

## Your response

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<p><b>Question 4.1: Do you agree that if BT's migration to an IP network is unpredictable, it could result in increased charges for providers routing calls to its network? Are there any other issues that might arise as a result of its migration?</b></p>	<p>Confidential? – N</p> <p>Yes, I agree that if not carefully managed, there is an opportunity for BT to exploit the migration from TDM to IP. It is not clear at this time whether BT IP Exchange in its current form is the path for TDM CPs to migrate their BT ISI/CSI interconnects to, however, if it is, then currently, there is no regulation of the IP Exchange product, and hence, the migration from a regulated interconnect to an unregulated environment will be a concern. This, as this consultation suggests, can delay or even prevent the migration to an IP environment if the charging does not have some form of clear price controls that at the very least do not cause a CP to incur greater costs when migrating to a BT IP interconnect – i.e. if the pricing is uncontrolled then there is no incentive to move. I can appreciate that currently, and in the short term, there is a value to IP Exchange in its ability to provide protocol conversion from IP to TDM on commercial terms, and the pricing of SIP per port charges and call charges seems to reflect this value, however to ensure that a migration is achieved in a timely manner, then a clear regulated IP interconnect product requires development.</p>
<p><b>Question 4.2: Please state which of these measures you consider would be appropriate for securing efficient migration and why?</b></p>	<p>Confidential? – N</p> <p>Option 1 (agreeing a timetable for number block moves to IP) is vital to ensure that CPs are able to plan their own migrations. In conjunction, there should be no disincentive from a charging perspective, and hence I also agree that the FTR must be regulated on both TDM and IP interconnects to ensure that the migration is incentivised. As has already been assumed in this consultation, a pace of change needs to be encouraged, and hence milestones for migration should be set to avoid timescales being extended arbitrarily.</p>
<p><b>Question 4.3: Would the regulation of charges for media conversion, switching and conveyance for calls routed via IP networks be an effective means of preventing excessive charges and promoting an efficient migration to IP?</b></p>	<p>Confidential? – N</p> <p>As stated in my response to Question 4.1 there needs to be an incentive to migrate interconnects to IP, and depending upon the commercial/regulatory position, this can have a</p>

	<p>positive or detrimental effect on the practicalities of the migration. If IP interconnects that allow a CP to interconnect come with media conversion, then this conversion (as it's a transitory step), must not have an exploitative commercial element to it, and hence regulation of pricing for media conversion is a must. It also ensures that BT continues the migration at pace, as retiring of media conversion will be the final stage once all TDM interconnects are recovered. Switching and call conveyance charges should also reflect the current regulation on BT as in the TDM environment, and only be relaxed once industry is fully migrated to IP.</p>
<p><b>Question 4.4: Do you agree that it remains appropriate that telecoms providers maintain their discretion to designate a single POI at which the FTR will apply?</b></p>	<p>Confidential? – N</p> <p>I have no strong views either way with this, however as a discretionary move then have no objection to it. Obviously until a final decision on how best to manage origination and termination charging mechanisms in future across a wholly IP network, we can only assume the status quo at this time. Distance in relation to IP interconnects becomes less of an issue as the consultation states, and it could also be argued that varying time of day charging is less relevant due to limits in capacity of TDM interconnects no longer being an issue and capacity provision less costly.</p>
<p><b>Question 4.5: Do you agree with our assessment about how BT's market position in relation to interconnection might change during migration to IP?</b></p>	<p>Confidential? – N</p> <p>I agree with the statements related to BT's market position, and that it will change throughout the migration. There must be no pricing differential throughout the migration that would cause number blocks that reside on TDM switches to have different termination rates to those hosted on BT's IP Network. BT's interconnect costs you have assumed will be lower for connecting at IP vs. TDM, however I have no feel for what that charge will be (e.g. LRIC/LRIC+), as currently all BT IP Exchange interconnections are commercial and contain protocol conversion. I agree that BT will over time lose SMP on WCO and WCT, however this is wholly dependent upon the IP interconnect standards and processes being consistent, quick and cost effective to establish to avoid having to use BT to transit traffic. It is also unclear at</p>

	<p>this time how call routing will work. Is IP routing simply seen by industry as a change in protocol from SS7 and the connectivity simply moves to an IP connection rather than an ISI, or (as I would prefer) a move to a DNS environment which uses a common database to identify the domain of the called party, and route the call either directly or via a routing hub to the called party?</p>
<p><b>Question 4.6: Do you agree that there is unlikely to be a need to impose regulation on BT's interconnection circuits once migration to IP is complete?</b></p>	<p>Confidential? – N I agree that once a fully IP network is in place, then there is unlikely to be a need to impose regulation. Again, this assumes that a CP has choices with regard to connectivity and that there is an obligation by a terminating CP to engage in connectivity on request - i.e. to maintain "any to any" call routing capability.</p>
<p><b>Question 4.7: Do you agree that we should continue to regulate BT's TDM interconnection circuits as the industry migrates from TDM to IP based networks?</b></p>	<p>Confidential? – N Yes, I agree that BT's TDM interconnection circuits need to be regulated throughout the migration.</p>
<p><b>Question 4.8: Do you agree that it would not be necessary to impose regulation on interconnection circuits at BT's IP network during migration?</b></p>	<p>Confidential? – N There needs to be a level playing field for call termination during migration as previously mentioned, so I would prefer an assurance that at least for call termination, any regulation encourages a good pace of migration. I can appreciate that once migration to IP has been completed, BT's SMP in WCO will decline, however this is not necessarily the case during the migration.</p>
<p><b>Question 5.1: Do you agree that BT's role is less central to the provision of end-to-end connectivity and that telecoms providers now have a choice of transit providers with whom they can interconnect?</b></p>	<p>Confidential? – N The migration of BT's existing TDM interconnects to IP and the schedule for the move of number ranges means that any CP that currently has a TDM interconnect with BT will need to replace this with an IP interconnect to ensure that initially in the early stages of the migration activity (and probably for some time post migration) they have access to BT's ranges. Any connectivity that a small CP has with BT will also in many cases, use BT for transit services, so whilst I agree that the smaller CP can establish additional IP connections with alternative transit providers, BT initially after migration will maintain a significant customer base on IP Exchange (again, assuming IP Exchange is the mechanism for IP interconnect</p>

	<p>minus protocol conversion) and hence the CP will rely on BT to provide end to end connectivity. If at this stage, BT no longer has any obligation to provide end to end services then there will be a forced condition on a smaller CP to establish additional IP interconnects to ensure their GC obligation. I would therefore suggest that for a period of 12 months after full migration to IP is completed, that BT is obliged to maintain an end to end obligation for practical reasons.</p>
<p><b>Question 5.2: How might the transition to IP networks change the pattern of interconnection and how might this affect how E2E connectivity is achieved?</b></p>	<p>Confidential? – N  This relies on what is deemed most appropriate by industry and the NICC. It could be argued that due to multiple communication methods now available to the consumer, that full end to end connectivity is less relevant. However, if the telecommunications network is to remain a national regulated and secure environment that is obliged to maintain an any to any connection and ensure access to emergency services, then this will determine the design of any patterns of interconnection. Use of a mesh of IP connections between every CP in the same way as is currently the situation with TDM interconnects I think misses the benefit of the technology itself. Obviously, the removal of DLE connections in BT's network simplifies BT's network significantly, however ISI/CSI connections between CPs to be simply replaced with IP connections and routeing handled by each CP seems to miss the point. The use of a common database in conjunction with DNS and a mesh of independent routeing hubs could allow any CP to connect to a common environment which allows all CPs to route between themselves. This is a similar approach to LINX and provides by design an end to end capability and ensures a common set of SIP rules and protocols can be enforced.</p>
<p><b>Question 5.3: Do you agree that General Condition A1 is sufficient to ensure that telecoms providers can obtain interconnection and that additional access obligations may no longer be required to ensure end-to-end connectivity? If not, please explain why and what obligations you think are necessary.</b></p>	<p>Confidential? – N  I agree that GC A1 is sufficient to ensure that CPs can provide end to end connectivity.</p>
<p><b>Question 6.1: Do you agree with our initial view that a lack of standardisation of IP</b></p>	<p>Confidential? – N  Yes, I agree that there must be an industry</p>

<p><b>interconnection may give rise to a risk of consumer harm?</b></p>	<p>(NICC) IP interconnect signalling standard to ensure that SIP signalling is consistent and ensures, for example, CLIs/privacy flags/etc. are maintained throughout call routing.</p>
<p><b>Question 6.2: To what extent is there divergence among telecom providers in respect of the IP standards they are using? Do you consider a lack of standardisation of IP interconnection to be (or likely to be) an isolated issue or more widespread, which may require an industry-wide solution?</b></p>	<p>Confidential? – N  From experience of having operated IP interconnects for many years, even larger CPs handle signalling differently e.g. capacity exceeded messages are handled differently; certain CPs do not pass presentation CLIs correctly and display the network CLI as the presentation CLI. This lack of standardisation could be addressed through a common database combined with routing hubs and a single standard for SIP signalling and SIP interconnect establishment. Testing also varies greatly between IP CPs and hence whilst there are some commonalities of approach, there are sufficient concerns that means standards need to be adhered to more closely than they are currently, once IP is the primary method of interconnect.</p>
<p><b>Question 6.3: What measures, if any, do you consider may be appropriate to address risks arising from a lack of standardisation of IP interconnection?</b></p>	<p>Confidential? – N  There are a number of different codec options available that means IP capacity can be used more efficiently by using greater compression codecs to achieve a greater number of concurrent calls across the same bandwidth. This benefit of more channels comes with reduced bandwidth per call, and hence the possibility of poorer voice quality. Badly configured connections can cause jitter with the result of lost packets and hence voice call interruptions. The variability of configuration both during migration and post migration poses a real risk if not standardised. The use of display parameters within SIP that could display to the end party names and text also needs to be considered to ensure this facility is not abused. In conjunction with SIP standardisation, all CLIs and dialled numbers should be referenced to the common database to ensure that numbers are valid and hence avoid calls routing where a number is invalid or unused.</p>
<p><b>Question 6.4: Would it be useful to consider the case for intervention in relation to technical standards for interconnection ahead of our next market review?</b></p>	<p>Confidential? – N  Due to the rapid evolution of IP networks for well over a decade, the increases in bandwidth across industry and the development of various commercial IP interconnect products, there are</p>

a number of variances and adaptations of standards between CPs. Whilst TDM has been a captive environment up until this point with IP protected from it via protocol conversion, the move to IP is a significant step and one which does require clear and defined technical standards to be followed. It is vital to ensure the security of our national infrastructure to ensure that any CPs who connect to it adopt the same set of standards. As has been described in this consultation, there are a number of CPs who deployed their networks many years ago, and will need to adapt to current standards. I believe there now needs to be a standard set of SIP interconnect procedures that ensure commonality, and that the commonality of approach needs to be driven by industry through the NICC and a UK Specification for Interconnect clearly defined with a set of interconnect tests that need to be applied each time an interconnect is established. Again, the previous suggestion of independent IP routing hubs could be a single point of authority in conjunction with the NICC to ensure that a standard approach is taken across industry for connection to the National Infrastructure.

**Question 7.1: What are your views on the factors that we have highlighted as having a bearing on the setting of termination rates? What other developments should we consider?**

Confidential? – N  
Once an all IP network is in place there should be no difference in real terms between CPs to the charge for terminating a call. Providing the ability to negotiate termination rates between CPs is fine with a cap, otherwise as has been stated, if it is uncapped there is a concern that the costs for certain number ranges could result in CPs removing the ranges from their bundles as has been stated. I also believe that MTR and FTR should be harmonized. Currently an IP CP hosting their ranges with BT IP Exchange does not receive any FTR despite terminating the call, paying for protocol conversion and in some cases having to pay a per call fee to terminate the call. Whereas an MNO receives significant termination rates for terminating a mobile call. Bearing in mind the technologies involved, I believe that once all IP migration has been completed, termination rates should be capped at a rate that averages the current MTR and FTR, with a glide path as IP networks establish their interconnects that brings rates to a level that is fair and reasonable bearing in mind their costs. Over time I would then consider removing all termination rates, as additional technologies and communication methods will have been created that result in call charges being negligible based upon fixed fee services which the majority of the tech industries now employ.

**Question 7.2: What are your views on the options we present for regulating the fixed and mobile call termination markets? Which appears to be the most appropriate regulatory option?**

Confidential? – N  
Initially the mandated reciprocity option seems the best compromise but with a cap as described above, and a common termination rate for fixed and mobile. Longer term removal of termination costs will not I believe cause any damage to the industry due to the declining voice market and will encourage development and evolution of other communications methods.

Please complete this form in full and return to [icandtermination@ofcom.org.uk](mailto:icandtermination@ofcom.org.uk) or:

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