

# NARROWBAND MARKET REVIEW: APPROACHES TO COST MODELLING

NOVEMBER 2012

## 1 INTRODUCTION

- 1.1 Cable & Wireless Worldwide welcomes this consultation into the approach to cost modelling in relation to a future charge control for narrowband voice services. Since 1997 the fundamental design of Oftel's and subsequently Ofcom's voice charge controls has changed little. While each subsequent charge control has evolved to take account of shifting remedies, the fundamentals of the modelling is largely unaltered from the inaugural charge control 15 years ago. Changes to the common regulatory framework in the form of revised guidance from the European Commission mean that all National Regulatory authorities have to modify their approach to the pricing of fixed termination.
- 1.2 The United Kingdom is usually at the vanguard of adapting to new European regulatory changes, however in this instance due to the cycle of existing UK voice charge controls several other member states have already moved to take account of the Commission's guidance. We are firmly of the view that Ofcom needs to take the time to develop a charge control modelling approach that upholds the Commission's recommendation while taking due account of the infrastructure, competitive landscape and particular circumstances of the UK's communications industry. Ofcom must not push Communications Providers into making particular technology choices, nor should Ofcom do anything that undermines the UK's competitiveness in this vital industry.
- 1.3 The model's main objective has to be about developing a sensible and coherent theoretical bottom up costing approach that is used to derive efficient termination (and origination) charges. It should not in any way undermine the commercial decisions taken by individual Communications Providers or those decisions bilaterally agreed between Communications Providers. Instead the model output has to form a key plank in the reference material that CPs use when undertaking investment and strategic interconnection decisions.
- 1.4 The rationale behind the Commission's guidance is to ensure that the pricing for fixed call termination is not tied in perpetuity to the past investment choices and the cost base of the incumbent, and is instead grounded in the efficient technology choices available today. We support this objective believing that it is entirely sensible to move on from a legacy cost base to one which better reflects the cost outcomes possible today. This consultation must focus its attention on what assumptions should be contained within the model in order to derive the most robust interpretation of what an efficient Communication Provider costs look like today in the United Kingdom. It should not seek to favour one segment of the market over the other, by for example, placing the needs of residential subscribers over those of business subscribers; instead it must consider all these factors in the round to deliver sensibly grounded prices which are realistic.

- 1.5 Ofcom should avoid jumping to conclusions on key policy matters within a consultation that is focused on model methodology and design. It is not appropriate for Ofcom to make a pronouncement at this point over where the costs of conversion between IP and TDM should fall without first having a detailed understanding of the practical realities, the technical standards both in force and in development and the views of stakeholders on this significant commercial issue. Ofcom's consultation takes a very binary approach to determining what technology platform can be regarded as the MEA. The reality is very different, with industry taking a rational approach to the adoption of new technology based on past and future investment considerations. There is not a single point in time when the MEA switches from one technology to another. Clearly the MEA for an entirely new network build today would be IP and from a cost modelling perspective it is sensible to use these costs. However there is no reason to draw a conclusion that since the MEA for constructing a new network is NGN, it follows that the MEA for interconnection should also be NGN.
- 1.6 Ofcom needs to recognise that we are in a transition phase and it would be a great mistake to conclude prematurely that there is a single MEA for interconnection at this point in time. The MEA for interconnection will be determined by the migration strategy of each individual operator, who will collectively set the pace for the industry. It is not the role of the regulator to set network strategy and while an MEA technology must be selected for the charge control model, it does not automatically follow that this technology choice should simultaneously become the default standard for interconnection. Likewise the final decision on how many points of interconnect to assume should also be the product of detailed consideration.
- 1.7 The period allowed to comment on these proposals has been extremely short and while we understand that the timetable Ofcom is working to is determined by the end date of the current charge control, we want to ensure that stakeholders have all the necessary information available to them to help inform their contributions to this process. While this model in its current form is of some help, assisting us in our understanding of direction that Ofcom are proposing to take, it is a long way from providing stakeholders with sufficient information to participate fully in the debate. The model is highly complex and it is all but impossible to determine the cost-drivers that have been assumed for each network element. Further, as it stands the model is populated with 'dummy' data and we have no idea if Ofcom believe this data to be even directionally correct. While we can see the dependencies between certain variables, we can't properly understand the impact of various assumption changes unless the underlying data has some degree of accuracy. Ofcom has now issued an information request to specific CPs with a view to obtaining the data to populate the model. Stakeholder input on further iterations of this model is vital if the consultation process is to reach sound conclusions. These iterations would not have to be accompanied by further consultation documents, Ofcom could take a more informal approach however, getting stakeholders to comment on further model iterations is an essential part of ensuring the integrity of the entire consultation process.
- 1.8 While Ofcom may wish to require termination prices to migrate to the new approach relatively quickly we would sound a note of caution around the timing of some of the other knock-on changes that may result. While the Market Review consultation will itself determine remedies,

we believe Ofcom must try to signal any significant price changes at the earliest opportunity. For example, should the market review propose a change to the way in which conversion costs are dealt with, then such a change should be phased in and not happen overnight. Likewise, where possible, changes to call origination prices should be implemented in a sensitive way to reflect the long standing nature of these services and the underlying needs of the consumers who rely upon them. Ofcom also has to think carefully about any knock-on impact for non-geographic services, as the new unbundled framework is expected to commence a short time after the expiration of the current voice charge control, so it would seem disproportionate to make any radical changes to the basis of recovering non-geographic services when the impact would only be felt for a few months and consumers need as stable an environment as possible ahead of the introduction of the new NGCS regime.

## STRUCTURE OF THIS RESPONSE

- 1.9 Following a brief executive summary, section three focuses on the model itself, raising questions where there is uncertainty and highlighting areas where we think the model may have diverged from common practice or is technical deficient. In the final section we address the specific questions posed within the consultation document.

## 2 EXECUTIVE SUMMARY

- 2.1 Ofcom has to take utmost account of the European Commission's recommendation on the cost base for call termination. We understand the logic of the Commission's recommendation, believing it to be grounded in a desire to move away from incumbent legacy costs to an approach centred on efficient costs, and taking the view that certain common costs would be incurred regardless of the presence of call termination. The challenge for Ofcom is to apply the recommendation in a way that is sensitive to the dynamics of the UK communication market and the breadth of suppliers within it who serve a broad range of consumer need.
- 2.2 Ofcom needs to take the time to reach the right conclusions. The current charge control expiration date is the end point for this process, but Ofcom must consult on future iterations of the model when there is greater certainty over what it contains. To move straight to a final statement without first sharing more than dummy data would undermine the entire consultation.
- 2.3 Even at this stage and with the limited time available we have identified a number of fundamental concerns relating to the composition of the model. We elaborate on these concerns later in this document, however some of the most notable issues relate to the lack of impact on Session Border Controllers, Callservers and backhaul transport when traffic is added. There is also concern over network structure with examples of one to one resilience on equipment that in practise would be a many to many (n:m) basis.

- 2.4 Ofcom have spent insufficient time considering the importance of technology choices available. A level of sophistication beyond stating “IP interconnect” is required, with consideration needed of the subsequent impacts on cost metrics (eg. G.711 vs G.729 codec choice). The model’s focus also needs to be re-evaluated, for example modelling is carried out a card level, when in practise no Communications Provider would build a network on this basis.
- 2.5 A clear distinction needs to be drawn between the assumed MEA for the purposes of modelling network costs and the MEA for real world interconnection. In doing so Ofcom needs to consider the impact that a lack of a NICC endorsed standard for IP interconnection has on CP decision making, likewise it may be the case that while a new entrant would deploy an IP based network, it would still be economically efficient for an existing market participant to sweat their legacy assets for a while longer, before migrating to IP. Ofcom should therefore not take action to undermine the most economically efficient choice for existing CPs and the focus should remain on deriving a theoretic efficient cost base, not mandating the use of one particular technology over another in the real world. As a consequence it is unsafe for Ofcom to reach any conclusion on TDM to IP conversion costs at this point in time.
- 2.6 Uncertainties remain on the frame of reference that Ofcom will use to assess the end output. There appears to a suggestion that model output will be calibrated against BT’s TDM costs and we are unclear what is actually planned and how the cost data deriving using two different cost standards can be compared.
- 2.7 Ofcom needs to pay close attention to the timing of any changes, providing clear signals to the market and phasing material changes where it makes sense to do so. Special attention needs to be paid to the related NGCS and call origination markets, avoiding any unnecessary disruption and ensuring all changes are proportionate and signalled with adequate notice.

### **3 MODEL CRITIQUE**

- 3.1 As we have previously indicated, we do not believe the model is fit for purpose and a considerable amount of work is required to make it so. However the current very preliminary state of the model cannot be reconciled with the current intention to proceed in one step to a final version. This approach is in considerable contrast with the level of effort involved in developing the mobile termination model over the period between 2005 and 2007. This model (even though many of the preliminary building blocks were already in place prior to 2005) ran through three progressively improving iterations on each of which stakeholders were able to provide comments and evaluations before the model reached the final version that was embodied in the statement. To proceed in one step from the first draft of the model to a final one in the case of fixed narrowband is likely to result in a model that is neither robust nor reliable. The solution is to issue a further draft version of the model (together with more contextual information) before the final statement in order to allow model development and stakeholder comment and input.

- 3.2 As a result of the current limitations of the model it is not possible at this stage to properly examine and critique the model and form an overall opinion on the likely fitness for purpose of the final version. In particular a fully populated “pre-final” version of the model, with accurate dimensioning rules, input costs and cost recovery methods needs to be made available before the final statement, in order for operators to assess the ability of the model to accurately predict the costs of fixed origination and termination.
- 3.3 There has been insufficient time to examine the model thoroughly at an appropriate level of detail, so any conclusions expressed at this stage must be considered to be provisional and partial in nature, but it has been possible to establish that there are a series of obvious deficiencies and gaps in the fitness for purpose of the model:
- 3.3.1 The model still needs a detailed line by line evaluation and assessment by Ofcom and by stakeholders of what network equipment is incremental to traffic, and what is not, in order that the assets that are incremental to termination are being correctly evaluated. An initial impression is that an insufficient range and volume of assets are being identified by the model as being incremental to traffic, and specifically to termination traffic.
- 3.3.2 One difficulty experienced in evaluating the reliability of the model to reflect the correct volume of assets arising from services (individually and in total) relates to the extensive disaggregation of each node into very detailed elements. This would appear to be unnecessary, given the fact that many individual components of each node are being recovered in a similar manner, with identical network element output cost recovery functions across multiple assets. There is no obvious reason why such commonly varying elements are individually costed, and several reasons to suggest that this disaggregation is wrong:
- The disaggregated detail complicates the logic of the network model, making evaluation of the adequacy of the model to correctly match network volumes with traffic services and thus calculate the LRIC of termination and the LRIC+ of origination unnecessarily difficult.
  - The disaggregation forces a knowledge of unit input costs at a much more detailed level than is necessary or straightforward to accomplish.
  - The purchase cost of such disaggregated elements when purchased individually may be both difficult to discern and be higher than when nodes are purchased as a single unit rather than as a kit of parts.
  - Given that it is not possible to obtain top down calibration with reference to operator total costs, unlike as was possible in the mobile model, the risk that the fixed model will bear unrepresentative costs becomes greater with increasing asset element disaggregation.

- 3.4 Whilst the model is capable of producing a LRIC+ output for all services when all services are being recovered on this basis, i.e. where all services are recovering fixed and common costs on an EPMU basis, the model does not apparently produce an output suitable for the LRIC+ of origination in circumstances where termination is being recovered as an incremental service as the last increment. Here the model should in the first instance calculate the pure LRIC of termination, and from the remainder of the costs, i.e. those generated from all services excluding the termination element of inbound traffic (the final leg from the “correct” PoI to the consumer) recover all remaining costs over all remaining services.
- 3.5 It is not clear that the model correctly recovers costs against services: the model uses total annual traffic rather than the busy hour traffic that drives dimensioning. This consideration is not relevant where all services have an identical busy hour/annual volume relationship. However the fixed model uses different busy hour/annual traffic ratios for data and voice, and for residential and business customers, but does not appear to reliably identify the traffic at the network busy hour – the modelled network busy hour traffic seems to be merely the sum of the four individual busy hours of residential voice, residential data, business voice and business data. This is not necessarily the correct level of traffic actually experienced in the network busy hour and may as a consequence be incorrectly dimensioning the network actually required to accommodate the peak load. Our response to Question 8 below highlights our concerns of the degree to which non-coincident busy hours should be assumed within the model; this should not detract from the fact that once an assumption has been agreed on the degree of non-coincidence, the model should properly incorporate that assumption.
- 3.6 There is an absence of traffic sensitivity modelling, particularly of data, where the future volumes of broadband traffic are most uncertain. It is not readily apparent how important any assumptions on the range of future fixed broadband traffic outcomes are to the modelled costs of origination and termination, but Ofcom needs to conduct such an analysis. For example, in the period during which this consultation has been held, Sky has launched an integrated version of BBC iPlayer within its set top boxes : it is inevitable that this will drive higher broadband throughput. Extrapolating historic growth is an almost certainly inappropriate approach.
- 3.7 One modelled assumption that is not obviously correct is the retention of the assumption of the TDM proportion of interconnecting traffic at 40% indefinitely. It would appear more reasonable to expect that this proportion will fall over time to zero as all fixed operators transfer to NGN alongside the assumptions that the model makes as to the NGN growth of the modelled operator. Further, we regard an assumption that 40% of traffic is IP today as being highly suspect : apart from anything else, those CPs with IP networks tend to have high volumes of customers using ported numbers, which will mean that the interconnect technology is not determined by the originator or terminating CP, but instead by the rangeholder CP.
- 3.8 A very significant factor in the weighting of voice against data is the selection of a high 135kbps codec for voice conversion. A lower bit rate codec could be more efficient, but it would be unwise to draw conclusions on this without a fuller understanding of the QoS implications.

- 3.9 In selecting unit prices for the modelled network operator there may need to be a downward adjustment to reflect the prices that would ensue if the modelled operator and all other operators were in practice buying NGN equipment, rather than maintaining service on legacy equipment.

## 4 ANSWERS TO OFCOM'S QUESTIONS

***Question 1: Do you agree with our proposal that NGNs can be considered the MEA for the purposes of modelling call origination and call termination services? If not, please explain why.***

Ofcom's consultation takes a very binary approach to determining what technology platform can be regarded as the MEA. The reality is somewhat different, with industry taking a more rational commercially driven approach to the adoption of new technology based on past and future investment considerations. While it seems likely that the MEA for an entirely new network build today would be IP and from a cost modelling perspective it is sensible to use these costs, we would have liked to see more robust proof of this assertion. In theory a competitor using a higher cost technology with no extra value would not survive in a truly competitive environment, however in reality in today's voice world a competitor using depreciated TDM could survive for some time. Indeed there may be some benefit in holding off investing until equipment costs fall and standards are defined.

So while we guardedly support Ofcom's MEA conclusions for the purposes of cost modelling (taking account of the Commission's recommendation), as elaborated in our response to Q4 we can't extend that support to real life interconnection decisions which are grounded in reality. Ofcom need to draw a clear distinction between the two and form a better understanding of how long the transition will actually take and where we are today in the process, considering the issue of when it might be optimal for CPs to invest. We will discuss the issue of interconnection in greater detail in our answer to question four and focus below on matters relating to the MEA for cost modelling.

While we accept Ofcom's assertion that for the purposes of cost modelling the MEA to assume would be NGNs, we have three concerns over the approach which we believe are worthy of consideration in any final decision, namely;

1. Whilst it is likely that NGNs will yield the lowest cost technology choice, CWW would have liked to see this demonstrated rather than assumed. We recognise the conceptual difficulties in comparing like-with-like when contrasting NGN and TDM costs. However, the need to make assumptions in the modelling should not detract from the need to verify that NGN technology is indeed more cost effective than TDM.

That new entrant CPs have utilised NGN technology is not a sufficient condition to demonstrate that NGNs are most cost effective. As identified elsewhere in the consultation, the number of interconnect handovers for NGN technology is less than that for TDM, the result being that backhaul to those handovers is longer. Therefore it is entirely plausible that the overall cost of deployment of an NGN to serve a given customer/service base is less than that of TDM, but because of longer backhaul to

handovers the cost of interconnection services such as origination & termination could be higher than of TDM. This would raise the regulatory quandary of the technology choice being most efficient approach *for whom?*

It may well be the case that for many CPs it would be more economically efficient to sweat legacy assets for a while longer given the nature of the assets they hold (being mostly fully depreciated), their existing customer need and the lack of nationally endorsed standard for IP interconnection.

2. The change in modelling approach combines both new technology and a change from LRIC+ to LRIC costing, which risks obfuscating the concerns we raise in (1). We are comfortable that in principle running the 2009 NCC TDM model forwards to verify that it yields a higher result than the new model could mitigate the risk of choosing the wrong technology. However, our understanding is that using the 2009 model in unchanged form would yield a comparison between LRIC+ costs of TDM handover and LRIC costs of NGN handover. We believe that the intent is to construct the 2012 model to produce both LRIC and LRIC+ models, so the 2012 LRIC+ output can be compared to the 2009 LRIC+ one. While there remains the (theoretical) scenario that the NGNs could yield a lower LRIC+ but higher LRIC than TDM, we are comfortable that this is unlikely. CWW seeks confirmation from Ofcom that our interpretation of its logic is correct.

3. The purpose of the model is to yield the costs incurred by an efficient network operator. Against this backdrop, we are confused by the statement at 3.54 that the unit costs for an NGN implementation should be moderated to allow BT to recover the costs of assets associated with TDM. CWW seeks clarification of the rationale and detailed proposals on this aspect.

***Question 2: Do you agree with our proposal that our NGN model should include Pols based on IP interconnection? If not, please explain why.***

CWW agrees with the proposal that the NGN model should include Pols based upon IP interconnection. However, we consider that Ofcom has as yet given scant attention to the technicalities of IP interconnection. Unlike the core of CP networks, IP interconnection cannot yet be considered to be the MEA: we expand upon this in our response to Question 4. As a consequence, CWW considers that the model should incorporate aspects of interworking costs, as we set out subsequently.

***Question 3: Do you agree with our proposal on 20 Pols for our NGN model? If not, please explain why.***

CWW disagrees with Ofcom's conclusion on this question. We agree that 20 is the correct order of magnitude, but believe that Ofcom disregards the conclusions of NGNuk that "27+2" handovers are required at its peril. In our answer to this question we will elaborate why, and the changes required to the model to reflect this.

We agree that 20 handovers is the correct order of magnitude as the alternative would be handover at fewer or more interconnects:

- Given the sheer volume of voice traffic exchanged between UK CPs, CWW considers that a smaller number of interconnects would profoundly risk network integrity in the case of simultaneous site failures.
- We consider a significantly greater number of handovers would lose scale economies in the provision of Session Border Controllers (or equivalent).

However, in proposing 20 handovers, we believe that Ofcom has taken a high level theoretical position, and in doing so has neglected considerations of real world physical topology, indeed risking breaching its regulatory duties with respect to integrity of the UK network. The issue of number of handovers to the BT network was debated at length in both NGNuk and Consult21, resulting in a proposal of “27+2” handovers. This decision was made with good reason by the stakeholder UK CPs, and (with one minor change reflecting industry consolidation in the meantime) CWW sees little justification for changing it.

As the motivation for using “27+2” rather than 20 may not be fully understood, we consider it appropriate to explain the background at this stage. The starting point for the number of handovers was indeed the 20 core nodes in BT’s transport network, but this was modified for the following reasons:

1. **Considerations of CP fibre.** It would be economically inefficient to select handover locations where few (if any) CPs actually had a fibre presence. To do so would necessitate significant civils activity, far outweighing the cost of BT backhauling the traffic on existing fibres or locating equipment at different physical sites to what a logical model would indicate. This issue related to three BT core nodes (Derby→Nottingham, Guildford→Kingston, Falkirk→Edinburgh), meaning that 3 core nodes were not within the choice of 27 made by industry. Were Ofcom to make modelling assumptions that ignored this, it would necessarily flow through to a physical implementation that demanded interconnection at core nodes (otherwise BT would be unable to recover its costs of using alternative handovers) meaning CPs would have to dig roads at inconvenience and cost to UK citizens. CWW also believes that factoring this aspect into the model is consistent with the “scorched node” approach advocated at clause 5.24: it would be inconsistent to take account of the location of BT’s existing assets, while ignoring the location other CPs’ investments.
2. **Geographic tromboning.** A plot of the 20 core nodes on a map of the UK serves to highlight this point. By concentrating traffic at the core nodes, this means that any calls destined for locations south-west of Bristol, in East Anglia, South East of London and on the south coast of England would have to be backhauled to the core for handover. So for example a local call within Plymouth would route via Bristol. It should be noted that for the bulk of calls that are local, this backhaul would occur on both the CP and BT side of the interconnection. Industry agreed this was inefficient, and based upon the location of CP fibre, agreed additional handovers at Exeter, Cambridge, Maidstone and Portsmouth.
3. **Resilience.** This is a specific instance of the issue identified in (2). If purely the core nodes were used, then there would be no handover in Northern Ireland, meaning that local calls within Belfast would trombone via either Glasgow or Manchester. This is not only inefficient,

but a potential risk to network integrity given the long repair times on the subsea cabling involved. It was therefore agreed to provide a handover in Belfast, but given the limited CP fibre presence in Northern Ireland, it was accepted that calls could be handed over at Belfast, Glasgow or Manchester. At the time of the agreement similar concerns were raised for the north of Scotland hence the inclusion of Aberdeen on the same basis. However, following the acquisition of Thus by CWW this concern was dropped, hence a more accurate description is “27+1”.

4. **Major handover nodes.** There are certain BT nodes which are metronodes (in the terminology of the CSMG activity, Aggregation Nodes) that have a significant CP fibre presence and host/parent large volumes of MSANs (CSMG term Access Nodes). Once again, it was felt that the deployment of SBCs at these locations was justified, the costs being outstripped by the backhaul savings on both parts, and consequent improvements in resilience. This resulted in the addition of Oxford, Liverpool & Leicester. As with item (1), CWW believes that incorporating these extra nodes is consistent with the scorched node approach to modelling.

In this consultation Ofcom appears to jump to a conclusion on the number of assumed points of interconnect without any supporting evidence and has failed to set out an explanation of why they have chosen to disregard the conclusion reached by NGNuk on the same issue after the organisation, at Ofcom’s behest, put in considerable effort to reaching a view. CWW seeks clarification of why Ofcom believes it is better qualified to design interconnection than the expert colleagues within stakeholder CPs that reached agreement on this important aspect of critical national infrastructure, or that having reached such agreements, the fair costs of implementation shouldn’t be recoverable.

It is reasonably easy to incorporate the consequences of the industry agreement into the network model, as follows;

- There should be 28 Interconnection Nodes in the model.
- Of these, 17 should be the Core Nodes, the remainder at Aggregation Nodes.
- The 17 Core Nodes should carry all traffic associated with Access Nodes ultimately parented to that Core Node, other than that described in subsequent bullets.<sup>1</sup>
- Of the Aggregation Nodes used as Interconnection Nodes, to cover points (2) and (4) above, 7 should carry the interconnect traffic associated with Access Nodes parented to that Aggregation Node alone.
- For one of the Aggregation Nodes used as an Interconnection Node, to cover point (3) above, a proportion of the interconnect traffic associated with Access Nodes parented to the Aggregation Node and two adjacent Aggregation Nodes<sup>2</sup> should be carried by that Interconnection Node, while the remainder should be assumed to be routed to the parent Core Node. CWW suggests that this proportion should be 50%.

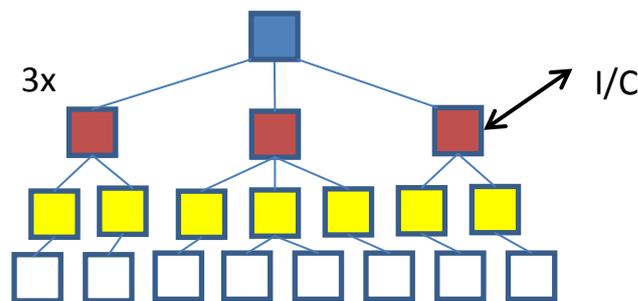
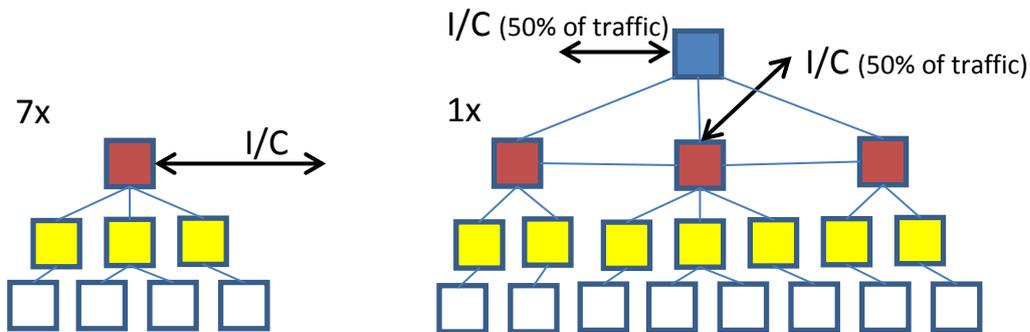
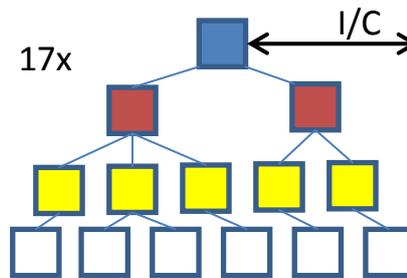
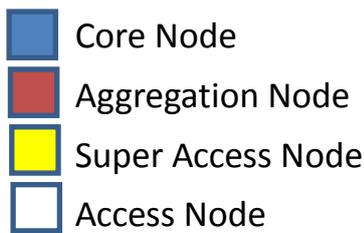
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<sup>1</sup> This means that of the 17, 9 will carry all traffic associated with Access Nodes parented to it, while 8 will carry a subset.

<sup>2</sup> CWW’s understanding is that the topology of BT’s transport network is there are three Metronodes (Aggregation Nodes) in Northern Ireland. Reflecting the unique geographic circumstances, these Metronodes are meshed together, meaning that intra-Metronode traffic need not route via the parent Core Nodes at Manchester & Glasgow.

- For the remaining 3 Aggregation Nodes used as Interconnect Nodes, to cover point (1) above;
  - Interconnect traffic associated with Access Nodes parented to the Aggregation Nodes should be carried by that Interconnect Node, and
  - Interconnect traffic associated with Access Nodes ultimately parented to the Core Node which parents the Aggregation Node should be carried by that Interconnect Node. (To be clear, the media path for call termination would be Interconnect/Aggregation Node→Core Node→Aggregation Node→[Super Access Node]→Access Node; there would be no Interconnect Node at the Core Node)

The required modelling is shown diagrammatically in the figure below, together with the number of Interconnect Nodes falling into each instance – in all cases the interconnect should serve all Access Nodes depicted:





**Question 4: Do you consider that if the MEA is NGN, the costs of conversion from TDM to IP should be excluded from cost-based call origination and call termination rates? If not, please explain why.**

CWW profoundly disagrees with Ofcom's proposals on this subject. There is no reason to draw a conclusion that since the MEA for constructing a network is NGN, it follows that the MEA for interconnection should also be so. Whereas the choice of technology for the internals of a network is implicitly an individual one made by each Communication Provider, for interconnection other parties must be engaged because of aspects such as mutually agreeing protocols, codecs and packetisation rates. Industry agreement is required on these topics: it would be economically inefficient to leave this even to bilateral negotiation because in the complex UK telecoms marketplace, many calls involve more than two networks hence heterogeneous bilateral arrangements will lead to costly transcoding and/or protocol interworking. Such industry agreement has not yet been reached, but will be soon.

This reflects that we are in a transition phase: at the last market review the MEA for interconnection was certainly TDM, and it does seem likely that by the end of the next charge control, IP could be the MEA. However it would be a great mistake for Ofcom to conclude prematurely that there is a single MEA for interconnection at this point in time when the transition is now just getting underway. The MEA will be determined by the migration strategy of each individual operator, who will collectively set the pace for the industry. We firmly believe it is not the role of regulators to set network strategy and Ofcom must draw a clear distinction between the MEA for the theoretical model used to derive termination rates and real world interconnection decisions taken by CPs. In the remainder of our response to this question we explore the issue in more depth, setting out proposals for the regulation of interconnection during this transition phase, and consequent implications for modelling.

We are extremely disappointed that a policy issue as profound as the technology choice for interconnecting UK CPs providing Critical National Infrastructure has been relegated to being a point of detail in a short-form consultation on constructing network costing models. We would have expected far more in depth consideration of the merits of how heterogeneous technology choices impact upon regulation during a transitional era, rather than a trite assumption that because the MEA for a network core is IP, the same must be the case for interconnection. We would also have expected Ofcom to assess whether currently published IP technical standards are capable of supporting the regulatory services that it mandates. Insofar that some of the aspects of these technical standards (codec choice, packetisation rate) directly impact the costs modelled, we would have expected consideration of this too. Under the circumstances it would be unsound to proceed without a more detailed examination of the facts and an impact assessment would be necessary in order for Ofcom to fully understand the impact that such a radical change would have on specific Communication Providers and the market as a whole.

As far as the modelling exercise is concerned, CWW agrees that the costs associated with interworking from IP to TDM (and vice-versa) should be modelled. For the reasons we set out in our policy analysis below, we consider that the modelling of this specific function should be on a FAC

basis rather than LRIC. It is our position that this outcome is the extent to which the current consultation should have progressed, but given the premature conclusions reached in 3.81 of the consultation, we feel compelled to explain why these conclusions are flawed.

The telecoms industry as a whole is in a period of transition from legacy TDM networks to those based upon IP. As concluded elsewhere within the consultation, new network deployments use IP, while a significant legacy base of TDM exists. However this summary masks significant technical detail: "IP" is a transport rather than application level protocol, and at the application layer VoIP networks can be based upon BICC, SIP(I) or SIP protocols. For SIP(I) and SIP, a plethora of standards exist. Even within this, the protocols support multiple codecs and packetisation rates.

To say that two networks connect using "IP" would therefore be a meaningless statement without first agreeing the detail of the protocol, supported codecs and packetisation rate: it is an almost certainty that two NGNs wishing to interconnect using IP, without any further standardisation of what that means, would end up with one or the other having to either interwork protocols, transcode codecs (*de facto* a form of interworking), or both. Little is new, and such considerations have historically occurred for TDM: while we use "TDM" as a shorthand, in reality we mean "TDM using C7 ISUP as standardised by NICC ND1007v3.3" or "TDM using C7 IUP as standardised by NICC ND1006v4.2" : indeed in the 1990s Oftel had to intervene to determine whether "TDM using C7 IBN7" should be added to that list, and facilitated industry discussions around the approach where one CP uses ND1006, the other ND1007.

In our response to the Call for Inputs to the Narrowband Review, CWW highlighted the situation regards technical standards for interconnecting NGNs. We will not repeat the detail of this, but in summary at this stage the only standards that exist for interconnecting NGNs, that are able to support the regulatory services expected by Ofcom as part of the General Conditions e.g. access to emergency services, access to directory enquiries and number portability, are SIP(I) and BICC.

As one of the most active CPs within NICC, CWW believes that neither SIP(I) as currently standardised, nor BICC, are fit-for-purpose for connecting fixed-line NGNs:

- SIP(I) is SIP with encapsulated C7 ISUP signalling. It was standardised for the aborted deployment of 21CN. It is predicated on the CP callservers running a C7 call control engine, which while supported by some callservers, is unlikely to be supported by those used by smaller IP operators. As such mandating it would represent a considerable barrier to market entry. Those CPs serving enterprise customers with IP-PBXs connecting via SIP are likely to use call control with a SIP engine rather than a C7 core with IP wrap. For these reasons, SIP(I) has not been significantly deployed : it is highly likely that there are consequently flaws or shortcomings in the standard, but NICC has not been particularly focussed on resolving these as with little deployment, there's little point.
- BICC is a standard deployed predominately between mobile operators and is specifically focussed for that application. Even for this community, BICC is seen as a stage in an evolution towards a SIP-based architecture rather than a technology end-game.

Un-profiled international standards such as “plain” SIP do not support the regulatory services. Although CPs may have bilaterally agreed profiles that would provide support, there are, for example, a variety of means of accommodating national digit formats and number portability prefixes, so there is no guarantee that such bilateral agreements will exhibit commonality, nor that they would be reflective of what other CPs prefer.

CWW’s view is the norm for interconnecting NGNs in the near-term is likely to be NICC ND1035, which profiles the international SIP standards to incorporate support for the regulated UK services (colloquially termed “basic SIP-NNI”). This would not be suitable for replacing all UK interconnections while supporting the current service set : it will not support all services between ISDN terminals for example, nor will it support prioritisation of calls to the emergency services<sup>3</sup>; in the short-medium term these would remain on TDM.

However, ND1035 is currently only in early draft form : we predict publication in mid-2013 if appropriate resources are dedicated to the activity. Even then, it would be unrealistic to expect CPs to support ND1035 widely by regulatory mandate within a matter of months.

CWW finds it incredible that Ofcom could conclude the MEA for interconnection is something which is as yet undocumented, or is something to be agreed bilaterally between CPs. [We would highlight that the most active CPs in progressing redressing this failure by getting ND1035 agreed and published as quickly as possible are BT and CWW, while the majority of CPs who advocate that IP is already the best way of interconnecting are doing little to codify quite what this means.]

Where CPs have deployed NGNs, CWW has seen little evidence that IP interconnection (in whatever form) has become the norm. In reality, we believe the majority of interconnection - even between those CPs using NGN cores – remains at TDM. Inevitably, this is partly reflective of the lack of technical standards.

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<sup>3</sup> NB this is used on the call leg between the 999 Call Handling Agency and the individual emergency services rather than between originating CPs and the 999 Call Handling Agency; as such it is predominately a matter between BT and CWW.

Indeed Ofcom appears to ignore the fact the most economically efficient outcome for many CPs may be to sweat their TDM assets a while longer, only investing when a technical standard for IP interconnection is agreed and it makes sense for them and their customers (taking account of future equipment cost reductions when a standard has been agreed).

Taking into account the lack of agreed standards to support regulated services, and lack of scale implementation, CWW finds it frankly ludicrous that a conclusion of IP being the MEA for real world interconnection can be reached. This conclusion can only be re-inforced by the fact that there is no further elaboration of what is actually meant by “NGN interconnection”, even though this question is a significant cost driver in the model.

Nevertheless, we are in a transitional phase. Certainly by the end of the next charge control, it is possible, indeed probable, that an agreed form of IP interconnection (e.g. ND1035 with agreed codec/packetisation parameters) would be the MEA, and potentially the most deployed form of interconnection. We believe regulation of interconnection should reflect this.

CWW considers that the current approach of reviewing the state of play at a three-yearly beat cycle represents a classic case of the regulatory tail wagging the network implementation dog, because the degree of migration to IP interconnect would inherently be rushed to meet, or deferred beyond an arbitrary three yearly date, rather than driven by market/technology requirements. Our view is that instead, Ofcom should develop criteria of when IP interconnection can be considered as something which is fit-for-purpose from a regulatory standpoint (hence is “an” MEA), and when IP interconnection can be considered as the sole MEA reflective of stakeholder deployment.

From the point at which IP is “an” MEA, we consider that if two CPs with heterogeneous technologies wish to interconnect, then they should negotiate to determine who carries out the interworking, and these costs should be shared equally. So for example if an IP originating network connects to a TDM terminating network,

- if the interworking is carried out by the IP network then they should get a discount from the “standard” regulated termination rate, and
- If the interworking is carried out by the TDM network then they should be able to charge a premium over the “standard” rate for doing this.

The discount/premium should be 50% of the interworking costs.

It is for this reason that CWW believes the cost modelling should assess the FAC cost of carrying out the interworking, and given the transitional nature, that it is appropriate that short (for example 3 year) depreciation cycles be adopted for assessing capital costs. FAC costs should be used, because absent interconnection of heterogeneous networks, there would be no need to carry out the interworking function (or to put it another way, in principle the LRIC cost *is* the FAC cost).

From the point where IP is “the” MEA, we consider that TDM-based CPs would meet all interworking costs, and at some (to be determined) subsequent date, the regulatory basis of these costs would evolve from FAC to become a commercial matter.

CWW considers that the commencement of the next charge control period could be a reasonable trigger point for where IP interconnect is considered fit-for-purpose and interworking costs are shared (currently they’re theoretically borne solely by the IP CP, but we are unaware of any CP actually

exercising their right to request IP interconnection on F&R terms). However, this must be contingent on the availability of suitable technical standards, and a reasonable period for implementation. Therefore, we consider that the trigger point should be at least six months after the publication of ND1035, subject to no stakeholder unreasonably holding up publication. For the purposes of regulation, the term “IP” would mean compliance with the appropriate NICC specification, with interconnection using any other IP derivative being a commercial matter.

We believe it is possible to develop criteria around when IP is the technology of choice for interconnection, so can be considered the sole MEA, based upon practical deployment of IP interconnection. CWW has devised a strawman approach to this, which we would be happy to share with Ofcom and should it be of interest, to industry stakeholders via a multilateral workshop on this issue.

It should be noted that the above arrangements differ in detail from those which we suggested in our response to the call for inputs, which also allowed for the recovery of backhaul costs associated with IP interconnection on an F&R basis. CWW continues to believe that there is a rationale for this, but accepts that determining what is F&R could be problematic, so considers this revised scheme as more workable.

We note that the consultation has been totally silent on the interaction with number portability. Were the Ofcom proposal that TDM operators meet the cost of interworking to be accepted unchanged, the implication would be that TDM rangeholders could be faced with two sets of interworking costs (one on each of the inbound & outbound call legs), yet be unable to recover this via the APCC. It would be unacceptable for the rangeholder to be unable to recover their fair costs in routing calls to customers with whom they have no business relationship.

***Question 5: Should we use a bottom-up modelling approach for calculating the efficient costs of call termination and call origination? If not, please explain why.***

Yes, however we would place great emphasis on the need to retain checks and balances within the framework to ensure that the results of a bottom-up approach are consistent with empirical top-down costs. We would like Ofcom to articulate from the outset how the checks and balances will work in practice so that there can be no doubt over how rates should be derived. This approach is in the spirit of the Commission recommendation, decoupling the legacy incumbent cost choices from forward looking efficient costs.

***Question 6: Do you agree that we should use a decremental approach when calculating the pure LRIC of call termination? If not, please explain why.***

In principle this approach makes sense and any departure from the approach taken in MCT would have to be justified. Great care does need to be taken in selecting the cost categories associated with call termination to ensure accuracy within the calculation. Likewise if there are costs which are difficult to determine & clearly non-traffic-variable (for example duct maintenance costs), then there may be considerable benefit in excluding these entirely from the calculation to minimise the room for error and remove the risk that these costs could then be re-used at a later date, with undue weight placed on their accuracy. In constructing the model Ofcom also needs to ensure that the decrement should focus on “geographic call termination for calls delivered at the correct handover”, not geographic call termination in totality, where commercial pricing can apply for traffic handed over a distant point of

handover (as the additional backhaul involved in providing ‘wrong’ switch handover will need to be purchased on a commercial basis and should not form part of the cost modelling).

It is important that a reconciliation exercise is conducted to ensure that displaced common costs from call termination match the uplift spread across the service covered in the LRIC+ model (including call origination, own-network and ‘wrong node’ geographic call termination).

We would like to gain a better understanding of why Ofcom have placed emphasis on ensuring that BT should be provided with a fair opportunity for cost recovery of TDM and how this fits with the aspirations for the model and the end output. There would seem to be a conflict between the objective of deriving efficient MEA costs for call termination based on an NGN pure LRIC approach and a backward looking approach which seeks to ensure that current incremental TDM costs are recovered. We would also question if that if such an approach were justified, why is it centred on BT and not widened to cover other CPs. Ofcom need to provide clarity on this point there is little justification for singling BT out for special attention on this issue when other CPs could potentially make the case that their current cost base was efficient. Clarity is needed from the outset to ensure that all purchasers of call termination don’t have to endure uncertainty over rates in the event that a CPs seek to challenge Ofcom’s approach due to its secondary focus on BT’s costs.

***Question 7: Do you agree with our approach to network cost verification? If not, please explain why.***

CWW agrees the approach as the best available, while acknowledging that it is far from ideal. In the case of sub-national NGNs, it will be necessary to factor in any scale economies which may be absent as a result of their market share when compared to that of a theoretical CP with 25% share. Further, it will be necessary to factor in any scope economies, because the main candidate CPs will for example have less presence in the Business Connectivity Market (leased circuits) than a CP such as BT, meaning the “increment” for voice termination is likely to be larger for them than it would for the theoretically modelled CP.

For other NRAs, Ofcom will need to pay close attention to ensure that any assumptions they’ve made are both well considered, and not specific to their particular market / geographic instance to ensure that any comparisons with the UK are meaningful.

***Question 8: Do you agree with our proposed approach to traffic forecasting and the modelled market share? If not, please explain.***

CWW has some concerns with the approach of assuming 25% market share, and around its make-up. Firstly, assuming equal market share amongst the four largest CPs cited in paragraph 5.15.3, this would imply that no other CP has any market presence whatsoever. This was probably a fair assumption to make in the context of the Mobile Call Termination (MCT) model on which this work inevitably builds, but in the fixed market it neglects a significant tail of hundreds of smaller CPs, not to mention larger CPs such as CWW, Gamma, Colt, KCOM etc, all of whom serve legitimate market segments or specific geographies and strive to do so in an efficient way. Secondly – and this is reflected in the wording of 5.15.3 – it places undue emphasis on the residential market, neglecting the impact of the business market. Notwithstanding this, we do not believe that a 25% share assumption is inherently wrong, but would wish to see the impact of for example modelling 20% share.

The subject of traffic assumptions, though, highlights a further concern. It is CWW's belief that the output of the modelling may be heavily influenced by the impact of non-coincident busy hours. In summary, if a CP has a residential-heavy mix, then the likelihood is that the voice busy hour will be during the daytime, data busy hour will be in the evening, so this can be exploited because the IP transport requirements of one will be great when the requirements of the other are small. The implication of this will be to reduce the incremental voice termination costs. In contrast, however, a CP serving predominately enterprise/business customers is likely to see absolutely co-incident busy hours for voice and data, occurring during the daytime. As such they will not be able to exploit the economies of scope, and face making a loss on call termination.

Arguably this is simply tough luck; the regime, however, is intended to reward those CPs that operate their networks efficiently, it is not intended to penalise those CPs that target a particular market sector. To consider this from another angle; the large residential CPs cited in 5.15.3 all have relatively few enterprise/business customers<sup>4</sup>. Were the modelling to actually use their residential/business mix, this would imply an assumption that *nobody* would be serving enterprise customers, as the modelling assumption is *defacto* those four CPs with equal market share.

One way around this would be for those CPs which don't have non-coincident busy hours to be allowed to recover their additional costs, however this is at odds with the EC recommendation that CP termination rates be symmetrical, unless Ofcom felt that a degree of tolerance for this situation could be accommodated.

CWW's conclusion is that within the modelling exercise, it is important that the traffic assumptions used within the model accurately factor in the theoretical CP having 25%<sup>5</sup> of the market as a whole, i.e. including both residential and business customers. This will mean that the theoretical CP's customer base will have proportionately more business customers and fewer residential customers than the CPs cited in 5.15.3. Our analysis of the model indicates that Ofcom may indeed have taken this approach. However, we would highlight that this consideration goes beyond the traffic figures input into the model. Notwithstanding our comments in Section 3 regarding whether the model is currently functioning correctly, we assume that the model inputs around level of voice traffic occurring in the network busy hour (which is largely driven by broadband) have been derived from the answers to S.135 requests made to CPs. However, if these are CPs with a heavy residential and light business mix, then the input will have to be modified to reflect that a larger business mix will increase the broadband network utilisation during the voice busy hour, hence reducing the "spare" network capacity that can be utilised for voice.

We do not believe that this approach will remove the effect of the non-coincident busy hours, hence it still means that enterprise-specific CPs could lose out, however it does at least result in the model delivering efficient costs for a CP serving the market as a whole, not one artificially benefiting by serving only a subset of the market.

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<sup>4</sup> That is, the percentage of enterprise traffic they carry is low when compared to the percentage of enterprise traffic relative to the UK fixed voice market as a whole : this is inherent as enterprise customers are targeted by enterprise-specific CPs such as CWW, Gamma and Colt.

<sup>5</sup> Or 20%, or BT's overall market share, or 50% as appropriate

Further, we do not believe that it is appropriate for Ofcom to simply target the model based upon data volumes created by customers using “broadband” (i.e. DSL). On CWW’s network, for example, the bulk of data traffic is created by large Ethernet pipes into enterprises rather than broadband. Similarly, we would expect in the case of BT, significant portions of their multiservice network capacity must be accounted for by Ethernet-based leased lines, which may well have a time coincident busy hour with the voice network busy hour.

***Question 9: Do you agree with our approach to non-network costs and passive network elements? If not, please explain.***

We share Ofcom’s view that non-network costs are unlikely to vary with volume. If it can be demonstrated that non-network costs sit outside the LRIC cost base of call termination then it is right to exclude them, however if specific resource is targeted at right switch call termination then it may be the case that some allowance for non-network costs should be made. We do not understand the significance Ofcom places on the reducing PPP charge as justification for excluding all these costs from the LRIC calculation. We believe the composition of the charge is a more importance consideration than the long term cost trajectory of it. If no PPP costs are dedicated to ‘right switch’ call termination then it is right to exclude these costs.

Ofcom’s proposed approach to passive network elements appears sensible and we await the outcome of Ofcom’s research into the scale of any incremental passive network element costs that may be attributed to call termination.

***Question 10: Do you agree with our proposed approach to cost recovery? If not, please explain why.***

If a different approach were to be used then Ofcom would need to set out why it had chosen to depart from its preferred methodology. We are not currently aware of any attributes of the fixed market that would justify such a departure.

- End -