunity to veto Ofcom's choice of appointee in limited circumstances such as previous unsatisfactory dealings or disputes.

A3.231 Whilst T-Mobile considers that Ofcom's proposed criteria are appropriate, it believes that selecting a third party is unnecessary at this time. Instead, T-Mobile considers that, as a first step, industry needs to agree on a lower cost alternative to a central database. Thereafter, it may not be necessary to appoint a third party.

Ofcom's response

A3.232 As explained in this Statement, we have decided not to proceed with either Option 2 or 4 as set out in our August 09 Consultation and therefore it is not necessary to appoint an independent third party to work with industry.

Question 6.4: Do you agree that three months is an appropriate period of time to produce a provisional technical specification from which stakeholders can derive reasonably accurate cost estimates? If not, explain why and detail what you consider to be an appropriate time scale.

Stakeholder comments

A3.233 3UK believes three months is reasonable since much of the ground work on this project was carried out by UKPorting. Syniverse also agree that this time period seems appropriate.

A3.234 BT believes that three months is likely to be optimistic and that six months may be more reasonable. [✂] also believes four to six months may be more realistic based on operators broadly agreeing on the UKPorting approach but the numbers and identity of those operators who are entitled to participate in the process will impact this.

A3.235 T-Mobile believes that if Ofcom were to allow industry to investigate alternative direct routing solutions then three months would be adequate for NICC/TSG to develop proposals and agree the standards.

A3.236 C&W believes this timescale to be unrealistic and thinks a target date of August 2010 to agree a technical specification to be more realistic.

Ofcom's response

A3.237 We note that respondents generally indicated that a period between three and six months would be required in order to derive a technical specification based on the work previously undertaken by NICC and UKPorting on a central database solution.

Question 6.5: Do you agree that a further three months is a sufficient period of time to derive cost estimates based on the provisional technical specification? If not, please explain why and detail what period you think would be appropriate.

Stakeholder comments

A3.238 3UK, C&W, [✂] and [✂] agree that three months should be a realistic period for deriving cost estimates. However, [✂] notes that the time period may extend if operators need to acquire costings from suppliers and remarks that Ofcom must allow for practical considerations and remain flexible over timescales.

A3.239 BT thinks six months may be more reasonable.

A3.240 Syniverse recommends allowing for a period of three to six months to account for any RFP[128] procurement process with due diligence.

A3.241 T-Mobile agrees that three months seems adequate once a detailed specification has been agreed. However, if a lower cost solution of the type described by T-Mobile were preferred, it may be that cost estimates can be derived well within the three month period suggested by Ofcom.

A3.242 Virgin Media maintains that if the existing NICC solution is used as the basis for any solution then it is likely that the relevant operators will have already done preliminary work on costing this solution.

Ofcom's response

A3.243 We note that most respondents broadly agree that three months is a reasonable period in which to derive cost estimates based on a technical specification.

Question 6.6: Do you agree that the conditions we have set out as being necessary to make this process successful in its aims are appropriate?

Stakeholder comments

A3.244 3UK agrees but adds that it is vital that stakeholder representatives are empowered to make decision and commitments to avoid unacceptable delays. Further Ofcom should consider requiring operators and other stakeholders to commit to engaging with any nominated consultant or adviser as consistency of resource is a requirement for progress.

A3.245 C&W and Virgin Media agree that operators need to provide sufficient resources.

A3.246 [✂], [✂], Scottish and Southern Energy, T-Mobile and Syniverse agree with Ofcom's proposed conditions. Scottish and Southern Energy and T-Mobile both disagree with the time limitation.

[128] Request for Proposal is an invitation for suppliers to submit a proposal on a specific commodity or service.

Ofcom's response

A3.247 We have decided not to proceed with either Options 2 or 4. Therefore the conditions for taking forward the next steps for progressing these options described in section 6 of our August 09 Consultation are not relevant at this time.

Question 6.7: Do you have any other suggestions which would help make this process constructive and effective?

Stakeholder comments

A3.248 3UK believes that Ofcom should remain as close as possible to the project once a consultant or adviser is appointed and be prepared to intervene to resolve potential problems. Ofcom should follow closely the synergies with the parallel running work on porting processes.

A3.249 [✂] believes that Ofcom needs to ensure it keeps direct routing and porting process issues separate. Linking the two is likely to significantly delay progress on direct routing.

A3.250 [✂] reiterates the need for a small group to be involved in drafting any technical specification and the requirement for clear process to deal with disputes.

A3.251 Scottish and Southern Energy maintains that the process of developing the specification should be undertaken within a framework of transparency and inclusivity but against the backdrop of a co-regulatory arrangement to progress Ofcom's policy objective.

Ofcom's response

A3.252 We are grateful to respondents for their additional suggestions for taking forward either Option 2 or Option 4 of the August 09 Consultation. However, as described elsewhere we have decided not to proceed with either of these proposals and therefore make no further comment on this issue.

Question 6.8: Do you agree with Ofcom's proposed next steps following responses to this consultation? If not, how do you think Ofcom should proceed to bring this assessment of calls to ported numbers to a final decision.

A3.253 3UK, C&W, Syniverse and [✂] agree with Ofcom's next steps.

A3.254 BT believes that Ofcom has two courses of action open to it. The first is pursuing the course of action set out i.e. inviting mobile operators to commit to introducing mobile only direct routing, failing which Ofcom would mandate its introduction in the sort of timescales indicated. Alternatively, Ofcom could review its assessment and conclude that the status quo may continue. BT believes that the latter case is stronger but that the former is not without merit.

A3.255 BT re-affirms its view that there is no case for direct routing for other call types and that Option 3 should be discarded.

A3.256 [✂] broadly agrees with the proposed next steps. Ofcom should confirm as soon as possible whether it intends to allow for an industry-led process or mandate direct routing. If the former, then Ofcom should clarify who should/could be involved. If

Ofcom decides to mandate, then [✂] agrees that the three stage process is a pragmatic approach. However there remains a level of detail to be clarified over the process.

A3.257 Scottish and Southern Energy reiterates its co-regulatory arrangement based around an amendment to GC18.

A3.258 [✂] believes that Ofcom should re-examine its cost benefit analysis based on its suggested approach to the likely costs and benefits of direct routing calls to fixed ported numbers and issue a new consultation.

A3.259 T-Mobile believes the next step is for NICC/TSG to be tasked with identifying and costing an alternative solution to the central database system proposed by Ofcom.

A3.260 Virgin Media believes there are uncertainties in Ofcom's estimations and that it needs to ensure that the NPV continues not only to be positive but material. Virgin Media therefore suggests that the next step should be a short update and proposed next steps but that any final decision can only follow robust costings of the final solution.

A3.261 Vodafone believes that all the activity discussed in section 6 of Ofcom's August 09 Consultation is premature and that Ofcom's current assessment in unsafe such that the imposition of either Option 2 or Option 4 would not be in the best interests of consumers. Whether a lower cost solution can be developed that would provide a favourable result is not known. Therefore, Vodafone believes Ofcom should first drop any insistence on a common database solution and invite industry to investigate lower cost direct routing solutions. Ofcom should revisit its cost benefit analysis with a view to establishing a likely lower bound of savings per year which would represent a ceiling of the cost within which industry could work in designing solutions. Provided some form of consensus emerged over the analysis, Ofcom could then look at options for implementation or alternatively declare that there was no reason to change.

Ofcom's response

A3.262 Our revised CBA supports the view that mobile only direct routing is unlikely to be cost effective; therefore we have decided that no regulatory intervention on the routing of calls to ported numbers is appropriate at this time.

Alternative method(s) of mobile only direct routing

A3.263 Several respondents discussed alternative methods of delivering direct routing. These are summarised below.

Respondents' views

A3.264 O2, T-Mobile and Vodafone maintain that there are potentially significantly cheaper ways of delivering direct routing than that based on a central database which Ofcom used in its cost benefit analysis. O2 simply refers to a solution "using range holders' information to route calls". T-Mobile describes an alternative solution in more detail, which it calls "direct routing based on SMS SRI look up", in which the originating network can identify the recipient network via the range holder network

and thereby route the call directly. Vodafone cites examples of alternative routing methods such as "an inter-operator SRF query" or an "ENUM[129] server approach".

A3.265 These three respondents each set out their concerns with a solution based on a central database. O2 comments that, based on Ofcom's own analysis, direct routing is required only in respect of mobile originated calls to ported mobile numbers and that donor provider failure was a second order matter. Whilst O2 did not rule out some advantage in relying on a central database, the benefits of using the range holders' routing information instead would include avoiding the cost of building and running a central database, associated programme office costs and the operator specific capital costs of interworking with the central database. Vodafone observes that whilst a central database may have merit where all UK communications providers need to use it, its relevance is less evident where there are only four or five participants who share common standards. It also comments on the costly and risky process of switching over to a central database approach to handling outbound calls.

A3.266 All three respondents argue that, in carrying out its cost benefit analysis, Ofcom has failed to investigate alternative methods of achieving direct routing that could realise the savings of not onward routing mobile originated voice traffic to ported mobile numbers but at lower cost than a central database method and thereby generate additional benefits. T-Mobile and Vodafone specifically support an industry initiative to investigate lower cost alternatives to a central database solution.

A3.267 In its response, C&W recognises that rather than using a common database, large mobile network operators could, as a least cost option to them of implementing direct routing, use "mobile-specific signalling" to query ahead to the range holder to determine the routing of a call to a ported mobile number. C&W are strongly opposed to a technical solution which is not practicable for incorporating into fixed networks because it maintains that, absent absolute surety that measures are taken to ring-fence the commercial implications of mobile only direct routing, it could be commercially compelled to utilise a direct routing solution. C&W concludes that it is essential that all potential stakeholders be involved in establishing both the technical and commercial arrangements. Notwithstanding the above, C&W maintains that, at some point, direct routing will make sense for fixed call origination and if the design for mobile direct routing is such that it is feasible only from mobile networks, this will impede the introduction of a holistic solution.

Ofcom's response

A3.268 Our assessment of alternative methods of direct routing is examined in paragraph paragraphs 4.67-4.74 of section 4 and our conclusions are summarised in section 3.

[129] ENUM is a form of Telephone Number Mapping which is a mechanism, used in conjunction with the Domain Name System to enable the translation between E.164 telephone numbers and Universal Resource Identifiers, which are used as identifiers within IP networks, including the Internet.