Vodafone's response to Ofcom's November 2006 Review of General Condition 18 – Number Portability

Summary and conclusions

1. Vodafone welcomes the opportunity to comment on Ofcom's far-reaching proposals for change to the operation of number portability in the UK. Vodafone is a key stakeholder in relation to portability of mobile, geographic and non-geographic numbers, and also has a keen interest in the transition to Next Generation Networks ('NGNs') which forms part of the backdrop to Ofcom's current proposals.

2. Vodafone has no objection in principle to looking afresh at number portability in the context of NGNs to assess how current portability arrangements may need to evolve to continue to deliver fit for purpose and cost-effective solutions. We do have serious concerns, however, that Ofcom's provisional conclusions are premature and not well supported by the analysis it has so far presented. In particular, for reasons discussed in more detail below, we do not believe the preliminary cost-benefit analysis Ofcom has commissioned provides a robust basis for the policy conclusions Ofcom appears to be drawing from it.

3. Sensitivity analysis is an important part of any cost-benefit exercise. The single sensitivity analysis Sagentia has performed for mobile only solutions drastically reduces the net benefit to the point where it is barely cost neutral[1]. Extending the same analysis to the converged ACQ/CDB yields a marked deterioration there too[2].

4. Vodafone has extended the analysis to test various alternative scenarios for converged and mobile only portability solutions using the same basic framework as Ofcom's consultants. Our analysis shows that marginal changes to the input assumptions produce dramatic swings in model outputs, calling into question not only the absolute size of the net benefit Ofcom appears to be counting on, but the very existence of a clear cut net benefit rather than a net cost. This should, at the very least, provide pause for further reflection and more detailed analysis before any firm decisions to proceed.

5. Despite these reservations about the reliability of the output numbers, Vodafone strongly supports the use of cost-benefit analysis as an aid to regulatory decision making. We note, however, that Ofcom has not offered any cost-benefit justification for its proposals to reduce mobile porting lead times. Ofcom appears

[1] Although Ofcom uses the term 'sensitivity analysis', it appears from Sagentia's discussion of cost modelling at section 6 of their report that they regard this alternative scenario as a more realistic and appropriate baseline case.

[2] Ofcom asserts at 3.53 that the converged ACQ/CDB solution is robust against a reduction in assumed mobile conveyance costs from 0.8 to 0.1ppm (and simultaneously robust against a £30 million increase in capital costs) but this scenario does not appear in the published version of Sagentia's report. Vodafone's further analysis at Annex 2, however, strongly suggests that Ofcom's apparent confidence in the cost-benefit results it has presented is not, in fact, warranted.

to take it as an article of faith that its proposals are good for customers without offering any convincing evidence to that effect. In fact, the evidence Ofcom does present suggests that the present portability process works well, and that those customers who have ported are generally satisfied with their experience. Of those who had not ported at all or within the last four years, only 3 per cent spontaneously expressed any concern at all about the porting process, with just 3 out of 1,167 respondents (i.e. just over one quarter of one per cent!) mentioning 'time taken to transfer their number to a new network' as a reason for not switching provider[3].

6. Against this background, there must be a serious doubt as to whether any proposed change that threatens to add cost to the current porting process is justified when there is no clear benefit in return. There is also a serious risk that tinkering with a process that works will break it rather than improve it. In Vodafone's view, Ofcom has not sufficiently considered the practical impact of its proposals and the risk of customer detriment rather than customer benefit. In particular, Vodafone believes that Ofcom's one-dimensional focus on elapsed time between Porting Access Code ('PAC')[4] activation and porting exaggerates the importance of speed relative to reliability, timing certainty, customer control and the ability actually to make use of a ported number.

7. The body of this response discusses Vodafone's reservations about Ofcom's analysis and the proposals stemming from it in more detail, looking at the overall cost-benefit framework, the converged CDB proposal, alternative mobile only solutions and proposals to reduce porting lead times. It also includes comments and suggestions on possible next steps, including Ofcom's proposed changes to General Condition 18 which Vodafone believes are not only premature but also inappropriate.

8. Annex 1 addresses Ofcom's specific consultation questions, while Annex 2 presents the results of Vodafone's review of the cost-benefit analysis.

Cost/benefit framework

9. In principle, Vodafone wholeheartedly supports the use of a cost-benefit analysis (CBA) framework as an aid to decision making. Number portability is a prime candidate for the application of CBA techniques.

10. Vodafone's concern in this instance is that Sagentia's preliminary analysis does not provide robust support for Ofcom's provisional conclusions in respect either of a converged fixed and mobile all call query central database (ACQ/CDB) or the two proposed alternative mobile only solutions. Ofcom's other main proposal, to reduce porting lead times, is not supported by any sort of cost benefit justification.

[3] See Annex 8, especially A8.17 under the heading 'Barriers to switching'
[4] Porting Access Codes are valid for 30 days

11. CBA results depend critically on modelling assumptions about likely costs and benefits and an implicit view of what would happen otherwise[5]. Unfortunately, the basis for many of the cost and benefit estimates employed by Ofcom's consultants is unclear and open to question in key respects.

12. On the cost side, Sagentia estimates the capital cost of a mobile only CDB solution at £12m and that of a converged CDB solution at £73.5m[6]. The detailed basis for such estimates is unclear, however, making it very difficult to judge the accuracy or reliability of these initial estimates. Sagentia explicitly acknowledges that its estimates are not derived from industry estimates. Unsurprisingly, most industry representatives surveyed were unable to assess likely costs in abstract without a clear idea of what the eventual form of any technical solution might be[7].

13. As a result, Sagentia's estimates are inevitably based on assumptions which may or may not turn out to be correct[8]. This is not a criticism in itself, although it would have been helpful if the modelling assumptions had been spelt out in more detail. The key point is to recognise the potential for variability and straightforward error, and consequent need to scrutinise modelling assumptions carefully and test model outputs for sensitivity against a range of alternative input assumptions.[9]

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[5] It is important to recognise that Ofcom's present proposals are set against the background of a functioning number portability regime. If number portability were being introduced for the first time, it is quite possible that current implementations would not be regarded as optimal. However, it is only the incremental costs and benefits of new implementations that are relevant to the current analysis. This may yield quite different results to those that might be expected in a 'greenfield' environment. Vodafone further notes that it is the past practice of regulators mandating technical solutions that has led to the entrenchment of the current onward routing regime, despite a preference by many industry players for a direct routing solution from the outset. We suggest that it is more appropriate to invite industry to devise and review alternative solutions prior to any formal regulatory mandate, as opposed to mandating the technical solution in advance and merely delegating detailed implementation issues to industry.

[6] See summary table at 6.1 of Sagentia's report.

[7] See Sagentia report at 5.12 *"Cost information for implementing a CDB solution in NGNs has been difficult to obtain . . . . . For future NGN implementations, cost information is not really known due to lack of specific implementation experience and uncertainty over aspects of implementation."*

[8] It is clear from Sagentia's report that it has assumed that the costs of a converged ACQ/CDB solution are the simple sum of fixed NGN and mobile only implementations. However, this seems to ignore the fact that a mobile only CDB based on TDM may not be compatible within a converged NGN-based implementation. If any converged solution has to cater for both TDM and NGN implementations, this will tend to increase costs relative to Sagentia's baseline assumptions. Alternatively, even if the converged implementation is based entirely on NGN architecture, there will be additional conversion costs from any pre-NGN mobile only CDB. It should also be noted that the NGN implementation costs seem to assume a 'fully featured' NGN, thus understating costs in the event that CPs deploy alternative NGN implementations from those assumed. See discussion of Transition NGN Architecture and Digit Analysis in NGN Architectures at Appendix C.

[9] In 2004, Vodafone commissioned Ovum to undertake a wide-ranging comparative analysis of MNP implementation in six countries. This included a retrospective evaluation of experience in the UK (where Ovum had conducted the original CBA for Oftel). In contrast to its initial estimate of £10 million for the Oftel CBA, Ovum's retrospective estimate of actual implementation costs was around £25 million, with a further £1 million in subsequent

14. While the cost modelling remains slightly obscure, the origin of the benefits Sagentia has modelled is much clearer and is derived entirely from assumed conveyance cost savings as a result of the move from onward routing to direct routing.

15. In principle, one would certainly expect some benefits of this kind. The question is how best to quantify them, and what one assumes would have happened anyway in the absence of a mandated CDB solution.

16. Sagentia's baseline model takes the mobile Donor Conveyance Charge ('DCC') and fixed line Average Port Conveyance Cost ('APCC') as proxies for conveyance cost, and calculates expected savings on this basis. However, Sagentia itself queries whether the embedded value of 0.8ppm (half the additional conveyance costs estimated by Oftel when it determined the DCC in 1999) is appropriate and accurately reflects current conveyance costs[10]. Using an alternative estimate of 0.1 ppm, the benefits of a mobile only direct routing solution are reduced from an NPV of £189 million to a mere £8 million (Ofcom portrays this as 'still positive', but Sagentia describes it – more realistically in Vodafone's view - as 'neutral'[11]).

17. Whatever the 'correct' current value for additional mobile conveyance costs due to onward routing may be, it is clear that the overall welfare result is extremely sensitive to it. It should also be noted that this sensitivity applies also to the converged CDB case, where assumed fixed to mobile conveyance cost savings at 0.8 ppm dwarf the equivalent fixed to fixed and mobile to fixed savings. It is not clear why Ofcom and Sagentia have not extended the sensitivity analysis to the converged case, but Vodafone calculates that changing no assumptions other than the assumed ppm mobile conveyance cost reduces the net benefit of the converged solution from £297million to £39 million[12].

18. While this effect is dramatic enough in itself, it is by no means a worst case. Vodafone has modelled various other assumptions, each of which makes a significant difference to the net benefit (or cost) individually and an even greater impact cumulatively.

19. For fixed and mobile, Sagentia's methodology assumes conveyance costs would otherwise remain constant over time. This is at odds with the historical downward trajectory of conveyance costs[13], as well as ignoring the impact of NGNs (where

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upgrades to the porting process. For present purposes, the actual numbers are less important than the illustration of the margin for error – of around 150 per cent in this case.

[10] See Sagentia's discussion of 'Modelling Mobile Networks' at 6.1 *"An alternative view of this is presented in Scenario M2, which applies a lower DCC that we believe reflects costs more accurately."*

[11] See Sagentia's Results Summary at 6.2, discussing scenario M2 *"This scenario is similar to Scenario M1, but uses a DCC cost of 0.1p/min. This results in a small NPV i.e. the cost benefit of the change is neutral."* Seen in this context, Ofcom's contention at paragraph 3.39 that the sensitivity analysis 'underlines the robustness of the conclusion of positive benefit' looks somewhat exaggerated.

[12] See Annex 2, Table 15

[13] Which Sagentia implicitly recognises in its update of Mason's analysis for the fixed TDM case

the central expectation must be of a step reduction in conveyance costs, given that more efficient network utilisation is the main rationale for NGN investment). As well as these points, which potentially apply to fixed and mobile conveyance costs alike, there are further mobile specific factors that could affect the analysis, including wider deployment of on-net call trapping and use of direct interconnect rather than transit for MNP traffic. All these factors further erode the £8 million NPV from Sagentia's own sensitivity analysis, in some cases turning it negative by up to £23 million[14].

20. A further factor that needs to be considered in any CBA exercise is the discount rate. Sagentia uses a rate of 7 per cent, though with little explanation. This is the same rate previously used by Mason, who rationalised 7 per cent as half-way between a 3.5 per cent rate used for certain government projects and an assumed commercial rate of 12 per cent[15].

21. The exact rate of return to be used in any given circumstance can be a source of intense debate in its own right. For present purposes, however, the key issue is not the precise number but whether there is any rationale for employing a different (lower) rate to this particular cost-benefit analysis than Ofcom has recently considered appropriate in other regulatory contexts such as the setting of price and charge controls.

22. In principle, Vodafone sees no valid case for a lower social rate of time preference in the present analysis. Insofar as there may be a theoretical economic rationale for a social rate lower than a fully commercial one, this generally relies on factors such as the presumed lower risk of public sector projects and government's ability to borrow money more cheaply than the private sector, neither of which is likely to apply here[16]. Unless Ofcom envisages that the CDB solutions proposed here would be publicly funded, which seems doubtful, Vodafone sees no case for employing a lower discount rate than in other comparable regulatory decisions.

23. The greater the difference between the discount rate applied by regulation and the commercial rate facing individual operators, the greater the potential distortion in economic decision making. Rational economic agents will prefer to invest their limited resources in projects with the highest prospective return (subject to risk). The bigger the gap between the private returns to investment in number portability and other commercial projects, the harder it will be to justify according commercial priority to such low return 'regulatory' projects.

24. In summary, Vodafone strongly supports the use of CBA techniques to assist major policy decisions of this kind but is concerned at the lack of sensitivity analysis Ofcom has conducted to date. On alternative assumptions about

[14] See Annex 2, Table 11
[15] See Mason report to Ofcom, April 2004 at 6.7
[16] A fuller discussion of these issues is contained in New Zealand Treasury Working Paper 02/21, entitled *Determining the Discount Rate for Government Projects* (Louise Young, September 2002). The author draws a distinction between the 'Social Rate of Time Preference' and the 'Social Opportunity Cost' concepts. The social opportunity cost rate of discount is the rate that reduces the net present value of the best alternative private use of the funds to zero. This means that the social opportunity cost largely reflects the cost in financial market terms.

conveyance costs, the net benefit of both converged and mobile only CDB is greatly reduced or disappears entirely even before allowing for the possibility of cost-overruns. This dynamic is clearly evident at the 7 per cent discount rate used by Sagentia, but is further exacerbated when a more realistic 11 per cent rate is substituted.

25. Annex 2 provides a fuller discussion of the cost benefit analysis, including a summary of results based on various alternative modelling assumptions at both 7 and 11 per cent discount rates.

26. Vodafone is not claiming that its own desk-based extension of Sagentia's preliminary analysis is the last word on the subject. In particular, it is clear that considerable uncertainty currently attaches to the underlying cost estimates, and this is likely to remain the case until such time as further necessary scoping and specification work has been undertaken. Nevertheless, Vodafone's analysis strongly suggests that the analysis Ofcom has published to date does not provide a robust or reliable basis upon which to proceed as it stands. We therefore recommend further detailed analysis is conducted and consulted on prior to any irrevocable policy decisions.

'Failing network' concern/donor independence objective

27. Although Ofcom's case for mobile and converged CDB solutions appears to be based largely on the findings of Sagentia's cost benefit analysis, Ofcom also seems to place some weight on a presumed 'additional benefit' insofar as CDB solutions may contribute to independence of donor networks[17]. This is presented as an added bonus, because it solves the problems Ofcom associates with onward routing in circumstances where a donor network 'fails' and is no longer around to re-route calls.

28. Vodafone does not find this analysis entirely convincing. If Ofcom were right in assuming a clear cut and substantial benefit without reference to donor independence, the strength of the failing network argument might not make much difference as it only reinforces a decision already determined on other grounds. However, since the basic cost-benefit analysis is far from conclusive, it is worth examining how much force the failing network concern should have in its own right.

29. Although not part of Sagentia's analysis, Ofcom attempts to quantify the potential value of donor independence by reference to the costs to consumers adversely affected by service interruption and need to change their number and the likely frequency and scale of potential network failure[18]. While necessarily somewhat speculative, Ofcom's analysis suggests the overall risks and consequent expected benefits of donor independence are relatively small and not, on their own, sufficient to sway a decision either way. This is consistent with Ofcom's previous conclusion when it evaluated the case for a CDB solution in the context

[17] Ofcom describes protecting consumers against network failure as one of its 'key objectives' – see e.g. the Summary at 1.4 of Ofcom's consultation document.
[18] See discussion at paragraphs 3.24 to 3.26 of the consultation document.

of fixed TDM networks, and Vodafone agrees that it would be wrong to regard donor independence as some sort of 'trump card' to be applied whatever the underlying cost-benefit analysis suggests.

30. It is surprising, therefore, that Ofcom nevertheless seeks to elevate donor independence into a primary objective in its own right. In the light of Ofcom's own analysis, this seems wrong in principle, and liable to distort Ofcom's outlook on the relative merits of a central database approach compared to other number portability solutions ✂[……]✂. To the extent Ofcom remains concerned about failing networks, it might also usefully consider whether those concerns could be addressed more proportionately and cost-effectively by other means[19].

31. It is important to note that although CDB solutions may have the potential to reduce dependence on donor networks, they do not entirely eliminate it. The most obvious example is the case of SMS and other messaging, which continues to rely on a signalling response from the donor network. Sagentia notes this caveat, and the fact that there are no extant standards for mobile messaging with ported numbers that achieve donor independence[20], though Ofcom does not explicitly acknowledge the point or its significance. Although number portability is a more limited concept than service portability, in practice number portability that only works for voice calls may be of limited benefit to customers who have become used to SMS and related messaging functionality.

32. It is, therefore, important to ensure that whatever decisions are ultimately taken on number portability, they are based on transparent and soundly based economic criteria, not skewed by a declared policy objective that is in itself questionable - and may not even be met.

'Mobile only' solutions

33. Since a sufficient and compelling case for a converged fixed and mobile ACQ/CDB has not yet been made (see comments on CBA framework above) the concept of a mobile only CDB as a stepping stone to the eventual converged solution is not compelling either[21]. Nor is Vodafone attracted by the idea of mobile as guinea pig or test bed for *two* mobile only implementations in quick succession, prior to a further move to a converged CDB.

34. The case for a mobile only solution ahead of any generalised converged solution must, therefore, stand or fall on its own merits. As noted previously, neither of the two alternative direct routing solutions suggested by Ofcom produces a materially positive net benefit using Sagentia's preferred conveyance cost

[19] Which, as Ofcom itself notes at paragraph 2.14, could include arrangements for an alternative operator to take over either the assets of the failed network or its number range.
[20] See, for example, Sagentia's comments at 3.10 *"To implement either Direct Routing or donor network independence all world-wide service centres (SMSC, MMSC) would need access to the CDB. This would be a major change to systems worldwide and is not dealt with by present standards."*
[21] As noted above, a mobile only CDB that is not based on NGN architecture may not be much of a stepping stone anyway.

estimates, even before allowing for the possibility of declining conveyance costs, conservative implementation cost estimates and a higher discount rate.

35. It should also be noted that mobile only solutions (whether CDB or HLR look up) do nothing to address fixed to mobile and mobile to fixed tromboning[22]. Therefore, even if trombone avoidance became important for reasons other than conveyance cost (e.g. voice call quality) a mobile only solution does not solve the problem. Fixed to mobile tromboning can only be avoided if mobiles can route direct to recipient fixed operators (requiring access to routing information) while fixed to mobile trombone avoidance additionally requires network intelligence that Ofcom assumes will only arrive with NGNs[23].

36. None of these observations need preclude migration to a direct routing solution for mobile without any regulatory intervention if the private benefits to MNOs suggest this is worthwhile in its own right. ✂[……..] .✂ However, MNOs should not be forced to migrate to a CDB solution which offers few if any benefits over other direct routing solutions ahead of any generalised converged ACQ/CDB solution – on which the jury is still out.

Rationale for mobile only/mobile first approach

37. Ofcom's underlying rationale for proposing a mobile only CDB solution prior to any wider converged CDB solution seems to presuppose that a CDB solution is the right answer, and that mobile networks should lead the way because unlike fixed TDM networks they already have the intelligence to make routing decisions that are not solely based on the destination number range. However, this analysis depends critically on the cost benefit analysis which, for reasons discussed in more detail above, Vodafone does not believe is reliable as it stands.

38. Although mainly predicated on its converged CDB end-game, Ofcom also hints that a new mobile only solution may be desirable in its own right because it would facilitate a change in the current commercial arrangements between mobile operators[24]. It is, of course, open to Ofcom to review the merits of the current commercial settlement model between MNOs. However, it is important to recognise that billing and settlement arrangements between MNOs are distinct from the underlying call routing solution, and that purely intra-mobile financial transfers have no direct bearing on other stakeholders or on overall economic welfare[25].

39. Transparency requires Ofcom to be specific about the policy objective it is trying to pursue, so if changed commercial arrangements between MNOs is an objective in its own right, it is important to understand the rationale for such a change so that it can be properly considered on its own merits.

[22] i.e. additional call conveyance caused by onward routing through donor networks
[23] It is the lack of network intelligence within current fixed TDM networks that is largely responsible for the prohibitive costs of a CDB solution in Sagentia's scenarios F1-3.
[24] This seems to be the inference behind Ofcom's comments at paragraph 3.41 and 3.42 read in combination.
[25] Ofcom correctly notes at 3.18 that customer charges are not affected by current inter-operator settlement arrangements.

40. Vodafone notes that the current commercial model for intra-MNO settlement was specifically mandated by Oftel following earlier consideration of number portability charging principles by the Monopolies and Mergers Commission (MMC)[26]. Oftel's view at the time was that the inherited termination rate regime was important for policy reasons, including pricing transparency to end users and originating operators given marked asymmetry in 900MHz operator compared to 1800MHz operator rates. A further underlying principle was that the additional costs imposed by number portability should not be borne by originating operators but shared equally between donor and recipient network. These principles became embedded in the resulting commercial settlement regime for mobile to mobile and fixed to mobile calls, which is still substantially in place ✂[……..]✂.

41. While it is open to Ofcom to revisit these charging principles, Ofcom has not sufficiently explained the rationale for any proposed change in the consultation document. ✂[…….]✂

42. Vodafone notes that if mobile operators were to move to a different settlement regime based on the recipient's termination rate rather than the inherited donor rate, it is likely that this would have to co-exist with the current inherited rate regime for fixed to mobile traffic. This assumes that fixed to mobile traffic continues to use onward routing, oblivious to whether the number range holder is the terminating network or not (which follows from Ofcom's analysis that fixed operators unlikely to be capable of performing ACQ routing inquiries prior to NGN deployment).

43. While it may be possible in theory for fixed operators to pay the recipient's mobile termination rate even under onward routing, apart from the billing development needed the public policy objection to this in the past has been about price transparency and the risk of margin squeeze. If originating operators and end-user customers have no reliable way of knowing which mobile network they are calling and originating fixed operators have no practical means of differentiating retail charges except by number range, end-users may face unpredictable price swings for no apparent reason. Alternatively, if originating fixed operators are not able to alter retail prices in real time, they may suffer windfall losses if retail rates reflect lower 900MHz operator rates but termination costs are at higher 1800MHz or H3G rates.

44. There are two main aspects to the current commercial regime for settlement between mobile operators: the inherited termination rate and the sharing of conveyance costs between donor and recipient through the DCC. In absolute terms, the impact of differences in termination rates between MNOs far outweighs that of the DCC[27].

[26] For details, see the explanatory memorandum accompanying Oftel's determinations setting the DCC at 0.8ppm

[27] Although Ofcom discusses both aspects of current settlement arrangements in passing at 3.17 and 3.18, it is surprising that Ofcom should focus on supposed over or under-recovery of net conveyance costs through the DCC without acknowledging that any such DCC effect is smaller than that due to the differences in underlying termination rates.

45. Sagentia suggests that current commercial arrangements mean originating operators have little incentive to agitate for change from onward routing because they do not currently bear the additional costs directly. There may be some truth in this, although as noted, it was Oftel that mandated this commercial model as the corollary of onward routing. For mobile operators, however, it is not the case that the existence of the DCC undermines incentives on donor and recipient networks to economise on conveyance costs. On the contrary, there is an economic incentive to economise on conveyance costs irrespective of the precise value of the DCC at any point in time.

46. One obvious example of this is the development of the on net call trap capability. ✂[.....]✂ There are further potential economies in prospect even if onward routing remains in place as NGNs reduce conveyance costs generally.

47. Providing the benefit of reducing conveyance costs associated with onward routing exceeds the costs of alternative measures necessary to achieve it there should be mutual advantage to MNOs in moving to direct routing without regulatory intervention, and Vodafone has led the standards work to facilitate the option of moving to direct routing via HLR look-up. However, the critical proviso is that the benefits should outweigh the costs. As discussed more fully above in relation to cost benefit analysis, it is by no means clear that this is the case at present.

48. The bigger issue, compared to the DCC, is current asymmetry in termination rates between mobile operators. For reasons outlined more fully elsewhere[28], Vodafone continues to believe that the current asymmetry is not justified but welcomes the prospect of greater symmetry over the period of next mobile termination charge control. As noted, the absolute differences in termination rates between mobile operators far exceed the extra conveyance costs associated with onward routing, whether measured by the value of the DCC determined by Oftel in 1999 or Sagentia's much lower current estimate of conveyance costs.

49. It is clear, therefore, that reducing asymmetry makes the difference between an inherited rate and an own rate model far less acute. To the extent that Ofcom has concerns about the current commercial settlement arrangements, its priority should be to reduce the current asymmetry in termination rates rather than mandate a series of different technical implementations of number portability.

Mobile port lead times

50. Vodafone agrees that the question of the elapsed time between PAC activation and the port itself is largely independent of the underlying call routing solution adopted. We strongly disagree, however, that Ofcom has made a case for mandating shorter mobile port lead times within the current process.

51. Vodafone has a stake in the operation of mobile number porting as both donor and recipient so it is critical to Vodafone and its customers that the porting

[28] Notably in successive Vodafone responses to mobile call termination market reviews

process works reliably. We are concerned that Ofcom's proposals are ill thought through and that compressing port lead times arbitrarily risks fatally undermining the current process with an overwhelmingly adverse impact on customers.

52. It is not clear why Ofcom should seek to downplay and disregard its own consumer survey evidence, but it would do well to take greater heed of the clear messages it contains[29]. The evidence Ofcom presents shows that consumers perceive the current system as working well and not a significant barrier to switching or porting[30]. There can be no serious suggestion that the porting process creates a material barrier to switching or the operation of effective competition in the mobile market in the UK[31]. Nor does Ofcom actually make a case that there is any clear correlation between port lead times and the observed level of switching internationally.

53. Although Ofcom posits a link between port lead times and propensity to switch, it would be very surprising if a single explanatory variable such as port lead times explained all variation in observed levels of switching and churn. Vodafone notes, for example, from Ofcom's Figure 1 at Annex 7 that Italy and Spain display broadly comparable propensity to port, despite considerable difference in the 'target maximum porting period'[32], but that the two countries also exhibit significantly different levels of churn[33]. It is also interesting to note that Germany,

[29] According to the findings presented at Annex 8, eight in ten of those who have ported their number were satisfied with the time the process took, and only one in ten was dissatisfied. Ofcom notes that perceptions of time taken to port, among those with recent experience of porting and those without, were often of a day or two. Since it is perceptions that drive behaviour, the accuracy of the perception is less important than the fact that it is positive. Of those who have not ported, only a tiny minority cite port lead times as an off-putting factor. A8.7 puts the proportion at 3%, but on closer inspection A8.17 reveals that the 3% figure relates to not wanting to change number (implying not that they perceive porting as taking too long, but that they don't understand that the facility to port exists). In fact, as noted earlier, it is just 3 out of 1,167 users who answered the question that spontaneously mentioned 'time taken to transfer their number to a new network' as a reason for not switching provider.

[30] Ofcom's characterisation of its own research findings at paragraphs 4.10 to 4.14 of the main consultation document seems somewhat strained and at variance with the raw data, e.g. statements such as 'consumers might think that the porting period is too slow', and 'the research does not indicate that port lead times are not a barrier to switching, given that most often consumers are content with their current service and see no reason to switch'. Ofcom also declares that its current research 'may not be conclusive' and that it intends 'to conduct qualitative research to further understand consumers' views'. This smacks of turning a blind eye to the quantitative data already available.

[31] Strangely, Ofcom makes no reference to the findings of other extensive consumer research published by it on the same day as the consultation document, in particular *"Consumer Experience Research Annex 4 – Consumer Decision-Making in the Telecoms Market – Report on research findings"* , Section 5 of which is devoted to analysing consumer behaviour in the mobile market. This research reveals, among other things, that 36% of consumers have changed supplier within the last four years, rising to 52% for those on contract tariffs. Regardless of whether or not they had switched network operator in the last four years, 32% had made some change to their existing service with their current supplier.

[32] See table at page 80 of Ofcom's consultation document – no comparable data is presented for 'time to switch to new operator'.

[33] Vodafone's most recent interim results report 21.7% churn in Italy and 37.0% churn for Spain for the quarter to 30 September 2006. This is a similar picture to the monthly churn for all operators reported by Merrill Lynch in its Global Wireless Matrix, which records 1.5% monthly churn for Italy, against 2.2% for Spain for Q306.

which has among the longest overall porting periods of the countries surveyed[34], exhibits levels of churn higher than Italy[35] despite the apparent low propensity to port[36].

54. Against this background, it is difficult to understand the motivation for Ofcom's present proposals. Ofcom suggests that 'excessive' port lead times could deter switching, without actually stating that current port lead times are excessive (which would be a difficult accusation to make stick given the clear indications to the contrary in from its own consumer survey evidence and observed levels of churn). Current port lead times are not 'excessive' by any objective standard; they compare favourably with other migration processes[37] and are clearly perceived positively by customers who have experience of them. Nor does the evidence support the theory that those who do not have personal experience of porting are daunted or deterred by the time they think the process will take.

55. It would be bad enough if Ofcom's proposals simply added cost to the porting process without commensurate customer benefit in return. Having considered the practical implications of Ofcom's proposals, Vodafone is concerned that Ofcom's proposals are potentially more damaging than that. The rigid maximum porting lead times Ofcom proposes threaten to limit customer choice, and put the reliability of the present porting process at risk.

56. Ofcom's apparent fixation on elapsed time between the activation of a PAC and the port itself neglects other crucial aspects of the current process which are intended to ensure a smooth and trouble free customer experience. The current process provides certainty as to the port date, and flexibility to alter default port date for customers' convenience[38]. It also puts the customer in the driving seat, sidestepping the sort of mis-selling issues that have beset fixed line migrations while simultaneously maximising customers' freedom to shop around and take advantage of better offers right up until the final 'lock down'[39]. These are significant customer benefits that would be at risk under either of Ofcom's proposals for a maximum of 24 hours or 3 working days[40].

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[34] 31 days (standard contract termination period) according to Ofcom's table on page 80.

[35] 1.8% monthly churn in Germany as against 1.5% in Italy according to the Merrill Lynch survey

[36] See Ofcom Annex 7, Figure 1

[37] Including fixed line and broadband migration processes which Ofcom has been considering separately, some of which are 'recipient led' and prone to abuse through 'slamming'. This has led to compensating safeguards such as the concept of 'non-marketing' letters, making for a cumbersome process which takes much longer in total than the current MNP process.

[38] See Mobile Number Portability Operator Steering Committee Porting Process Manual, Issue 1.15, February 2006 for details

[39] Such better offers could come from any other supplier, including the current supplier. This is perfectly legitimate within the current process and can also be pro-competitive, as Ofcom has acknowledged when commenting on 'save' activity in other contexts. See, for example, *Broadband migrations: enabling consumer choice, Consultation dated 17 August 2006* at paragraph 3.10.

[40] The separate research findings noted above published concurrently with the consultation illustrate the point. See, for example, 5.1.1: *"While consumers were far more likely to change the tariff or package they were on (31%) than ask they (sic) supplier to match a better deal they had seen elsewhere (8%), research shows that mobile phone users are becoming increasingly aware of their potential to negotiate. Those on contracts were generally more*

57. Ofcom's proposals also make no allowance for different treatment of bulk porting, or for the fact that a ported number is of no use unless other essential aspects of provisioning (such as shipping handsets and SIMs) are also in place. Requiring ports to take place to an arbitrary timescale that runs ahead of practical ability to use the ported number simply adds to the risk of service interruption – the very opposite of a customer benefit.

58. For all these reasons (and others set out more fully in response to Ofcom's specific questions) Ofcom should think again.

Next steps

59. We note that the current consultation includes a formal notification of proposed modification to General Condition 18, even though Ofcom acknowledges that a further statutory consultation is likely to be needed before putting any of its current proposals into effect[41].

60. By including a formal notification in this first round consultation Ofcom risks giving the impression, rightly or wrongly, that it is prejudging the outcome – which would clearly be quite wrong[42].

61. Whatever one thinks of Ofcom's proposals, it is undeniable that they raise issues that are complex, wide-ranging and engage the interests of a wide range of stakeholders. While Ofcom hints at pre-consultation with some key stakeholders[43], this has been very limited in practice if Vodafone's experience is anything to go by[44].

62. Mobile operators and their customers are clearly among those most immediately and directly affected by Ofcom's present proposals. Yet until publication of Ofcom's consultation document in November there have been few clues as to the nature and extent of the present consultation, let alone any concrete proposals to react to.

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active in this regard than those on pre-pay packages: 62% had changed their existing tariff/package and 16% had attempted to re-negotiate their package/deal."

[41] See consultation document at paragraph 2.22 *"Ofcom is likely to need further evidence from stakeholders before concluding on the issues and amending General Condition 18. Therefore, there may need to be a short supplemental consultation early next year where Ofcom sets out its final proposals in the light of all the evidence it has received."*

[42] The mere appearance of having pre-judged a consultation outcome can be enough to vitiate any decision based on it.

[43] See paragraph 2.22

[44] Vodafone regards the 'pre-consultation' as unsatisfactory in several respects. A detailed questionnaire prepared by Sagentia proved to be of limited value because it was submitted to Vodafone a matter of hours before the interview, with no advance information about any 'straw man' solutions to consider. The focus of discussion during the interview was on the more distant NGN ACQ/CDB proposal, in contrast to Ofcom's present proposals which are almost entirely 'mobile only' in the short term.

63. It is regrettable that the ten weeks Ofcom has allowed for the present consultation straddled the Christmas and New Year period, curtailing the effective time available to stakeholders in which to digest and analyse the impact of Ofcom's' current proposals and formulate their responses. Vodafone has sought to provide as full a response as is reasonably practicable in the time available, but reserves the right to comment further in subsequent rounds of consultation – which are clearly needed before Ofcom makes any formal changes to the General Conditions.

64. Vodafone remains to be convinced that any changes to the rubric of General Condition 18 are necessary at the present time and we emphatically reject the proposed changes contained in Ofcom's current notification. We note that it is less than a year since Ofcom last modified General Condition 18 to address the need for technological neutrality[45]. Ofcom's present proposals seem to run directly counter to the thrust of its previous, but still very recent, reforms. Instead of pursuing a technologically neutral approach within a general framework applicable to all communications providers, Ofcom is proposing highly prescriptive intervention targeted almost entirely at mobile operators.

65. Even if Vodafone were persuaded that Ofcom had made a sufficient case for the thrust of its policy proposals (which we are not) we would seriously question whether drafting changes to GC18 of the kind Ofcom proposes is the appropriate next step. It is not necessary to legislate at this stage for proposals that would only come to fruition several years hence[46]. The priority at this stage should be to consider the responses to the present consultation with an open mind and move from there to seek to broker consensus on the appropriate way forward. If the cost-benefit analysis is transparent and compelling, this can only facilitate agreement on how to proceed. If, by contrast, the cost-benefit case is seriously open to question – as Vodafone believes it is currently - Ofcom needs to ask itself why that should be so.

66. Since Vodafone regards Ofcom's notification as both premature and misconceived we are not inclined to offer extensive drafting comments at this stage, though we reserve the right to do so later if appropriate. We would point out, however, that Ofcom's current proposals may have effects quite different to those Ofcom intends.

67. It seems that Ofcom has tried to codify its preference for shorter porting lead times by reference to the timeliness of establishing portability. This conflates two quite distinct concepts. From the commentary in the consultation document, it appears that Ofcom is concerned with the time between PAC activation and porting for a particular number or numbers once 'portability' has been established between a donor and a recipient provider. Historically, however, 'portability' within the context of GC 18 has been concerned with the time taken to establish the *capability* to achieve such porting in the first place, sometimes known as service establishment. Ofcom might seek to argue that the current rubric

[45] See Ofcom Statement entitled *Number Portability and Technology Neutrality*, March 2006

[46] Ofcom's very near term proposals to compress mobile port lead times within six months are ill-conceived, and should not be pursued through the proposed drafting changes to General Condition 18 in any event for reasons outlined more fully below.

encompasses both concepts[47]. However, even if that is correct it appears that the effect of the revised GC18 would be to require all communications providers to establish mobile portability within 24 hours or 3 days as the case may be[48]. This cannot be the intention.

68. Taken together with other substantive errors contained in the original version of Ofcom's consultation document (notably the proposed deletion of the definition of Publicly Available Telephone Service from GC 18) this suggests the need for fuller consideration before rushing to publish formal legislative proposals of this kind. We urge Ofcom to reflect thoroughly on the entirety of this response before proposing any legislative changes to the current framework for number portability.

Vodafone
January 2007

[47] ✂[……..]✂
[48] ✂[……...]✂

Annex 1

Answers to consultation questions:

Question 1: Do you agree that an ACQ/CDB solution is required to achieve independence of Donor Networks?

No. The question presupposes a requirement for complete donor independence, but there is a prior question as to whether this is an appropriate policy objective.

Ofcom explains the rationale for donor independence by reference to its 'failing network' concern. However, this cannot be a trump card on its own. Any solution to address this concern must be proportionate to the risk, which Ofcom's analysis suggests is small. It would also be appropriate to consider other means to address any concerns in respect of failing networks, short of complete overhaul of number portability.

✂[[49]…….]✂

Even if complete donor independence were accepted as a valid objective, there is a question as to how far an ACQ/CDB solution achieves it. It is clear that ACQ/CDB is not completely independent of donor networks, since it requires all networks to ensure that the CDB is accurate and to maintain their local copies. Donor independence will not be achieved in relation to call routing if the ACQ/CDB solution requires a fall back to onward routing as a failsafe. In the case of SMS messaging there is no extant standard that allows portability without requiring a signalling response of the donor network, so donor independence is not achieved.

Question 2: Do you agree that an ACQ/CDB solution common to both fixed and mobile networks is the preferred solution?

Not necessarily. For reasons set out more fully in the body of this response, Vodafone is not convinced that Ofcom's preliminary analysis provides a robust or reliable basis for a major decision of this kind.

On close inspection, the bulk of the benefits contributing to the positive NPV advanced by Ofcom stem from savings in mobile conveyance costs. However, Ofcom's consultants clearly have reservations about using the current value of the DCC as a proxy, suggesting a much lower number better reflects current costs. Using this lower number with other input assumptions unchanged, the consultants own sensitivity analysis shows that the mobile only CDB proposal is barely cost neutral. Since expected savings in mobile conveyance costs also contribute a large proportion of the expected net benefit for the converged CDB, it follows that the overall NPV for the converged solution also deteriorates substantially.

[49] ✂[…….]✂
[50] ✂[……..]✂

There is a further question as to whether it is realistic to assume current costs will not decline further over time (Vodafone submits that it is not) in relation to both fixed and mobile conveyance costs, particularly in the context of NGN deployment.

With modified conveyance cost assumptions, the NPV for any CDB solution is at best marginal, even before allowing for the possibility that the implementation costs turn out to be conservative[51].

Additionally, Vodafone submits that the NPV estimates Ofcom presents are artificially inflated by the use of an inappropriately low 7 per cent discount rate.

From a network architecture perspective, IP networks are by their very nature distributed in how they operate at almost all levels of routing. This provides a great deal of flexibility and resilience at the network level for traffic delivery, alternate routing and link failures. The idea of forcing the UK to adopt a centralised routing database that would sit at the heart of this is in some respects counter-intuitive.

While the subject of new potential number portability solutions in the context of NGNs merits further study, Vodafone is concerned that pre-judging the outcome without a detailed review of the substantial technology and business impacts is not the right way to go about this, particularly as large scale deployment of IP interconnects between carrier class networks is only just beginning and consequently how this may impact on network design remains subject to considerable uncertainty.

It should also be noted that a good deal of NGN design and deployment is already committed based on the current onward routing paradigm, so it is not the case that NGNs inevitably demand a CDB solution or that mandating future use of a CDB avoids the costs of building the facility for onward routing into early NGN deployments. Fundamentally, number portability requires the ability to identify the recipient network, whether via a donor network or directly. Although one possible option, it does not necessarily require originating networks to provide complete routing information for use within the recipient network.

Question 3: Do you agree that any transition to ACQ/CDB should occur in the context of migration of fixed networks to NGN architectures?

Vodafone agrees that the cost/benefit analysis tends to confirm the previous conclusion based on the Mason study that a mandated transition to a CDB for TDM networks is not cost justified.

However, while NGN architectures may reduce some implementation costs for fixed networks, it is not yet clear that Ofcom's expectation of a clear cut positive NPV is robust. On alternative (plausible and, we believe, more realistic) input assumptions, NPV is marginal or negative.

[51] Cf. Ovum retrospective assessment of its own CBA, cited above

Question 4: Do you agree that it would be beneficial to require the mobile industry to complete its transition to an ACQ/CDB solution by September 2009?

No. It is not clear that there is any case for a mobile only move ahead of any combined fixed and mobile CDB.

As noted, a mobile CDB does not achieve donor independence because of SMS.

The case for a mobile only CDB therefore hinges on the presumed benefits of direct routing. Ofcom's consultants own sensitivity analysis suggests that on alternative assumptions about mobile conveyance costs, a move to direct routing is barely cost neutral. If one additionally assumes a downward trend in conveyance costs over time and/or higher implementation costs NPV turns negative. The CBA case for a move to direct routing is not made.

Even if a case for direct routing could, hypothetically, be made on some other grounds (e.g. if trombone avoidance became critical to voice call quality) a mobile CDB is not the only way direct routing could be achieved. ✂[……]✂

MNP architecture has continually evolved over the last eight years as commercial pressures in various areas have highlighted the need to provide additional options to allow networks to reduce costs. This has happened without any particular drive or directive from the regulator, and there is no reason in principle to expect that this should necessarily change as industry moves fully (or more fully) into an NGN world.

Question 5: Ofcom would welcome respondents' analyses of the costs and benefits of a comprehensive transition of the mobile industry to direct routing using NICC Service Description 8 or other suitable standard within one year, ahead of a further transition to ACQ/CDB.

Either there is a case for a mobile only direct routing solution or there is not. If, as Vodafone's analysis strongly suggests, there is not an overwhelming case currently, then the issue of an interim non CDB solution followed by a subsequent CDB solution does not arise.

As noted above, even if a case for direct routing were made, the rational approach would be to consider from among the available alternative solutions, which stands to deliver the most cost-effective solution. It seems highly unlikely this would result in the implementation of two altogether different systems in quick succession.

We note that Ofcom suggests the NPV of either mobile only direct routing solution would be identical. While the modelling assumptions underlying this result are not entirely clear, the result itself seems implausible and therefore suspect. Intuitively, the presumed benefits in both cases would arise from the same reduced conveyance costs, but the initial set up and on-going implementation costs are unlikely to be the same except by pure coincidence or fluke.

Even if the set up costs were broadly similar (and it is not clear why this should necessarily be the case) we would expect the CDB solution to have higher on-going costs due to the need to upload and download data to and from the CDB. These costs are likely to depend in part not only on the quantity of data but also on the frequency with which data is exchanged[52].

Question 6: Ofcom welcomes views from stakeholders as to the appropriate approach to be adopted in achieving implementation of ACQ/CDB while ensuring that such co-operation is limited to technical matters directly related to the ACQ/CDB solution.

Clearly there is a non-trivial co-ordination problem associated with any ACQ/CDB solution. The issue would arise even if discussion of a mobile only CDB were confined to established mobile network operators, but the degree of complexity is compounded if a 'mobile only' solution is intended to become a template for the eventual converged CDB. In the latter case, all fixed and mobile communications providers potentially become stakeholders in design, scope and specification decisions. The large number of potential stakeholders and the diversity of their outlooks are likely to make rapid consensus difficult to achieve. Ofcom's indicative timelines look unrealistic in this regard.

In addition to this issue of practicality, there is also an issue of propriety i.e. what it is and is not proper for actual and potential competitors to discuss. The wording of this question seems to suggest that technical matters can be discussed in isolation from commercial issues such as funding and governance arrangements and settlement model. However, even if narrowly technical issues are ring-fenced from wider commercial issues, those commercial issues still need to be discussed. Some of this discussion (e.g. around governance and funding for any CDB) will necessarily be multilateral, even if some aspects of commercial settlement arrangements could in principle be negotiated on a bilateral basis.

While such issues may not be insuperable, they cannot simply be assumed away. In Vodafone's view, the case for an ACQ/CDB is not yet made, either for fixed and mobile or mobile only, so in one sense the question is premature. However, this is clearly an issue that would need to be thought through more fully before a firm decision to mandate an ACQ/CDB were made. It would be necessary to understand in broad terms what decisions remain to be made by industry itself, and what decisions Ofcom has already mandated in order to address the question in more detail.

Question 7: Do you have any comments on the transition milestones and their corresponding dates? Could the dates be achieved earlier? Alternatively, could any of the dates be at known significant risk of being missed?

[52] Very aggressive (e.g. sub-24 hour) port lead times might conflict with a cost-effective upload/download cycle (which would otherwise tend to be scheduled at times of low network utilisation) though the extent of this effect is difficult to calibrate at present in the absence of any technical specification for a mobile CDB solution.

For all the reasons outlined above, Vodafone does not consider that a compelling economic case has yet been made for any of Ofcom's core proposals, so setting a firm timetable is at best premature (and should not be hard-coded into General Condition 18).

Ofcom must be careful not to pre-judge the present consultation by assuming that its core proposals for a converged CDB preceded by a mobile only transition are justified on cost-benefit grounds. We note from Sagentia's report that Ofcom instructed its consultants to canvass views on a straw-man timetable in advance of the results of the cost-benefit analysis[53]. As a purely hypothetical exercise, this might be reasonable, but Ofcom must maintain an open mind and not decide on the answer it finds most attractive before completing the necessary analysis.

Even if the case for Ofcom's proposals were accepted, the straw man timetable Ofcom has put forward looks questionable. According to the consultation document, Ofcom does not expect to publish conclusions from the present consultation before the spring[54]. The idea that standards and specifications for new CDB solutions can be agreed industry-wide within a matter of months[55] is not realistic.

Even if there were a broad consensus behind Ofcom's proposals in principle (which remains to be seen) the detail would require time to work through. It is hard to estimate precisely how long this might take while the eventual form and shape of proposals is unclear. However, the potentially large number of stakeholders, together with the diversity of their interests will tend to complicate and elongate matters.

On Ofcom's current proposals, much of the short term focus is on mobile only solutions. Whether these can be devised and agreed in a mobile only forum, however, depends critically on whether they are really 'stand alone' proposals or whether – as Ofcom suggests – the first step towards an eventual industry wide solution[56]. By the same token, in the event that a decision is made to pursue a converged CDB at some point (with or without a prior mobile only solution) it is clear that mobile operators would need to be closely involved in its development, which they have not been to date.

Question 8: Do you agree that Ofcom should require port lead times to be reduced to less than one working day? If you do not agree, please provide evidence that shows otherwise.

No. See Q9 below which addresses both one day three day proposals.

Question 9: Alternatively, do you agree that Ofcom should require port lead times to be reduced to three working days?

[53] See 2.4 of the Sagentia report
[54] See 'Next Steps' at A1.12 of the consultation document
[55] See draft timetable at 1.10, the first two items of which envisage a) 'Stable standards agreed by NICC – June 2007' and b) 'Governance arrangements for the database agreed by industry – July 2007'
[56] As noted above, a purely TDM implementation of a mobile CDB solution would not necessarily be compatible with any eventual NGN-based CDB solution

Vodafone does not agree that Ofcom should require (mobile) porting lead times to be reduced to less than one working day or to three working days.

Ofcom appears to take it as axiomatic that reduced porting lead times is 'a good thing' and further assumes that 'shorter is better'. Neither of these propositions is self-evidently true, however.

Ofcom has not made a compelling case for either proposal, and without such a case should not mandate any change to current arrangements.

Vodafone has an interest both as a donor and a recipient, and in both cases is concerned with the practical impact on the customer experience. We are particularly concerned that shortening lead times threatens to add cost and increase the risk of error without a corresponding benefit to customers sufficient to make such extra costs and risks worthwhile.

Vodafone accepts that very long lead times could be inconvenient or off-putting for customers, but does not accept that Ofcom's apparent contention that current port lead times are 'excessive' by any objective standard. Mobile port lead times compare favourably with other migration processes which Ofcom is not addressing as part of the present consultation. Ofcom's own consumer survey evidence shows that consumers' perceptions of the current process are largely favourable and that consumers are not significantly deterred from switching or porting. Against this background, the nature and extent of any consumer benefit Ofcom might wish for from cutting port lead times is wholly unclear.

In Vodafone's view, Ofcom's proposals place insufficient weight on key customer benefits that are embedded within the current process but which would be lost or put at risk if port lead times were arbitrarily curtailed. In particular, the current process puts the customer firmly in the driving seat, maximising ability to shop around and take advantage of better offers right up until the last moment. They also provide certainty over the port date and flexibility to change this so that porting takes place at a time convenient for the customer and that coincides with their ability to actually use the ported number with their new service. Requiring porting to take place ahead of the customer's practical ability to take advantage of it is of no benefit whatsoever and merely increases the likelihood of highly inconvenient discontinuity of service when switching between providers.

Question 10: What is a reasonable timeframe for the implementation of a one working day process?

See Q9 above. Vodafone does not accept that a one working day process is a sensible policy objective in the context of the current MNP process as a whole. This view is based less on technical difficulty of cutting over from one operator to another at a network level than on concern for the resulting customer experience, which a longer implementation timescale would only defer, not eliminate. See also answer to Q11 below.

Question 11: Do you consider that a three working days port lead time process could be introduced within 6 months?

No, not responsibly. While less severe than a one day lead time, the impact of moving to a mandatory three working day maximum across the board could still be substantial.

Ofcom does not distinguish in its proposals between the standard 5 working day/7 calendar day SLA for individual ports and the different bulk process for accounts with 25 connections or more, where the equivalent SLA is 10 working days/14 calendar days. Particularly at the larger end, migration from one provider to another typically involves swapping out a large number of devices. This often takes significantly longer than 10 working days and consequently port dates tend to be set a long way out by mutual agreement. We see no case for removing this operational flexibility through a rigid three day maximum, irrespective of what the customer wants or what the recipient provider can practically provision.

Even at the smaller end, the standard process currently breaks down into a 72 hour 'customer choice' period during which time the customer can change their mind and cancel the PAC and port request, followed by a 42 hour 'lock down' period before the release date after which time the customer cannot change their mind and the port cannot be reversed.

Ofcom has not explicitly indicated whether it envisages that time would be lost from the customer choice period or the lock down period, or both.

If taken from the customer choice period, this clearly truncates the customer's ability to change their mind and/or benefit from better offers. This would represent a diminution of customer choice rather than a customer benefit.

If, on the other hand, time is taken from the lock down period, there would be an increased risk of failure and consequent customer experience issues if for any reason either the donor network or the recipient network experienced a network outage. The 48 hour lock-down window was agreed to allow adequate safety margin with this issue specifically in mind, as any issues can typically be resolved within 48 hours.

The precise impact and consequent cost to attempt to mitigate would clearly depend on where the cut off was set and the balance between eroding customer choice and truncating the lock-down window. Either way, however, there would be increased cost and potential adverse customer impact for no clear benefit.

Taken together with Ofcom's own survey evidence suggesting customers perceive the current process positively and do not regard it as a barrier to porting or switching, we see no case for a change to the current porting process in the immediate future.

Annex 2

Vodafone's review of the cost-benefit analysis

Summary

Ofcom has used the cost benefit analysis developed by Sagentia to assist it in forming a view on the relative merits of alternative methods of routing traffic to ported customers. Its conclusion is that there is a good financial case for the scenario of an initial adoption of a mobile solution to eliminate mobile onward routing that is followed by a fixed solution to eliminate fixed onward routing that collectively produce a combined solution that eliminates all four onward routing flows. In Vodafone's view this conclusion is unwarranted.

Vodafone agrees with the use of cost benefit analyses to assist in decision making, but suggests that other conclusions are possible from the data on which Sagentia reports. Vodafone has conducted a desktop review of the cost benefit analysis contained in the consultation document. Given the time constraints and data uncertainties, no attempt has been made to suggest a single correct level for any particular parameter; rather the exercise has considered the underlying logic of the cost benefit analysis, and allowed for variations in the parameters in a more complex way than the study by Sagentia reports on.

This work suggests that some reasonable scenarios of the mobile only solution, the fixed only solution and the combined solution generate negative present values, giving reason to question the robustness of any inference from the results of the cost benefit analysis. Also it should be noted that although Ofcom expresses a preference for a phased combined solution, i.e. an initial mobile solution followed perhaps three years later by a fixed solution, this scenario is not included in the cost benefit analysis: all combined fixed and mobile scenarios modelled assume simultaneous deployment of the two elements.

Further, the uncertainty on the costs and the benefits of the NGN solution give cause to question the logic of initially embarking on a mobile only solution that is at best financially neutral in the hope that the future overlay of the fixed solution will generate an overall benefit.

There is an added associated risk that any initial mobile solution may not be capable of being future proofed and may hence require some reworking when the fixed solution becomes certain.

Outline of the cost benefit analysis

The cost benefit analysis seeks to obtain a NPV of 10 years' net inflows and outflows from 2007, obtained by matching:

- Incremental savings, which are costs of onward routing that are avoided by direct routing. These are modelled as a product of traffic volume estimates and a unit per minute rate that varies on whether the onward routing is via a fixed or a mobile operator.

- There is a maximum of four onward routing traffic flows that can be eliminated, depending upon the solution that is modelled:
  - Mobile to mobile (M2M)
  - Mobile to fixed (M2F)
  - Fixed to fixed (F2F)
  - Fixed to mobile (F2M)

- The costs of the solution that eliminates onward routing. The model considers three basic elements:
  - A mobile only solution
  - A fixed only solution in the current TDM environment
  - A fixed only solution in the future NGN environment

The mobile only and either of the fixed only solutions can be combined to arrive at an all operator (and hence all onward routing flows) solution, the cost of which is modelled as the simple sum of the two selections.

The basic structure of the analysis and many of the values for the costs and savings are taken from the April 2004 Mason study, *Costs and Implementation Issues of a Central Database Solution for Number Portability in the UK*, but as published, the 2006 cost benefit analysis considers fewer variations and sensitivities. The study identifies nine distinct scenarios, one to reproduce a Mason scenario from 2004, and the others all on a current basis, as per the table on page 63 of the study. It is worth reproducing this for the eight current scenarios:

Table 1: Sagentia scenarios, parameters and results

	Solution		OR flows avoided				OR unit cost		NPV
	Fixed	Mobile	F2F	F2M	M2M	M2F	Fixed	Mobile	£m
F2	TDM	-	Yes	-	-	-	Std	-	-214.9
F3	TDM	-	Yes	Yes	-	-	Std	-	-126.1
M1	-	Yes	-	-	Yes	-	-	High	189.0
M2	-	Yes	-	-	Yes	-	-	Low	8.0
M3	-	Yes	-	-	Yes	Yes	-	High	193.1
C1	TDM	Yes	Yes	Yes	Yes	Yes	Std	High	73.7
N1	NGN	Yes	Yes	-	-	-	Std	High	15.3
N2	NGN	Yes	Yes	Yes	Yes	Yes	Std	High	297.3

The standard onward routing cost for a fixed operator used is BT's APCC, at 0.0163p, and for mobile the high cost used is 0.8p, as per the current DCC, and the low is 0.1p, the latter described by Sagentia as a value that "*reflects costs more accurately*". All NPV calculations are done in the study at a discount rate of 7%.

With the help of this information, and the scenario results from Annex A of the study, it is simple to reproduce the flows and results on a spreadsheet – the N2 scenario is shown as an example below.

Table 2: Sample cost benefit working sheet

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	PV
Incremental savings: i.e volume times rate											
F2F	-	-	-	13.30	14.70	16.00	17.40	18.70	20.10	21.40	80.06
F2M	-	-	-	12.30	14.70	17.10	19.50	21.90	24.30	26.70	88.74
M2M	-	-	-	28.70	34.30	39.90	45.40	51.00	56.60	62.20	206.83
M2F	-	-	-	0.70	0.70	0.80	0.90	1.00	1.00	1.10	4.08
Total savings/costs avoided	-	-	-	55.00	64.40	73.80	83.20	92.60	102.00	111.40	379.71
Necessary outflows:											
Incremental capex	14.70	29.40	29.40	-	-	-	-	-	-	-	- 67.86
Incremental opex	-	0.50	1.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	- 14.10
											- 81.96
Net Cash flow	- 14.70	- 29.90	- 31.00	52.40	61.80	71.20	80.60	90.00	99.40	108.80	

Discount factor	7%	1.00	0.93	0.87	0.82	0.76	0.71	0.67	0.62	0.58	0.54
Present values		-14.70	-27.94	-27.08	42.77	47.15	50.76	53.71	56.05	57.85	59.18
Cum present values		-14.70	-42.64	-69.72	-26.95	20.20	70.97	124.67	180.72	238.57	297.75

NPV of gross benefit	379.71
NPA of incremental cost	-81.96
Net	297.75

The only difference from the Sagentia version (apart from rounding) is that Vodafone has calculated separate present values of the solution costs and the incremental savings, to allow a wider range of permutations to be easily generated and evaluated.

It is clear that any fixed only solution that uses TDM costs is strongly negative in NPV – since the TDM scenario is dismissed by Ofcom on ground of practicality as well as cost, TDM solutions form no part of the subsequent analysis in this document.

Several other observations can be immediately made from an analysis of the eight Sagentia scenarios:

- Although Sagentia state that 0.1p is a better measure of the mobile onward routing cost, it is only used in one of the scenarios – there is therefore no version of the combined fixed and mobile solution that explicitly shows this lower cost (although Ofcom refer in paragraph 3.59 to a sensitivity analysis using the lower value).

- Scenario F3 seems implausible in that it is described as "Fixed Originated, Fixed and Mobile Terminated" and thus claims savings from both the F2F flows and the F2M flows, but with no additional cost over scenario F2, which achieves elimination of the F2F flow only. In order for this scenario to function the fixed operators would require sight of not only fixed porting information but also all mobile porting data. The implication that mobile operators would be able to supply mobile porting information to the fixed operators, and that the fixed operators would configure their systems to perform the lookup on all mobile terminating calls as well as all fixed calls, without any additional cost to the industry seems wrong. Further the scenario assumes that mobile operators would reconfigure their systems so as to somehow make porting information available to the fixed operators without making any provision to share the information between themselves. This eventuality is a little far fetched – we question the logic of including it in the study.

- Similarly scenario M3 “Mobile Originated, Fixed and Mobile Terminated” apparently suggests that the fixed operators make porting information available to mobile operators to eliminate M2F onward routing, again with no additional cost over the situation where only the mobile operators use the mobile solution.

- Scenario C1 seems defective in that its operating costs unlike N1 and N2 are not the sum of the fixed and mobile solutions, but merely those of the fixed.

- Both of the combined scenarios, C1 and N2 assume fixed and mobile solutions are rolled out simultaneously – neither of them correspond to Ofcom’s expressed preference of an initial mobile solution followed after an interval of three years by a fixed solution.

In Vodafone’s view the scenarios and values developed by Sagentia are not the most appropriate for a consideration of the costs and benefits of introducing a mobile only, a fixed only or a combined central database to avoid the costs of onward routing. Alternative values of several of the parameters used in the analysis need to be considered, as does a scenario of phased mobile and fixed implementation.

Varying the input parameters

Cost of capital

It is not clear that the 7% value used by Sagentia is appropriate. The basis of the value does not seem to be explicitly discussed in the text of the study, but it seems obvious that it is expected that the operators would fund any investment in a central database, and that any savings would be in operator network and conveyance costs. It is hard to see why in these circumstances the appropriate cost of capital could be any other than the operators’ cost of capital – use of any other value could lead to operators making an invalid choice in balancing network investment vs. network costs, and thus leading to a sub-optimal return on capital.

In principle, Vodafone sees no valid case for a lower social rate of time preference in the present analysis. Insofar as there may be a theoretical economic rationale for a social rate lower than a fully commercial one, this generally relies on factors such as the presumed lower risk of public sector projects and government’s ability to borrow money more cheaply than the private sector, neither of which is likely to apply here. Unless Ofcom envisages that the CDB solutions proposed here would be publicly funded, which seems doubtful, Vodafone sees no case for employing a lower discount rate than in other comparable regulatory decisions.

A higher rate than 7% seems mandated. For the purposes of this exercise, Vodafone has adopted (without particular endorsement) as a proxy for the industry commercial rate, the cost of capital used by Ofcom in the September 2006 mobile termination market review document, i.e. 11%. (A higher value might be more appropriate.) In order to illustrate the sensitivity of other variables in the cost benefit analysis, outcomes are shown below at both 11% and 7%.

Cost of the solutions

Sagentia observes that the costs of the solutions, fixed and mobile, are uncertain estimates. The only version that appears to be generated in a detailed manner is that for the fixed TDM solution, which has however been dismissed from the evaluation. Under these circumstances it would seem reasonable to consider the sensitivity of these estimates to the overall results.

In 2004, Vodafone commissioned Ovum to undertake a wide-ranging comparative analysis of MNP implementation in six countries. This included a retrospective evaluation of experience in the UK (where Ovum had conducted the original cost benefit analysis for Oftel). In contrast to its initial estimate of £10 million for the Oftel cost benefit analysis, Ovum's retrospective estimate of actual implementation costs was around £25 million, with a further £1 million in subsequent upgrades to the porting process. For present purposes, the actual numbers are less important than the illustration of the margin for error – of around 150% in this case.

To cater for the probability that Sagentia's estimates are not correct it is worth considering a range of values. For simplicity the approach has been to halve or double Sagentia's numbers to give an indication of the range of possible solution costs. On a present value basis, the outflows of capex and opex in £m for the ten year period, using 11% cost of capital under a range of scenarios could be (taking "basic" to be the Sagentia cash outflows):

Table 3: Present values of a range of alternative solution costs at 11%, £m

PVs

Costs:	Basic	Up 25%	Up 50%	Up 100%	Down 25%	Down 50%
Mobile	15.96	19.95	23.94	31.92	11.97	7.98
Fixed NGN	60.78	75.98	91.17	121.56	45.59	30.39
Combined	76.74	95.93	115.11	153.48	57.56	38.37

The present values at Sagentia's cost of capital of 7% are not significantly different.

Table 4: Present values of a range of alternative solution costs at 7%, £m

Costs:	Basic	Up 25%	Up 50%	Up 100%	Down 25%	Down 50%
Mobile	17.53	21.91	26.29	35.06	13.14	8.76
Fixed	64.43	80.54	96.65	128.86	48.33	32.22
Combined	81.96	102.45	122.94	163.92	61.47	40.98

There is insufficient information to attach precise probabilities to any of these outcomes. It is not valid to say merely as a result of Vodafone's method of developing alternative estimates that the Sagentia estimate of costs is the core case. Probably all that can be said is that based on the very limited estimates available it is hoped that the present value of the build costs for the fixed NGN solution lies somewhere between £30m and £122m (providing the build starts in 2007). Given the paucity of knowledge a cost benefit analysis should examine whether these extremes give a consistently positive or consistently negative NPV in order to give some degree of comfort on the usefulness of the exercise to draw conclusions on the appropriateness of any particular solution.

An issue that suggests that the Sagentia estimate may be on the low side is that one category of cost would appear not to have been taken into account. The assumption that is made and modelled by Sagentia is that any combined fixed and mobile solution would be contemporaneous. However Ofcom are suggesting the scenario of an initial mobile only solution that is followed several years later by a subsequent NGN fixed solution. It seems unlikely that this will result in a combined solution that is the simple sum of the mobile and fixed solutions. Given the considerable uncertainty that exists in NGN architecture, and the presumption that whilst the mobile only solution would be circuit switched, the NGN solution is likely to be IP based, there is a strong probability that any mobile solution would not be able to be fully future proofed, and would require some degree of reworking to integrate in with the fixed solution. The extent of such reworking is impossible to ascertain, but it seems reasonable to expect that in order for the early mobile only solution to be cost justifiable any costs written off at that stage should be recovered not over the 10 year period envisaged in the study, but over a much shorter period, i.e. the period between the implementation of the mobile and fixed solutions. In addition any supplementary costs incurred in converting the mobile only CS solution into the combined IP solution should also be factored into any combined cost benefit analysis. Clearly any such costs are purely hypothetical at this stage, but provision should be made in the cost benefit analysis for the probability that they will exist.

Costs saved by direct routing – traffic volumes

The costs saved per year by direct routing are a product of a forecast unit cost per minute that varies by operator type and a set of forecast traffic volumes for the four traffic flows that can be rerouted.

The traffic volumes that have been used in the study can be deduced since the unit rates and the annual savings are known values. Whether these volumes are appropriate is not clear, since their provenance is not explored in the Sagentia document.

One matter that is exposed by Ofcom is that two of the mobile operators have implemented a function described as “Call Trap” that prevents onnet tromboning, i.e. mobile operator 1 sending calls to mobile operator 2 which are then ported back to mobile operator 1. (This can occur when a customer of mobile operator 2 has ported to mobile operator 1: it can be eliminated by an individual operator by filtering outbound calls to look for such customers.) It might be considered that if onnet tromboning were to be eliminated by all 5 mobile operators then the volume of M2M porting traffic could fall by say 25% - this would clearly have an identical impact on the cost savings. It is not clear however whether the volume of M2M traffic used in the study includes or excludes onnet tromboning i.e. whether or not the study is claiming a benefit that can be and is being eliminated by the actions of individual operators independently of any central porting database solution. For the purposes of prudence Vodafone does not attempt to adjust the M2M volumes in the study.

It is not clear to Vodafone whether an analogous position exists in the fixed domain. It is possible that the F2F traffic also includes an element of onnet porting that presumably cannot be eliminated cost effectively in the TDM world. Whether however the NGN architecture that is adopted will allow a fixed operator to eliminate its own

onnet tromboning traffic without the requirement for a central database solution and whether this will have a material impact on F2F volumes is not known to Vodafone: it does suggest however that the possibility exists for a downward adjustment to the savings in the cost benefit analysis.

Given the uncertainty on their origin, no variation to the volume assumptions used is made in this exercise: clearly however the level of savings is sensitive to whatever volumes are used.

Costs saved by direct routing - fixed

The unit cost used by Sagentia for fixed onward routing is BT's APCC which as noted on page 67 of the consultation "*has changed from 0.0267p/min in 2004 to a current cost of 0.0163p/min*". The cost benefit analysis then assumes that this cost will remain constant through to 2016, despite the 39% reduction that has been observed over 2 years (or approximately 20% per year). A constant cost over 10 years seems unlikely – it would be more reasonable to assume a gradual reduction of the unit rate in the future. Vodafone considers two alternative scenarios in addition to the flat rate, an annual reduction of 5%, and an annual reduction of 10%. These give the following results in terms of present values in £m at both 11% and 7% cost of capital for the fixed to fixed flow:

Table 5: present value £m of fixed to fixed costs of onward routing

	F2F	F2F
Savings:	at 11%	at 7%
Basic .0163	64.30	80.08
Basic down 5% pa	45.37	56.07
Basic down 10% pa	31.77	38.96

An assumption of a future rate reduction that is half that actually experienced over the last two years thus gives a halving of the present value of the saving from the Sagentia assumption.

A further factor to consider is whether the current value of 0.0163p is a valid starting point. It could be argued that there is a logical flaw in a cost benefit analysis that compares the solution costs assumed under NGN with the savings assumed under TDM. The question is whether the savings under TDM, either at current flat rates or on an annual extrapolated declining rate are an adequate surrogate for the future APCC equivalent costs that can be expected under NGN: an initial presumption must be that they are not, and that NGN cost savings might be viewed as being a step down from the existing TDM rates (although possibly not as steep a drop as for the estimate of the solution costs, where the PV of the NGN solution at £61m is only 22% of the TDM solution, £276m). For the purposes of this exercise, Vodafone has contemplated a step decline of 20% from TDM to NGN. This gives the following present values in £m:

Table 6: present value £m of fixed to fixed costs of onward routing, lower NGN rates

	F2F	F2F
Savings:	at 11%	at 7%
0.0130	51.44	64.05
0.0130 down 5% pa	36.30	44.86
0.0130 down 10% pa	25.41	31.17

Costs saved by direct routing – mobile

As already mentioned the Sagentia study makes use of two values, the DCC of 0.8p and a lower value of 0.1p. Sagentia's view is that the latter "*reflects costs more accurately*". Vodafone has not attempted in the context of this desktop study to form its own view, but merely questions why if Sagentia has formed this view, only one out of the five mobile scenarios used by Sagentia employs the lower value?

Similar considerations to those derived for the fixed rate might be thought to apply, in that if 0.8p was an appropriate value 6 years ago, but the best view of cost is now 0.1p, then some form of future cost decline might possibly be anticipated. In order to preserve a symmetrical relationship with the fixed costs alternative versions Vodafone suggests the following variations of present values be used for the purposes of this exercise:

Table 7: present value £m of mobile to mobile costs of onward routing, alternative unit cost scenarios

	M2M	M2M
Savings:	at 11%	at 7%
Basic .1	20.62	25.85
Basic down 5% pa	14.41	17.93
Basic down 10% pa	9.98	12.33

DCC to 0.8	164.97	206.83
DCC to 0.8 & down 5% pa	115.27	143.46
DCC to 0.8 & down 10% pa	79.87	98.64

These present values are linear in that a unit rate of 0.8p generates a result eight times the "basic" 0.1p. If it were determined that these volumes also contained onnet tromboning, the present values of the alternative scenarios would need to be discounted somewhat, by perhaps 25%.

Cost savings by direct routing – fixed and mobile combined

Combining these F2F and M2M present value permutations and adding the additional F2M and M2F onward routing flows that a combined solution could also

potentially eliminate gives the following set of results for the present values of the calculated savings:

Table 8: present values of all onward routing flows, at 11% cost of capital

Savings:	F2F	F2M	M2M	M2F	Total
Basic .0163 & .1	64.30	8.85	20.62	3.27	97.04
Basic all down 5% pa	45.37	6.18	14.41	2.31	68.27
Basic all down 10% pa	31.77	4.28	9.98	1.62	47.65
DCC to 0.8	64.30	70.78	164.97	3.27	303.32
DCC to 0.8 & rates down 5% pa	45.37	49.45	115.27	2.31	212.40
DCC to 0.8 & rates down 10% pa	31.77	34.26	79.87	1.62	147.52
With fixed cost savings down by 20% from start, re NGN					
Basic .0130 & .1	51.44	8.85	20.62	2.62	83.53
Basic all down 5% pa	36.30	6.18	14.41	1.85	58.74
Basic all down 10% pa	25.41	4.28	9.98	1.29	40.96
DCC to 0.8	51.44	70.78	164.97	2.62	289.81
DCC to 0.8 & rates down 5% pa	36.30	49.45	115.27	1.85	202.87
DCC to 0.8 & rates down 10% pa	25.41	34.26	79.87	1.29	140.83

Table 9: present values of all onward routing flows, at 7% cost of capital

Savings	F2F	F2M	M2M	M2F	Total
Basic .0163 & .1	80.08	11.09	25.85	4.08	121.10
Basic all down 5% pa	56.07	7.69	17.93	2.85	84.54
Basic all down 10% pa	38.96	5.29	12.33	1.98	58.56
DCC to 0.8	80.06	88.74	206.83	4.08	379.71
DCC to 0.8 & rates down 5% pa	56.07	61.55	143.46	2.85	263.93
DCC to 0.8 & rates down 10% pa	38.96	42.32	98.64	1.98	181.90
With fixed cost savings down by 20% from start, re NGN					
Basic .0130 & .1	64.05	11.09	25.85	3.26	104.25
Basic all down 5% pa	44.86	7.69	17.93	2.28	72.76
Basic all down 10% pa	31.17	5.29	12.33	1.59	50.38
DCC to 0.8	64.05	88.74	206.83	3.26	362.88
DCC to 0.8 & rates down 5% pa	44.86	61.55	143.46	2.28	252.15
DCC to 0.8 & rates down 10% pa	31.17	42.32	98.64	1.59	173.72

Results of Vodafone's analysis

Vodafone has thus built in the sections above two sets of tables of present values, one of the costs incurred, and one of the costs avoided. Subtracting the former from the latter for a varying mix of outcomes can give a range of NPVs that could be shown as a two dimensional matrix.

Mobile only

For the mobile only solution, the following permutations of net present values in £m are obtained:

Table 10: net present values £m of the costs and benefits of the mobile only solution, 11% cost of capital

Mobile only	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic DCC at .1	4.66	0.67	-3.32	-11.30	8.65	12.64
Basic all down 5% pa	-1.55	-5.54	-9.53	-17.51	2.44	6.43
Basic all down 10% pa	-5.98	-9.97	-13.96	-21.94	-1.99	2.00
DCC to 0.8	149.01	145.02	141.03	133.05	153.00	156.99
DCC to 0.8 & rates down 5% pa	99.31	95.32	91.33	83.35	103.30	107.29
DCC to 0.8 & rates down 10% pa	63.91	59.92	55.93	47.95	67.90	71.89

Thus the result in the first cell of a £4.66m present value is obtained by the intersection of the basic savings at 0.1p of £20.62m from Table 7 above less the basic costs of £15.96m from Table 3, and the result of -£9.53m derived from the same tables where solution costs are up 50% and the unit rate of the savings are down 5% per year i.e. the sum of £14.41m less £23.94m. One can see by inspection that Sagentia's base case is only slightly positive (justly described as "neutral" by Sagentia). Admitting the possibility that the solution costs are underestimated or that the unit rate of cost savings could be expected to fall can easily turn the neutral into a negative. It is only if one accepts, as Sagentia do not, that the costs saved are close to the DCC of 0.8p, that a consistently positive NPV is generated.

The set of results at a 7% cost of capital is broadly similar (using table 4 rather than table 3), although as one would expect the lower and unrealistic cost of capital generates more positive net present values:

Table 11: net present values £m of the costs and benefits of the mobile only solution, 7% cost of capital

Mobile only	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic DCC at .1	8.32	3.94	-0.44	-9.21	12.71	17.09
Basic all down 5% pa	0.40	-3.98	-8.36	-17.13	4.79	9.17
Basic all down 10% pa	-5.20	-9.58	-13.96	-22.73	-0.81	3.57
DCC to 0.8	189.30	184.92	180.54	171.77	193.69	198.07
DCC to 0.8 & rates down 5% pa	125.93	121.55	117.17	108.40	130.32	134.70
DCC to 0.8 & rates down 10% pa	81.11	76.73	72.35	63.58	85.50	89.88

It is difficult to construe from these observations that a mobile only solution is invariably positive.

Fixed only

Building a similar matrix for the fixed only solution by subtracting the fixed NGN row in table 3 from the values in table 5 or 6 gives the following:

Table 12: net present values £m of the costs and benefits of the fixed only solution, 11% cost of capital

Fixed only	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic .0163	3.52	-11.68	-26.87	-57.26	18.71	33.91
Basic down 5% pa	-15.41	-30.61	-45.80	-76.19	-0.22	14.98
Basic down 10% pa	-29.01	-44.21	-59.40	-89.79	-13.82	1.38
0.0130	-9.34	-24.54	-39.73	-70.12	5.85	21.05
0.0130 down 5% pa	-24.48	-39.68	-54.87	-85.26	-9.29	5.91
0.0130 down 10% pa	-35.37	-50.57	-65.76	-96.15	-20.18	-4.98

There are very few positive values generated here: given the lack of certainty on the costs of any fixed solution, it is hard to avoid the conclusion that a fixed only solution cannot be justified on the available level of knowledge.

Again, the matrix of outcomes at 7% is not dissimilar:

Table 13: net present values £m of the costs and benefits of the fixed only solution, 7% cost of capital

Fixed only	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic .0163	15.65	-0.46	-16.57	-48.78	31.75	47.86
Basic down 5% pa	-8.36	-24.47	-40.58	-72.79	7.74	23.85
Basic down 10% pa	-25.47	-41.58	-57.69	-89.90	-9.37	6.74
0.0130	-0.38	-16.49	-32.60	-64.81	15.72	31.83
0.0130 down 5% pa	-19.57	-35.68	-51.79	-84.00	-3.47	12.64
0.0130 down 10% pa	-33.26	-49.37	-65.48	-97.69	-17.16	-1.05

Fixed and mobile combined

A combined solution adds two extra flows on which savings from avoiding onward routing can be expected, i.e. F2M and M2F, and increases the costs to at least the sum of the fixed and the mobile standalone solutions. The matrix becomes a little more detailed, since more permutations become possible: here the “combined” row in table 3 is subtracted from the total column in table 8.

Table 14: net present values £m of the costs and benefits of the combined solution, 11% cost of capital

Fixed & Mobile	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic .0163 & .1	20.30	1.11	-18.07	-56.44	39.48	58.67
Basic all down 5% pa	-8.47	-27.66	-46.84	-85.21	10.71	29.90
Basic all down 10% pa	-29.09	-48.28	-67.46	-105.83	-9.91	9.28
DCC to 0.8	226.58	207.39	188.21	149.84	245.76	264.95
DCC to 0.8 & rates down 5% pa	135.66	116.47	97.29	58.92	154.84	174.03
DCC to 0.8 & rates down 10% pa	70.78	51.59	32.41	-5.96	89.96	109.15
With fixed cost savings down by 20% from start, re NGN						
Basic .0130 & .1	6.79	-12.40	-31.58	-69.95	25.97	45.16
Basic all down 5% pa	-18.00	-37.19	-56.37	-94.74	1.18	20.37
Basic all down 10% pa	-35.78	-54.97	-74.15	-112.52	-16.60	2.59
DCC to 0.8	213.07	193.88	174.70	136.33	232.25	251.44
DCC to 0.8 & rates down 5% pa	126.13	106.94	87.76	49.39	145.31	164.50
DCC to 0.8 & rates down 10% pa	64.09	44.90	25.72	-12.65	83.27	102.46

Sagentia's solution N2, mobile and fixed combined, was at 7% cost of capital, with flat rate of costs avoided, using for mobile the DCC rate of 0.8p, and gives £297m – the equivalent at 11% cost of capital is £226.6m. Ofcom comments in 3.59 "*this (*positive) *assessment is robust against a reduction in the assessment of the costs saved in mobile network conveyance by a factor of 8 relative to the current value of the donor conveyance charge and simultaneously robust against an increase in the estimated capital costs by £30m".* Inspection of the table above shows that the position is not so straightforward. If one accepts Sagentia's suggestion that 0.1p is the correct measure of costs saved in mobile network conveyance then at flat future rates of costs avoided and Sagentia's estimate of solution costs then there is only a positive present value of £20.3m: increasing the solution costs by only 25% generates a neutral result, whilst allowing the possibility that the unit rates of the savings could fall over time generally results in a negative present value.

The negative result can be made worse by entertaining the scenario of a step change down from current TDM based costs to an NGN unit cost for the fixed onward routing.

In this situation in order to consistently record a positive NPV one has to assume a high mobile conveyance cost, and little possibility that the base estimate for the solution costs will be exceeded.

At the unrealistic lower cost of capital the outcomes are (tables 4 and 9):

Table 15: net present values £m of the costs and benefits of the combined solution, 7% cost of capital

Fixed & Mobile	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic .0163 & .1	39.14	18.65	-1.84	-42.82	59.63	80.12
Basic all down 5% pa	2.58	-17.91	-38.40	-79.38	23.07	43.56
Basic all down 10% pa	-23.40	-43.89	-64.38	-105.36	-2.91	17.58
DCC to 0.8	297.75	277.26	256.77	215.79	318.24	338.73
DCC to 0.8 & rates down 5% pa	181.97	161.48	140.99	100.01	202.46	222.95
DCC to 0.8 & rates down 10% pa	99.94	79.45	58.96	17.98	120.43	140.92
With fixed cost savings down by 20% from start, re NGN						
Basic .0130 & .1	22.29	1.80	-18.69	-59.67	42.78	63.27
Basic all down 5% pa	-9.20	-29.69	-50.18	-91.16	11.29	31.78
Basic all down 10% pa	-31.58	-52.07	-72.56	-113.54	-11.09	9.40
DCC to 0.8	280.92	260.43	239.94	198.96	301.41	321.90
DCC to 0.8 & rates down 5% pa	170.19	149.70	129.21	88.23	190.68	211.17
DCC to 0.8 & rates down 10% pa	91.76	71.27	50.78	9.80	112.25	132.74

Sagentia's N2 can be seen here.

These combined scenarios however all (including Sagentia's N2) assume the simultaneous build of the fixed and mobile solutions in the period 2007 to 2009, and the simultaneous achievement of savings from all four onward routing flows in 2010. This is not Ofcom's preferred solution, which is for a mobile solution to be in place by September 2009 (and hence M2M flows avoided from say 2010) and for "*a full transition of fixed networks to an ACQ/CDB solution*" by the end of 2012. It is appropriate to attempt to model this scenario, which would involve:

- Expenditure on the mobile only solution 2007-2009 as currently modelled
- Savings from the M2M onward routing from 2010 as currently modelled
- Expenditure on the fixed only solution pushed back three years to 2009-2012
- Additional expenditure in say 2012 to convert the CS mobile only solution to IP compatibility (assume for working purposes as £5m of capex only)
- Savings from the F2F, F2M and M2F delayed until 2013
- Potentially extending the recovery period for the cost benefit analysis beyond 2016, say to 2018, i.e. over a 12 year period

This approach generates the following present values:

Table 16: PV of costs, savings and net flows of the phased combined solution at 11% cost of capital

Costs:	Basic	Up 25%	Up 50%	Up 100%	Down 25%	Down 50%
Mobile followed by fixed	64.46	80.58	96.69	128.92	48.35	32.23

Savings:	Total
Basic .0163 & .1	85.59
Basic all down 5% pa	55.44
Basic all down 10% pa	35.36

0.0130 & 0.1	75.14
0.0130 & 0.1 down 5% pa	48.81
0.0130 & 0.1 down 10% pa	31.24

Outcomes	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic .0163 & 0.1	21.13	5.01	-11.10	-43.33	37.24	53.36
Basic all down 5% pa	-9.02	-25.14	-41.25	-73.48	7.09	23.21
Basic all down 10% pa	-29.10	-45.22	-61.33	-93.56	-12.99	3.13

0.0130 & 0.1	10.68	-5.44	-21.55	-53.78	26.79	42.91
0.0130 & 0.1 down 5% pa	-15.65	-31.77	-47.88	-80.11	0.46	16.58
0.0130 & 0.1 down 10% pa	-33.22	-49.34	-65.45	-97.68	-17.11	-0.99

These results are not particularly different from the simultaneous fixed and mobile scenario, showing neutral to negative results (the average of the 36 permutations shown here is -£20m). Only if one allows the cost of mobile onward routing to rise towards 0.8p will consistently positive results be obtained.

Similarly at 7% cost of capital:

Table 17: PV of costs, savings and net flows of the phased combined solution at 7% cost of capital

Costs:	Basic	Up 25%	Up 50%	Up 100%	Down 25%	Down 50%
Mobile followed by fixed	74.76	93.45	112.14	149.52	56.07	37.38

Savings:	Total
Basic .0163 & .1	114.80
Basic all down 5% pa	73.91
Basic all down 10% pa	46.82

0.0130 & 0.1	100.58
0.0130 & 0.1 down 5% pa	64.92
0.0130 & 0.1 down 10% pa	41.25

Outcomes	Costs					
Savings	Basic	up 25%	up 50%	Up 100%	down 25%	Down 50%
Basic .0163 & 0.1	40.04	21.35	2.66	-34.72	58.73	77.42
Basic all down 5% pa	-0.85	-19.54	-38.23	-75.61	17.84	36.53
Basic all down 10% pa	-27.94	-46.63	-65.32	-102.70	-9.25	9.44
0.0130 & 0.1	25.82	7.13	-11.56	-48.94	44.51	63.20
0.0130 & 0.1 down 5% pa	-9.84	-28.53	-47.22	-84.60	8.85	27.54
0.0130 & 0.1 down 10% pa	-33.51	-52.20	-70.89	-108.27	-14.82	3.87

Here the average of the 36 permutations is -£14m.

Conclusion

Vodafone's conclusions from this work are:

- If one accepts Sagentia's view that the costs of mobile porting conveyance are 0.1p rather than the 0.8p of the DCC, then the case for a mobile only solution to avoid the costs of mobile to mobile onward routing on a standalone basis is not confirmed by a review of the possible range of outcomes from the cost benefit analysis.

- A fixed only standalone solution does not seem to have a positive outcome from the cost benefit analysis.

- Looking at the combined solution, either assuming a simultaneous build of fixed and mobile solutions, or an initial rollout of a mobile solution to be followed subsequently by a fixed solution, whilst it is possible to generate outcomes with a positive present value, there would appear to be more outcomes that are apparently negative.

- A major complication is the uncertainty arising from NGN, in terms of both the architecture (and costs) of any solution and the unit cost of onward routing in a fixed NGN network.

- Until some of this uncertainty is resolved, it seems difficult to conclude that the evidence of the current cost benefit analysis categorically shows that a positive benefit can be obtained from commencing a mobile solution (that does not appear to stand on its own) now in the hope that when a fixed solution becomes clear, the costs of that fixed solution are sufficiently low and the costs of the onward routing avoided are sufficiently high that the overall project becomes positive.

Vodafone
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