The Future of the UK's Voice Interconnect Regime and Call Termination

June 2019

Vodafone's response

Non confidential Version

Executive summary

1. Vodafone welcomes Ofcom's initial Ofcom consultation into the future of the UK voice interconnect regime and call termination. It is clear that a fresh and coordinated approach is required if the UK is to successfully complete the transition to IP.

2. Effective interconnectivity between different communication providers is essential for the functioning of the communications market. It is necessary for seamless connectivity between end users and provides the foundations for a competitive market place. It enables consumers to choose their preferred communications provider, safe in the knowledge that end-to-end connectivity to all is assured.

3. In recent years, we have seen significant friction developing within the UK's interconnection market. Differences over the pace of technology adoption between providers, an outdated contractual framework that is no longer fit for purpose and an inefficient and outdated approach to geographic number portability have hampered the development of wholesale competition and a more liberal UK wholesale voice trading environment.

4. Past deregulation of the wholesale interconnect market has handed too much control to BT, allowing them to dictate terms across large parts of the market; There is compelling evidence to suggest BT's slow adoption of IP and failure to offer IP termination on a regulated basis across all its UK geographic ranges has held the UK industry back in its journey to IP. Regulation of call termination at IP is now required to prevent BT distorting the market.

5. It is clear that IP is now the standard for connectivity and the time has now come to formalise this. This will ensure that geographic call termination at the regulated rate is available for all number ranges on an IP basis. The status quo has provided scope for BT to game the system, seeking to make it harder for CPs to secure regulated Fixed Call termination rates universally.

6. From 2021, if customers remain hosted on legacy TDM networks, then the terminating provider should fund any additional conveyance and conversion costs (from IP to TDM) until they make the technology transition to IP. Such an approach is consistent with Ofcom's previous approach, with Communication Providers at the leading edge of IP deployment over a decade ago expected to fund conversion, when TDM was regarded as the 'norm'. The opposite is now true, and those CPs not offering IP termination as the default should be responsible for funding conversion.

7. The new regulatory framework needs to take a CP-agnostic approach, departing from the BT-centric model of today. A future framework has to endorse IP as the industry standard. Sitting on the fence is no longer tenable. Ofcom's technology neutral stance is anything but neutral and has not worked. It has allowed BT's scale and dominance in call routing (for termination, hosted, transit and ported traffic) to set the agenda. This must end.

8. Migrating away from an inefficient onward routing approach for geographic number portability will significantly help in removing BT involvement from a large proportion of traffic where it is neither the originator nor terminator, this in turn will help restrict its ability to dominate commercial terms elsewhere in the market.

9. If Ofcom are to make the transition to IP a success, **then an industry standard IP interconnection contract is the most important foundation to any new regime**. It will help CPs set standard terms, essential in a network industry. Leaving them free to set their own pricing within a competitive market.

10. Incremental changes to BT's Standard Interconnect Agreement or the use of BT's IPX agreement will not work. These contracts need to be retired and the BT – CP relationship re-set on reciprocal, equitable terms, avoiding carrying over features of legacy dominance.

11. Ofcom need to provide a strong oversight role in these new industry contract discussions, utilising the OTA to facilitate a new contractual framework for IP interconnection. Communication Providers also to need to organise themselves, being full participants in this process. BT should not be allowed to divide and conquer. This should not become a BT pen holding exercise. There needs to be joint authorship of the new industry IP template contract.

12. Only when the playing field is level and IP is endorsed as the standard, will there be a more equitable wholesale market place that does not allow the incumbent to carry over features of historic dominance into a forward-looking IP market.

13. We will work with Ofcom to deliver a new UK IP interconnect framework that will stand the test of time and better reflect the diverse voice communications market of today.

1. The realities of today's interconnection market

UK interconnection remains a substantial market, with nearly £6Bn of traffic revenues flowing annually. The market has largely been deregulated, with BT's regulated revenues accounting for less than £14M of the total market. Taken at face value, this would point to a competitive market, no longer constrained by the incumbent. The reality is very different, with BT able to exercise a controlling influence on the market that is detrimental to competition.

BT as the unappointed System Controller

BT's retention of a number of important commercial and technical levers allows it to act as the de facto system controller across many markets. This control manifests itself through a variety of mechanisms, including control of the terms of the Standard Interconnect Agreement (SIA), control of the Carrier Price List (CPL - where BT is able to push through unilateral price changes), the Element Based charging (EBC) matrix (indicating BT's preferred point of handover for BT or third party number blocks, from which charges are then derived) and through its authorship of various product and technical manuals that document a number of interconnection services, processes and standards[1].

BT's Standard Interconnect Agreement, together with BT's commercial IPX Agreement distorts competition. The SIA, which all CPs interconnected with BT must sign, fails to permit reciprocal contract terms, allowing BT to dictate outcomes and block any realistic chance of contractual reform.

BT's Standard Interconnect Agreement dates back to 1997, when Oftel played a key role in brokering industry discussions to move the industry from a bi-annual diet of determinations (which set BT's rate card in arrears) on to a forward looking regime that provided communication providers with regulatory certainty (as key rates were subject to charge controls). In return, BT secured the contractual ability to impose those regulated terms on communication providers without further challenge.

It was a pragmatic outcome that allowed BT's Standard Interconnect Agreement to deviate from all other interconnect contracts of the time, which were largely reciprocal in nature. Communication Providers were able to sign the SIA with confidence, knowing that the constraint on BT's behaviour would come, not from the contract itself, but from regulation, which set a ceiling on what BT could charge and constrain the terms it could impose.

Over the intervening period, successive market reviews have rolled back regulation on BT, largely in recognition of their falling wholesale market share. Today, only call termination using BT's chosen technology (largely TDM local call termination) and interconnect circuits are subject to a charge control, with BT largely free to set all other prices.

Instead of deregulation being a springboard to ensure a more balanced market place, with competition constraining BT's behaviour, the opposite has occurred. As regulation has evaporated, BT's contractual and

[1] For example - billing manuals

practical grip on the functioning of the market is tighter than ever. BT's control of the market comes from a number of sources, the SIA being at the core.

The review mechanism within the SIA is not the right vehicle to progress the extent of reform needed to ensure interconnected agreements are fit for purpose. SIA reviews are slow to progress and allow BT to block all meaningful change. Most recently, BT prevented CPs from attempting to widen the scope of the ongoing 2018 SIA Review, to address the provision of IP services under the contract.

Understandably, BT is very resistant to change and will not willingly choose to give up its many contractual freedoms, without formal regulatory intervention. The only recourse for CPs is a formal dispute, which, with its four-month resolution target, is not the right vehicle to deliver a reformed contract that will seek to reflect an equitable relationship between communication providers and stand the test of time in an IP interconnect environment. Ofcom's involvement in this contract evolution process is necessary and we believe CPs, BT, Ofcom and the OTA need to come together and write a new contract that resets interconnection relationship on equitable terms.

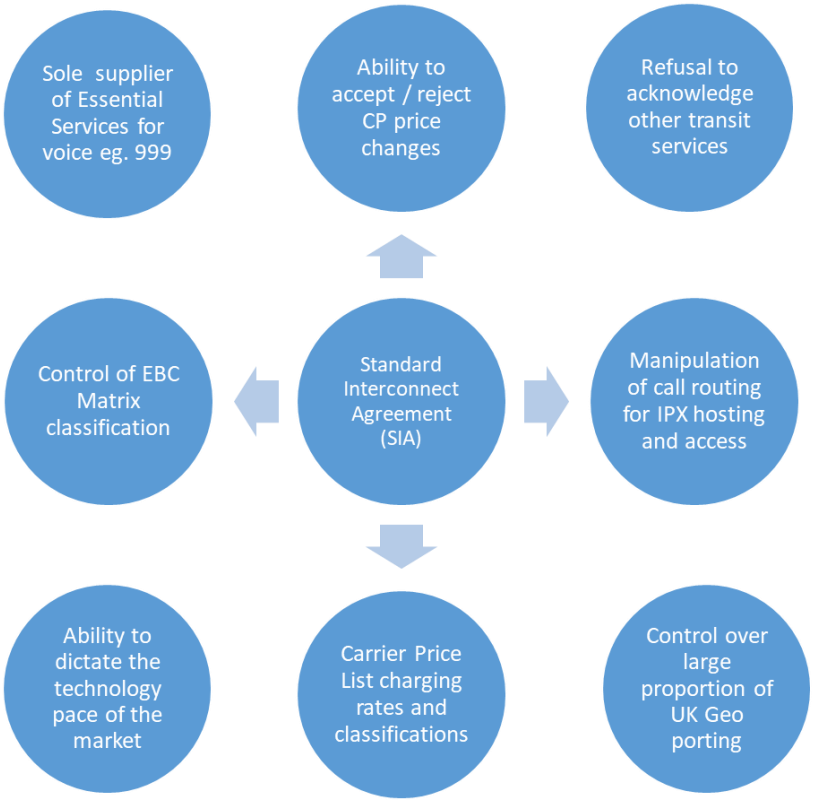

Figure 1. BT's System of control in the UK voice interconnection Market

The supply of Low volume essential services

Ofcom requires communication providers to offer access to emergency services. Only BT has the scale to fund such a service (which has to be resilient, spread over a number of geographically diverse sites, with secure and robust connectivity to each), and, in the case of e-call, only BT is the designated PSAP. There are also platform, people and training costs to consider. Unless there is a critical mass of call volumes to spread this over, then the economics do not add up. Cable & Wireless could not compete due to a lack of scale and exited the market. There are similar concerns around Text Relay and The Payphone Access charge (covering free-to-caller traffic from the UK's payphone estate).

BT has SMP in this space, yet Ofcom's market analysis fails to pick up the significance of these services to the workings of the market. The retail fixed voice market has altered over the past decade and now comprises four very large players BT (trading as BT, EE and Plusnet) Virgin, Sky and Talktalk. The Post Office and Vodafone sit outside this pack, being significantly smaller but seeking to gain market share. There is then a very long tail of smaller, mostly IP and specialist providers that target specific customer segments. The competitive influence of the providers outside leading four are very significant for the competitive dynamics in the overall market, ✂.

Often smaller providers do not have the resources to operate more sophisticated approaches to interconnect routing and can only justify connection to a single transit network at the wholesale level. BT's dominance in the provision of essential services such as 999 means they are the default choice, giving them market power that does not register in a traditional SMP assessment.

Third party transit networks struggle to provide a one-stop-shop for smaller providers because, for example, there is no means for originating communications providers to access the 999 database to populate their numbers absent signing the SIA, This leaves the transit networks in the position of having to populate the database on behalf of their originating networks' customers, hence having responsibility for elements of their regulatory compliance.

There is no realistic prospect of any market entry and no opportunity to generate a return if volumes are subscale. Ofcom needs to implement a solution to take the impact of BT's dominance in this area into account, preventing unjustifiably high prices being imposed, and guarding against the wholesale interconnect market being distorted in the process. A system that rewards BT fairly for the costs it incurs, including a reasonable rate of return, but which prevents them exploiting this monopoly into competitive markets, is needed. Safeguards are required to ensure provision of these services does not dictate outcomes in the wholesale interconnect and transit market.

3. The status quo fails to support wider IP adoption

For a number of years, many Communication Providers have been keen to move to an all IP-environment. The move to IP would take considerable costs out of their business and provide the scope to provide additional functionality to end customers that are not possible in a traditional switched telephony environment. At a practical level, the removal of legacy equipment that is either out of support or nearing that point (with spare parts in short supply), would have significant operational benefits. However these CPs have all been stopped from making the full transition to IP due to the need to interconnect with BT at scale and the requirement to send a large volume of traffic to BT for termination at TDM, even if a large proportion of that traffic ultimately terminates elsewhere (due to the onward routing nature of number portability).

Vodafone has incurred considerable amounts of capex and opex in order to continue to interact with legacy TDM networks. This spend is focused on Media Gateway capacity [redacted] and on supporting infrastructure to convey traffic between TDM and IP estates during this transition phase [redacted], including having to maintain an ability to retain our Least Cost Routing cost base (to secure FTR) on BT's TDM estate. While only a proportion of this spend is attributed directly to BT, it is likely that a number of other TDM operators have delayed their own transition to IP due to BT's failure to adopt the technology at scale. These CPs appreciate that moving to IP ahead of BT will result in them having to fund their own media gateway and extra transmission capability in order to move traffic across their network and present it using BT's preferred technology.

In 2017, our analysis showed that 82% of voice traffic is IP in the core. However, those communication providers who have opted to fast track to an all-IP environment find themselves in a prolonged state of limbo. They find themselves needing to purchase commercial services from BT under a largely unregulated commercial IPX agreement, which often prevents them from securing the lowest rates and requires them to fund IP to TDM conversation. The terms of IPX often require signature of an onerous term volume commitments that often necessitate the need to take traffic away from other communication providers to hit the volume targets. This can have an adverse impact on the wider market, resulting in inefficient routing for UK networks as a whole. For example if operator A has a volume commitment with BT that they can't fulfil, they then have an obvious incentive to offer below-cost rates to operator B to ensure they hit the required volumes and don't suffer financial penalties from BT. In these circumstances, Operator B's traffic, which would otherwise be routed direct or via an existing alternative commercial arrangement, is routed inefficiently, using routing that wouldn't normally make any commercial or operational sense.

It cannot be right that BT's technology decisions mean that we face the cost of maintaining a transmission network connecting to hundreds of BT sites in order to secure the termination rates that we are entitled to under regulation. Given the inefficiency of needing to connect to hundreds of switch sites is purely down to BT's network investment decisions, then this cost should lie with BT and no one else.

[redacted]

This strategy has effectively locked CPs into long term volume commitments to secure more favourable/acceptable rates and resulted in large volumes of transit traffic, which may in fact have been more efficiently routed elsewhere (perhaps directly to the rangeholder) being routed to BT, just to fulfill a volume commitment . The impact of voice deregulation has backfired, handing control of a large part of the market to BT. The market circumstances now give them influence well beyond their own market share and cannot be formally dealt with in a conventional market review or contract review approach.

4. The Future of Call Termination: regulation of IP is now a requirement

There is a single market for Wholesale Call Termination, with IP and TDM interconnect products both in this market. Regulation in this market is designed to provide predicable cost base for originating CPs. It is a distortion that TDM interconnect is given regulatory certainty, while IP interconnection does not have this same level of certainty. It is therefore essential that purchasers of (primarily BT's) Fixed IP Termination should be afforded the same regulatory certainty on fixed termination to ensure networks and interconnect arrangements can evolve in the UK without the uncertainty that goes with being outside the scope of formal regulation.

A lack of regulatory certainty today for IP Termination means that CPs are reluctant to move to IP interconnect, leading to inefficient network investment decisions being made by CPs in the UK. If we leave distortions due to regulation to one side, the preferred interconnect mechanism will be determined by the technology used in the core of networks. If an operator has a network with an IP core they would wish to extend that to interconnection, conversely if the network has a TDM core then that is preferable for interconnection.

We consider it necessary for all CPs to offer the regulated rate for geographic call termination on an IP basis. If the service is ultimately terminated as TDM, then a regulated TDM termination rate should be offered. Where conversion from IP to TDM is needed, then the terminating provider should fund this, but only charge FTR. Where a call is terminated as IP, but handed over as TDM, then an additional conversion and conveyance cost should be charged by the terminating provider, but only if they have set out clearly the IP nature of the number and have made the CP aware of hand over points. If the call is not handed over the at nearest point of handover to the hosting switch (either as IP or TDM) and additional (discretionary) conveyance can be charges (equivalent to local to tandem, or inter-tandem conveyance in an TDM environment).

Maintaining Certainty during Migration

BT's Migration to IP is likely to be unpredictable, occurring at a pace set by themselves on an exchange-by-exchange basis. As the timings of the migrations will be within BT's control, it is important to ensure predictability during this phase. Granting FTR on IP universally is the only way to provide certainty, create the right incentives to invest in IP and prevent gaming for short-term gain. Ofcom's proposed option 3 – FTR at the DLE and IP POI is the only way to ensure certainty.

We firmly believe that IP<->TDM conversion charges should be borne by BT, removing the need to regulate them. They would only be chargeable if a CP had handed over an IP Geo call to the TDM network, actively choosing not to use the IP POI.

Discretion around which PoIs to nominate for IP should rest with the terminating provider, however nothing should be done to prevent IP PoIs from being accessible. They should be transparently identified and easy to connect to, with connection available on fair and reasonable terms.

In the event that Ofcom elects to regulate IP interconnection (which we believe is essential for competition), then it becomes largely a matter for BT how and when it migrates its terminating services. However, if Ofcom were to allow conversion costs to be recovered, then there must be a requirement for BT to publish information sufficiently in advance (to enable CPs to adapt their routing) identifying the termination point (s) at an acceptably granular level. As numbers will migrate on an individual level, BT will need to treat a number range blocks (1k or 10K) as being 'homed' on IP or TDM for charging purposes, regardless of which technology serves the number. Where the number actually terminates will be irrelevant in this transition phase, what will matter is how it is charged and what information is supplied in advance to Communication Providers.

Regulation of interconnect circuits

Previous market reviews appear to have missed the significance of interconnect circuits. For geographic call termination, TDM circuits now form a significant (20%+) part of the cost base, yet no proper analysis of the efficient costs of operation have been undertaken. Whilst geographic termination rates are set according to the costs of an efficient network (i.e. IP technology), BT is able to pass on the costs of maintaining its TDM interconnect estate to its competitors.

From 2021, TDM circuits will require to be regulated to prevent BT exploiting other CPs while a large part of its customer base remains connected to the TDM network. BT's IP interconnect routes should be subject to a safeguard cap for the first time. Often these circuits have no rental charges applied and we would support this practice continuing on a reciprocal basis.

End to end connectivity

The motivation for originally imposing the end-to-end connectivity obligation on BT was well founded. If BT declined to purchases services from other communications providers, it could quickly compromise the business of that CP and ultimately damage competition. Unfortunately, BT has used the end-to-end connectivity obligation as a means to misbehave in the market, refusing to purchase transit services from any other CP and regarding itself as a market gatekeeper for its own commercial gain. This has had a negative impact on the market and helped BT to secure the lion's share of the transit market. Even if the transit conveyance charges themselves are comparatively low, the revenues associated with transit minutes remain very material to the market and help to give BT a critical mass that funds a wider platform.

We think the time has now come to end BT's end-to-end connectivity obligation. It should be replaced by clear Ofcom guidance to help ensure BT is not able to act anti-competitively and that sets an expectation on all providers to offer universal connectivity in all but exceptional circumstances (risk of fraud, failure to agree commercial terms having negotiated in good faith). Larger CPs like BT should have special responsibilities in this regard, as failure to open up a number range on their network could have a damaging impact on competition at both the wholesale and retail level.

Securing IP standards across the industry

There has been significant work to develop an IP standard across the industry. A pragmatic approach has been taken, being only as prescriptive as to allow interoperability, safeguard security and to ensure call quality. Standards should not be BT or vendor centric to ensure it remains as inclusive as possible. This work is now largely complete. Whilst Ofcom need not impose compliance with NICC standards, it should make it clear that should any dispute or disagreement arise, it would have a presumption that NICC standards should prevail unless there are compelling reasons not to.

BT's Wholesale Control: Impact on Retail Competition

There is a clear case for IP interconnect (call termination and bearer circuits) to be subject to regulation. This would give CPs sufficient commercial certainty to make informed investment decisions and provide the market with new technology and choice. This is not an esoteric wholesale market without relevance to consumers. Termination costs (i.e. both wholesale call termination, and the consequent costs arising on one's own network to access this service) are what sets the underlying cost base for retail competition.

This concern is borne out in the retail calls market. While the volumes of minutes is on a downward trajectory, BT's share of revenues is rising at an alarming rate. From being below 49% in 2014, Ofcom's last published data now puts it over 55.4% and on a rising trajectory. The picture is more concerning when the more supplier diverse business calls market is excluded, with BT's share of retail fixed residential calls now standing at 61%, demonstrating their continued and increasing dominance in the narrowband market and the lack of market participation by many consumers.

Ofcom have themselves raised competition concerns about the functioning of the standalone voice market (where BT had around 90% market share), proposing direct intervention in one part of the retail market. However, it is clear that the problem is wider than that and if other CPs are to compete with confidence in the retail narrowband market then certainty around pricing in the wholesale market is required.

Fixed and Mobile Convergence

The fixed network environment has some way to go to catch up with the competitiveness of the UK mobile market. Unlike the fixed network, the mobile market is not dominated by a single incumbent. There is a history of network competition and consumer choice in the mobile sector. There is a diverse retail market, with MVNOs competing alongside the network providers. It would however be premature to assume that the costs on fixed and mobile networks are are convereging. There remain cost differences for termination on mobile networks that need to be reflected in mobile termination rates. Separate rates for fixed and mobile continue to be justified.

5. Ofcom Questions

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?

Yes, BT plans to transition to IP have altered a number of time over the years, changing to meet their own business priorities. It is no longer tenable to rely upon a framework where BT themselves get to set the pace of transition around what technology presentation secures FTR. The sheer scale of BT's network, its role in number porting and its failure to transition at scale to IP is currently adding cost and inefficiency to the industry's interconnect arrangements and universal FTR access at IP is now essential (with BT funding the conversation where it is not).

Question 4.2: Please state which of these measures you consider would be appropriate for securing efficient migration and why?

It is not for Ofcom or industry to set BT's technology plans. The third option proposed by Ofcom to require FTR at DLE and at IP POI provides stability, removes inefficiency and creates the right incentives for BT to embrace IP at scale. We further believe that for as long as the current onward routing approach prevails, BT's ability to charge APCCs should not allow it to recover technology conversion costs where, for example, an originating network delivers a call as TDM and the recipient network collects it as IP – that a technology conversion is required is entirely a result of BT's tardiness in migrating to modern technologies.

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?

BT has gamed the current framework, requiring IP only providers to fund media conversion and associated conveyance costs. While BT maintains TDMs assets, CPs must either agree to their terms on IPX or maintain legacy infrastructure to route to 600+ DLEs at 100+ locations, maintaining an outdated SDH network in the process. Ofcom have also allowed BT to continue to charge for ports on a FAC basis increasing with inflation, so rentals are now ~25% of the cost of call termination (vs typically no or low charge on IP ports). If BT themselves is required to fund conversion and conveyance, and can no longer charge CPs for this, then it would remove the harm being caused.

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?

Yes, providing that an accessible FTR IP PoI is made available (alongside TDM, until the service is no longer terminated as TDM).

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?

The transition to IP and the move away from onward routing fixed number portability will result in far fewer calls needing to touch the BT network. This will help boost competition in the wholesale market, making it harder for BT to influence market outcomes. However this can only arise if the existing Standard Interconnect Agreement is retired and replaced with reciprocal IP interconnect agreements. The SIA was drafted assuming that regulation would continue it is original form. This is not the case, yet BT retains the right to impose prices on others and reject rate proposals or refusing to pay transit fees. A new interconnect agreement is needed and Ofcom oversight is crucial if this is to occur.

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?

Existing TDM circuits should fall out of regulation once FTR at IP is available universally. There will be a need to regulate the price of IP routes to BT in the short term during any transitional period, particularly in the period ahead of a common numbering database being rolled out. Given CPs have had to retain TDM links into BT for a far longer period than they might of wished, it would be manifestly unfair if BT could increase the price of TDM in the short term, failing to provide adequate time for CPs to establish enough IP capacity and change routing plans.

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?

Yes, TDM circuit regulation will be required until such time as IP routes are fully functioning and the industry has had sufficient time to re-route traffic to utilise them. Having held back the industry's move to IP, BT should not be afforded the opportunity to charge for these circuits on commercial terms during the transition.

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?

Given BT's commercial conduct and ability to game the system, where FTR is available at IP, the circuit capacity needed to reach it will also have to be regulated. It would be untenable to reach a situation where BT was compelled to offer IP at FTR, but then was free to charge what it wished for capacity to achieve this rate. This creates the potential for a waterbed effect, which would harm competition and ultimately the consumer interest. There is no need for an onerous charge control, a simple price cap on BT IP interconnect capacity would suffice.

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?

Regrettably BT has used the end to end connectivity obligation to misbehave, believing it has special obligations which prevent it being a purchaser in the transit market and using it as a mechanism to bundle a range of services into its interconnect relationships. It remains the case that CPs cannot trade without a BT interconnect and should BT decline to offer this (or reach terms for particular traffic types) it would impair CPs' businesses. In light of this we believe the time has come to call time on the end to end connectivity

obligation, but it should be replaced by a looser obligation on all carriers to ensure open access to voice services, with the obligation requiring communication providers to take reasonable steps to ensure access to the full range of termination services (with exemptions for fraud, consumer harm and failure by a terminating provider to offer reasonable commercial terms).

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?

End to end connectivity remains an important feature of the market and should be safeguarded. BT will still have an important role in ensuring end to end connectivity occurs, given its place in the transit and interconnection markets. A common numbering database and a revised contractual basis will help to diminish BT's market influence and control over time, but this will be gradual and Ofcom need to ensure end-to-end connectivity is preserved in all but the most exceptional circumstances.

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.

It may be appropriate to amend (or update the guidance) around General Condition A1 to accommodate a revised end-to-end connectivity expectation. In the alternative, a new obligation should be drafted on all CPs to promote this vital concept, which remains essential for retail and wholesale competition.

Question 6.1: Do you agree with our initial view that a lack of standardisation of IP interconnection may give rise to a risk of consumer harm?

A lack of technical standards for IP interconnection would create a significant risk of consumer harm, but this is not the situation that the industry faces. There has been significant work to develop an IP standard across the industry. A practical approach has been taken, being only as prescriptive as to allow interoperability, safeguard security and to ensure call quality. Standards should not be BT or vendor centric to ensure it remains as inclusive as possible. This work is now largely complete, via the publication of NICC ND1035. Whilst Ofcom need not impose compliance with NICC standards, it should make it clear that should any dispute or disagreement arise, it would have a presumption that NICC standards should prevail unless there are compelling reasons not to.

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?

Adoption of IP interconnection has to an extent been carried out bilaterally using international (IETF) standards, pending the adoption of a formalized UK profile. This has now been addressed via the publication of NICC ND1035. There remains an installed base of pre-standards interconnection, but we are not aware of this causing any widespread issues. Where there are inconsistencies, adoption of ND1035 should resolve this, and Ofcom's endorsement of it will signal that it should be adopted.

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?

A lack of defined standard is a risk. It creates uncertainty and will allow individual carriers, particularly BT to dictate their own requirements. If Ofcom inaction creates a standard vacuum, BT will fill it with their version and lead the industry to their own commercial and technical agenda. This would be mistake and allow them to carry over legacy incumbency into an IP future.

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?

We do not see this an onerous task for Ofcom. It merely needs to acknowledge the work of the NICC and ensure its conclusions are robust, inclusive and provide a clear mechanism to standardise IP interconnection.

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?

It is important that Ofcom take a consistent approach to the setting of termination rates, providing certainty to communication providers over an extended period. This benefits the wholesale market and provides stability for retail price competition.

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?

Given the very different architecture of mobile networks (and the transition to site heavy, small cell 5G deployment), we do not believe there are sufficient parallels between mobile and fixed services. Any attempt to harmonise would be for academic convenience rather that genuine convergence.

End