

**Next Generation Networks – Future
arrangements for access and
interconnection**

Response to the consultation document issued by Ofcom

Video Networks Limited, 2005

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1. BACKGROUND

Video Networks (VNL) has been offering pay television services over ADSL in the UK since 1996. Initially the service was video-on-demand only for the market trial over the Kingston Communications network in the Hull area.

Following an 18-month trial a commercial service was launched in late 2000 comprising video-on-demand services to the television and broadband internet service to the PC using BT's Videostream product in the London area. Due to problems initially with customer provisioning capacity and quality and later with network economics the sales campaign was halted and customer connections were significantly scaled back.

Extensive work with BT over the period 1996 to 2003 failed to produce a product meeting Video Networks' requirements for functionality, coverage and price.

In 2002 following significant changes in local loop unbundling prices and products VNL decided to run its service using BT's Local Loop Unbundling products and associated services. This provided an economic delivery platform, using components similar to those used by BT to provide Videostream and provided a cost-effective network solution providing VNL with considerable flexibility in the bandwidth, quality of service and capability of the delivery platform. This enabled VNL to launch a service in February 2004 that includes broadcast television channels and video-on-demand services delivered to the television and broadband internet service to the PC.

Although network technology has changed over the period 1996 to 2004 no fundamental enabling changes have taken place in the network infrastructure required to provide VNL's "HomeChoice" service. The evolution of the delivery platform for Video Networks' service has required VNL to expand the scope of its capabilities considerably with the attendant increase in delays, risks and financing required. In other words VNL has had to move from being a pure service provider into being a facilities based infrastructure provider to enable delivery of its service.

This consultation is taking place in parallel with the Strategic Review of Telecommunications Phase 2 and BT's 21st Century Network Consultation process. Also the consultation period has been halved to 5 weeks. Inevitably give the time constraints and necessary interaction between these consultation processes some of the views expressed in this response might have changed by the time it is read.

In this response VNL has restricted its answers to matters affecting its market and the consumers of its service. VNL has not given views that are purely subjective or on matters outside its core market.

2. ANSWERS TO THE QUESTIONS RAISED IN THE REVIEW

Section 3

Question 1. What are your views on the potential for competition based on access at different geographic levels (local/metro/core) and the way this may vary depending on geography?

The size of BT's MDF sites by number of residential lines varies significantly. Over 70% of MDF sites have less than 10,000 homes passed. This indicates that the potential for competition could vary significantly with geography. Large MDF sites offer the greatest potential number of customers in the residential market but need not be collocated with metro or core sites. The definitions of metro and core, whilst not being explicit, imply sites where traffic from many MDF / MSAN sites are aggregated. As traffic between MSAN sites and Metro sites is carried on optical fibre there is no fundamental physical relationship, subject to fibre availability and quality, between them that makes collocation a significant advantage.

Network competition at MDF / MSAN sites is therefore likely to be coincidental, being available if competing infrastructure happens to be nearby. Considering the large number of

sites this competition is unlikely to be significant giving BT a significant advantage in this origination market.

Competition at Metro sites would be very likely to develop given their smaller number but would rely on competitive networks being physically nearby. However given that BT can arbitrarily define Metro and Core sites there is no guarantee that competition will develop. Competition requires that alternative suppliers can provide infrastructure capacity at reasonable cost. The published and stable designation and location of Metro and Core sites in relation to competitive networks is therefore a key driver for competition.

Question 2. In what areas might regulatory withdrawal be feasible if 21CN enabled the delivery of improved equivalence, including ‘equivalence of inputs’?

It is premature to talk of regulatory withdrawal until equivalence of inputs is available on the family of wholesale products required to deliver an end-to-end service. Different services have different requirements for bandwidth and quality of service, which includes latency, reliability and contention. There are restrictions on the network traffic that can be conveyed both within the MSAN and between the MSAN and the Metro node. Service construction, where BT does not provide the service end-to-end, will require the fitting together of several wholesale products. The only mechanism to ensure that this “fitting together” will be fit for purpose to enable competition is the “equivalence of inputs” measure.

Regulatory withdrawal would therefore require not only the introduction of suitable wholesale products but also a sufficient take-up of product to indicate a competitive market had formed.

Question 3. What opportunities are there for generic access products to enable withdrawal of regulation from existing service specific products?

Clearly generic access products could be provided that supported a wide range of services. However it does not follow from the convergence theme of NGNs that a wide range of services requires the use of generic access products. The access products used are completely within the design domain of BT and need not be generic. Withdrawal of regulation might be possible were BT to provide a committed roadmap and product set that clearly demonstrated the use of generic access products that supported a wide range of existing and emerging services.

Question 4. What approaches should be considered for focusing regulation on enduring economic bottlenecks?

Provision of an end-to-end service will require the use of different wholesale components in different geographies. Evidence of competition having developed in a particular geography would not necessarily be implied by the use of individual components, such as unbundled loops, by alternative operators. Competition must exist between the services offered and not just the components used. The definition of a service includes not only the product but also the target market. For example the existence of business leased line replacement products over broadband by an LLU operator at an exchange does not imply that competition could exist in the residential broadband product market.

A possible solution that would allow the focusing of regulation would be to require “cost based” metro products to be made available that were fit for purpose for the delivery of a range of end-to-end services. Although this would not be competition at the deepest level of the network it could prevent economic bottlenecks being hidden. The definition of “cost based” would not be simple but may usefully be done by looking at margin squeeze so as not to confuse the investment case for NGNs.

Question 5. What principles should Ofcom adopt in order to promote a favourable climate for efficient and timely investment by all operators in Next Generation Networks?

VNL has no further comment to add to those principles implied in the consultation.

Question 6. Do you think there may be demand for products offering access at the MSAN in addition or as an alternative to LLU? Are there relevant issues other than LLU migration processes and enabling backhaul competition?

For residential services it does not seem that access at the MSAN will significantly improve the delivery of competitive services. MSAN access does not solve the significant issues of “broadband dial-tone” and, given the lack of backhaul competition at the bulk of BT’s MDF sites, would not provide sufficient scale to promote backhaul competition where BT clearly has competitive infrastructure.

MSAN access has the potential to provide a richer product set than that provided at Metro level. However this would work against the use of more generic products implied in the answer to question 4. There seems to be no fundamental reason on an NGN why product features provided at an MSAN could not have a Metro equivalent in all respects.

VNL think there would be demand for a product at the MSAN/MDF site that allowed the baseband voice service terminating on an LLUO’s MSAN to be handed to BT’s network without the use of individual copper pairs as currently done with SMPF product. This would increase voice service reliability and reduce provisioning cost and complexity.

Question 7. What is the potential impact on LLU operators and competition in broadband access of the widespread availability of broadband dialtone?

A key feature of an LLU operator’s service is the ability to offer innovative services. However in addition to the innovative aspects the LLU services also have many features in common with services provided over BT’s IPStream product set. It is reasonable to assume that over time, as today’s innovations become tomorrow’s customer expectations, the gap between LLU services and other services will shift.

Broadband dial-tone as currently proposed would make possible electronic “zero-touch” provision of non-LLU broadband services to end-users with a BT telephone service. This would enable quick and low-cost provision of such services, with obvious convenience gains for the end-user.

Consumer demand for LLU-based services, however compelling their functional differentiation, could be severely undermined if equivalent speed and convenience of provision of LLU services were not available at the same time. This would limit the growth and therefore the business potential of LLU-based operators, and threaten sustainable competition using LLU.

Question 8. Is it likely to be sufficient for LLU operators to have ‘near-equivalence’ compared to broadband dial tone, and if so, how short must provisioning timescales be?

No. The experience from the customer’s perspective needs to be independent of the method of provision otherwise service providers and their platform operators will be unfairly disadvantaged. This applies not only to the initial provision of service but also to migration of services. In order for the customer’s experience to be equivalent an LLU operator must arrange for the services¹ on the voice part of the line to be transferred. This transfer will entail either the use of SMPF, as today, or some forms of voice interconnect that provide the same services.

The provisioning timescale for LLU must therefore be no longer than the provisioning timescale for broadband dial-tone provisioned services. In addition any migration of voice services that is entailed should be provided in the same timescale.

¹ Voice services include not only the origination and termination of calls but also the provision of line rental, network services (such as CLI), telephone number and other services necessary for delivery of PATS (such as emergency calling).

Question 9. What is the shortest provisioning timescale that might reasonably be delivered by a re-engineered manual migration process for LLU? If a re-engineered manual migration process is likely to be inadequate, then what alternative means should be considered to ensure operators can compete on an equal basis with a broadband dial tone (eg copper cross-connect, ‘soft LLU’)?

It is reasonable to expect that, if manual jumpering is not eliminated, the processes for migration to LLU could be re-engineered down to 3 or 4 working days. This lead-time is most unlikely to be competitive when compared with a zero-touch process enabled by broadband dial-tone.

In VNL’s experience, poor provision process has been the key brake on the development of broadband services since the launch of BT’s broadband platform in the year 2000. This experience has been sustained in the early deployment of LLU, which VNL started in early 2004. During the last year, process quality and performance improvements have been incremental from a low base, and at times have taken steps backwards.

This experience leads VNL to identify the development of broadband dial-tone as a potential significant threat to its business, and therefore considers it imperative that full equivalence between LLU provision and broadband dial-tone is achieved, and that all available options to achieve such equivalence are reviewed in depth beyond that possible in the five-week period of this consultation.

The re-engineering of the manual migration process for LLU will never be able to match the timescale of automatic “zero-touch” provision using broadband dial-tone. However for LLU operators it is inevitable that a copper cross-connect must be changed in the exchange either manually or electro-mechanically. This leads to a dilemma.

In addition to the solutions proposed it would seem that there is another solution. This would entail providing a set of migration processes that are well documented, defined, time-bounded and suitably automated to give the customer a “zero-touch” experience. This would not be a simple undertaking as can be seen from the range of migration processes already requested by LLU operators.²

In addition the processes would need to start by allowing the LLU operator to be selected from the broadband dial-tone gateway and to offer initial service in the same way that a service provider using BT’s wholesale broadband products would. This connection would only be required until the copper cross-connect had been changed. Clearly all the “voice services” however provided would need to have been migrated before this.

This alternative solution would probably require the use of an automated copper cross-connect to allow the timing and effect of the LLU provision to be equivalent.

No amount of re-engineering of the manual process will provide an adequately equivalent provisioning time for LLU lines.

Question 10. If some form of ‘soft LLU’ was made available, might it be practical to provide alternative providers with an ability to configure line cards independently of each other, based on an ‘operator profile’?

No. The use of “soft LLU”, if practical, would only increase marginally the capability of service providers to innovate. There is an inherent relationship between the nature of the service to be delivered and the configuration of the line card, MSAN and Backhaul.

² See the Ofcom consultation published: Dec 16, 2004 “Consents to disapply BT’s SMP services conditions that require the notification of charges, terms and conditions and technical information in respect of certain products and processes relating to LLU and LLU backhaul”

Configuring the line card ensures the service delivery capability on the copper however bandwidth and traffic shaping restrictions generally require that the line cards offering a particular service conform to known limitations in the MSAN. The range of traffic bandwidths and qualities of service is extremely large ranging from single highly contended broadband PC services to multiple video streaming services required on a single loop. The backhaul bandwidth reserved per loop for these different services could vary by up to a factor of 100. Unless the MSAN and backhaul were being run without contention the innovations available using “soft LLU” would in no material sense enable service innovation over BT Wholesale broadband services.

Question 11. To what extent, and over what timescale, might operators realistically build out their own networks to the MDF/MSAN nodes, thereby enabling a competitive market in backhaul services?

VNL does not own a network and so must purchase backhaul components from BT and other operators. VNL is in discussion with a number of alternative backhaul providers and would observe that the vast bulk of exchanges do not have alternative backhaul providers. For a number of alternative operators their networks are focussed on BT’s current voice nodes with coverage of other exchanges being “coincidental”. This means that competition in the backhaul market will be driven by BT and LLU operator requirements alone.

In VNL’s opinion a competitive market for backhaul will not develop principally because of the risks inherent in the low number of “customers” for these services at each exchange.

In some geographies these general statements do not apply principally where there are groups of larger exchanges and where backhaul networks exist to service non-residential needs. The existence of these exceptions cannot be extended to imply competitive backhaul availability.

Question 12. Are there parts of the UK where backhaul between MSAN nodes and Metro nodes should be regarded as an enduring economic bottleneck?

Yes.

The requirements for backhaul services vary significantly with the type of service delivered and the target end-customer market. For this reason there will necessarily be some debate about the parts of the UK (exchanges) where there is an enduring economic bottleneck.

For many services the attractiveness of an exchange for service delivery depends on the type (either business or residential) and number of customers served in an exchange area.

An analysis of exchange and post-code data shows less than two hundred exchanges serving a significant number of businesses and shows that more than half of exchanges that serve residential postcodes pass less than four thousand homes.

It is therefore reasonable to conclude that exchanges can be placed into three categories:

1. Exchanges where there are competitive backhaul services available or nearby.
2. Exchanges where there is no competitive backhaul available or nearby and where the attractiveness for service delivery is low. From the data above it seems likely that three to four thousand of BT’s MDF sites would fall into this category.
3. Exchanges that are in neither of the first two categories.

Clearly agreement of the classification of exchanges into these categories requires both subjective judgement about exchange “attractiveness” and confidential commercial data about network extents and plans. Despite this it should still be possible to identify those MSAN nodes where availability of backhaul will be an enduring bottleneck.

Question 13. Might MSAN interconnection enable sustainable competition in backhaul in geographies where LLU is not viable?

As in VNL's response to question 6 above. MSAN interconnection (even with "soft LLU") would not be able to offer significant and sustainable innovative services and so would therefore be unlikely to drive backhaul competition.

This should not be taken to mean that MSAN interconnection is not required as a product.

Question 14. Is it likely to be cost-effective for MSANs to support dynamic routing of IP traffic, and if not, what alternative options should be considered for providing some form of MSAN interconnection?

VNL has no authoritative view on this.

Question 15. If MSAN interconnection were appropriate, what level of access (eg layer 2 v layer 3 v voice interconnect) is likely to be suitable?

VNL has no authoritative view on this.

Question 16. Is it possible to rule out at this stage the option of providing service specific interconnect at every MSAN?

VNL has no authoritative view on this.

Question 17. Given that MPLS technology is only likely to be deployed within core networks, at least for the immediate future, how might services based on some form of MSAN interconnection provide adequate quality of service?

VNL has no authoritative view on this.

Question 18. What are the aspects of equivalence of input that would need to be considered for MSAN interconnection?

At a superficial level table 5 describes equivalence of functionality. For equivalence of input to be effective it must not only be possible to convey different traffic types but to do so using an MSAN interconnect product that satisfies any quality of service criteria to be met taking into account the need to manage this as the number of customers connected changes or customers change their service mix.

Take for example the last entry in the table where BT enable "broadband dial-tone". Suppose this "broadband dial-tone" were routed to the Altnet's interconnect. At this stage, excluding voice services, the Altnet will not have a contract for supply of (DSL) services with the customer. When the customer utilises the "broadband dial-tone" he expects a choice of services or service providers to whom he can connect. If the "broadband dial-tone" has been passed to an Altnet this choice will be different to BT "broadband dial-tone" choice. This is clearly complex to explain to the customer. In this instance equivalence of input will lie upstream on the MSAN interconnect point in the mechanism that presents "broadband dial-tone" to the customer.

Question 19. Do you believe that inter metro node conveyance is not an enduring economic bottleneck and therefore, where LLU/MSAN access competition is not viable, that regulation should be focussed on access at the first metro node?

Clearly this depends on the location of the metro nodes. BT in its 21CN design process will take a number of factors into account when selecting metro node sites. As traffic from MDF site to Metro node and traffic between Metro nodes is carried on optical fibre and optical fibre can carry large volumes of traffic large distances there is considerable geographic flexibility available to BT when selecting the majority of Metro nodes.

Obviously networks capable of providing competitive services currently have a fixed geography. Once the Metro node locations are known then it would fall to each Altnet to assess the feasibility of reaching a Metro node given the service required at that Metro node. It therefore seems reasonable to assume that BT will be required to publish the Metro node

locations and also to undertake not to move Metro nodes. If it is reasonable to assume that Metro nodes will not be perversely located with respect to Altnets current networks and that their location will be both published and fixed then it would be reasonable to assume that inter Metro node conveyance would not be an enduring bottleneck.

In any event given the relatively small number of Metro nodes compared to the overall number of MDF sites it is reasonable to focus regulation on the first Metro node.

Question 20. Is the ability of operators to build out to metro nodes likely to vary geographically, resulting in the need for conveyance to some nodes to be regulated on an ongoing basis?

VNL has no authoritative view on this.

Question 21. What would the characteristics be of a metro node access product supporting equivalence of input?

Considering the number of exchanges served on average by a Metro node a Metro access product which would take traffic from the Metro node to an Altnet's point of presence would be required to be reliable, diverse, capable of supporting quality of service and scaleable. In addition the traffic from one MDF site would be capable of delivery to more than one Metro node to ensure resilience of the Metro/MDF network. Therefore the Metro access product would be required to support this diversity of traffic routing.

In line with Ofcom's principle of "promoting competition at the deepest level of infrastructure where it will be effective and sustainable" it is worth considering the service layers that would underpin such a product. Clearly because of the variety of services carried to the Metro node the appropriate layers of the OSI model are Transport, Network, Data Link and Physical.

A fundamental requirement of a Metro access link is reliability and this is accomplished by automating the routing of traffic in case of a network failure. There are two classes of network failure to consider one is the failure of a link and the other is the failure of a Metro node. When a link is built equipment is placed at each end to carry traffic. If the physical link is underpinned by diverse fibre then the equipment can use an alternative fibre should one fibre fail. In IP networks (as opposed to SDH networks) a number of technologies exist to handle such failures. However no single protocol dominates. It is therefore necessary for the equipment that handles the failure at each end of the link to be controlled by the same operator. The only common deepest element to these failover systems is the fibre that provides the link. It follows therefore that BT should make fibre available between a Metro node and a point of handover³.

In addition when a Metro node fails to be able to route traffic from a number of MDF sites then links from the alternative Metro node(s) should be identifiable and available.

Question 22. Under what circumstances should BT face specific access obligations for intelligence capabilities due to its SMP in a related market and what specific examples are there?

The examples highlighted in section 3.61 are highly pertinent to VNL's (or any Altnet's) ability to provide a value add service within its business model. In addition, the delivery of services relying on those identification, authentication and management features are critical to the end user experience.

CPE interaction with the service providers' platforms is managed from a pool of service provider IP addresses and user authentication is mapped against their profile of history and allowed services.

³ The distinction between a point of handover and a point of presence is that a point of handover need not be a building with powered equipment. It could be a fibre junction point.

If an Altnet is not allowed to control the allocation of IP addresses to its end-user, BT must be required to provide resolution of the address they actually have used against the allowable addresses of the Altnet. Without requiring BT to provide this service, any Altnet would be hampered in the services and functions they could support. Altnets could be forced to only use addresses provided by BT.

BT should not be allowed to inhibit the ability of an Altnet to deliver services by withholding intelligence which might reasonably be expected to be available in the management for a fit network. Regardless of the particular situation, if BT has information or hooks which can be shown are inherently available in the management and functioning of the particular network, they should be required to make those hooks available for use by the Altnet and not be allowed to withhold them for profit. When an Altnet has contracted for a particular service from BT, the service should include all the functionality expected to be available if the Altnet had installed and implemented a similar network for themselves.

Without direct experience of BT's practices in the new 21st CN, VNL cannot respond with appropriate examples. Typically negotiation with any business entity with SMP would translate into a service whose functionality and prices are not open to discussion. It is expected that the improved abilities of the new 21st CN will allow BT to provide much more responsive and custom service offerings at desirable rates. If it is shown that BT have not taken advantage of this new functionality to benefit their customers, BT should be regulated to use these capabilities in a more market-orientated manner.

Question 23. Under what circumstances should access to intelligence capabilities be regulated on a reciprocal basis and what specific examples are there?

VNL has no authoritative view on this.

Question 24. To what extent might commercially negotiated access to intelligence capabilities remove the need for regulation?

VNL has no authoritative view on this.

Question 25. Is it important to consider the provision of deeper hooks to directly access intelligence capabilities and is this access likely to be practical?

VNL has no authoritative view on this.

Question 26. What might be the benefits from achieving equality of access to 21CN OSS, and do these require adoption of 'equivalence of inputs', or is some form of compromise appropriate?

VNL sees 'equivalence of inputs' as a fundamental requirement on which there can be no compromise since experience shows that without 'equivalence of inputs' there will be no 'equality of access'.

Without 'equivalence of inputs' there can be no effective competition: while other operators are forced to use inappropriate, error-prone and unreliable systems to manage their customers' requests, BT Retail are able to re-enforce their monopoly position through preferential access to data, processes and personnel. It is essential that interfaces, systems and processes used by BT between their Retail and Wholesale operations be appropriate and available to competing wholesale operators as this is the only way in which process-based, artificial barriers to competition can be demonstrably removed. If BT believe that they are providing effective, scalable, fit-for-purpose solutions to other operators then there is no other way to verify such claims than through BT Retail itself using those same processes and systems.

The alternative of measuring 'equality of outcomes' has demonstrably failed. A simple example relates to LLU and attempts to compare service levels provided by BT Wholesale to BT Retail and to other operators. Meaningful, comparable statistics have never been produced: BT fail to agree appropriate KPI definitions with industry; or they calculate figures on an unknown basis which bear no resemblance to operators' own calculations; or

BT claim that comparable figures cannot be generated from the private, in-house systems which are available to BT Retail alone.

With both BT Retail and their competitors using the same 21CN OSS to interface with BT Wholesale there will be an incentive for BT Wholesale to ensure that those systems are fit for purpose. Moreover, doubts about equality of treatment will be largely removed.

Question 27. What might be the practical barriers to achieving ‘equivalence of inputs’ in relation to 21CN OSS, and do you believe that these are likely to be surmountable?

VNL sees no significant barriers to equivalence of inputs, other than ones that might be artificially erected.

To date, not only has BT used different OSS interfaces for BT Retail and for other operators but has also adopted a bizarre systems architecture in which new software is developed from scratch when providing identical functionality to each sub-group of those operators. Such architectural and organisational principles make OSS development slow and expensive, continually driving operators to use so-called ‘tactical’ manual solutions that always prove to be error-prone and unable to process transactions effectively as volumes grow.

We do not see concerns about scalability of B2B gateways as a justification for postponing equivalence of inputs. Operators have these concerns already and expend considerable effort negotiating and producing forecasts at ever increasing levels of detail in an attempt to convince BT Wholesale of the need to ensure that their interfaces have adequate capacity to handle anticipated volumes. What more accurate way to estimate gateway capacity than to aggregate demand across products and operators (BT Retail included) and then commission the necessary infrastructure.

Neither do VNL see issues surrounding security and standards as in any way providing an excuse for delaying equivalence of inputs. If operators other than BT Retail are to have any access at all to 21CN OSS then those issues must be resolved in any case, and the amount of work involved is largely unaltered whether there be one, ten or a hundred such operators. Moreover, these issues do not simply disappear because BT Retail is part of the same commercial entity as BT wholesale. There is indeed a piece of work to be done here, and it is clear that the most effective way of completing it is to provide a common 21CN OSS interface for all of BT Wholesale’s customers including BT Retail.

Section 4

Question 28. What do believe the appropriate guiding principles should be for the transition from existing access and interconnection arrangements to new arrangements? Do you agree with Ofcom’s proposed principles?

VNL has no authoritative view on this.

Question 29. What types of product migrations are there likely to be for 21CN and what general issues do they raise?

The regulated LLU backhaul products classed as AISBO (Alternative interface symmetric broadband origination) are currently provided using a mechanism that provides a transparent network link with low bit error rate, low latency and low jitter. A key issue is that there are vital product characteristics that are not included in the BT Supplier Information Notes (SINs) and these characteristics could be lost in certain 21CN implementations particularly if layer 2 carriage is emulated over higher layers in the OSI stack.

Question 30. What might be the impact of geographic migration of points of interconnect for alternative network providers?

Other than our response to question 19, which is echoed in the second bullet point of paragraph 4.9 of the consultation, VNL has no authoritative view on this.

Question 31. Might this be mitigated, by for example continued provision of interconnect at some existing sites?

VNL has no authoritative view on this.

Question 32. Where the impact cannot be mitigated, what principles should determine the level of compensation paid by BT?

VNL has no authoritative view on this.

Section 5

Question 33. Would it still be relevant for future IP based versions of voice interconnect services to be charged on a pence per minute basis or should other charging schemes (e.g. flat-rate origination and termination included within the line rental) be considered?

Other charging schemes should be considered, as the economics of NGNs are considerably different to those for PSTN services. As NGNs carry many services, including voice, on a common infrastructure the mechanisms that enable per minute charging can significantly increase cost depending of the choice of protocols for the network design.

Question 34. Given that 21CN will result in narrowband and broadband access being supported using almost identical platforms, is it sensible to continue to make a distinction between wholesale narrowband access (WLR) and wholesale broadband access (Broadband EUA), or should consideration be given to a single wholesale access transport service supporting narrowband and broadband?

Creating a new single wholesale access transport service does not solve the problem of how to allocate the common cost of the copper loop among a basket of wholesale products. It may help to expose any issues raised when the product mix on the line changes and the service that was paying for the copper is ceased by the customer even though other services continue to be delivered on the line.

Question 35. Is it likely that take-up of ‘Voice over Broadband’ will eventually allow the withdrawal of voice-specific regulation, and if so, under what conditions and over what timescale might this occur?

VNL has no authoritative view on this.

Question 36. Would it be appropriate to consider refocusing voice specific regulation on those low-spending customer deciles least likely to take ‘Voice over Broadband’ service, and if so, how and when might this be done?

VNL has no authoritative view on this.

Question 37. Which legacy voice services and line features provided by the current PSTN might not be supported by the 21CN PSTN replacement service, what should be the process for producing a definitive list, and what should be the process and timescale for withdrawing services on this list?

VNL has no authoritative view on this.

Question 38. What compensation arrangements should be considered when alternative operators are forced by BT to re-arrange their PSTN points of interconnection?

VNL has no authoritative view on this.

Question 39. Might it be possible to mitigate the impact of the withdrawal of local exchange interconnection, either by providing TDM gateways at more locations, or by establishing a charging structure under which those operators capable of providing backhaul for themselves would not be charged if they were forced by the new interconnection arrangements to use BT backhaul?

VNL has no authoritative view on this. Obviously a charging structure based on an operators current backhaul capability will lead to difficulty in defining those operators that qualify for the reduced BT backhaul charges.

Question 40. What issues need to be considered relating to signalling used for PSTN interconnection with 21CN? (for example the SIP specification to be adopted, the availability of SS7 as well as SIP interconnection, the availability of IUP as well as ISUP, the availability to interconnecting operators of H248, support for a UK specific feature set))

VNL has no authoritative view on this.

Question 41. What transmission interfaces need to be considered for TDM gateways used for PSTN interconnection?

VNL has no authoritative view on this.

Question 42. For call types that traverse multiple TDM gateways what is the likely impact on end-to-end QoS, and what options should be considered for mitigating this impact (a new approach to number portability, for example)?

VNL has no authoritative view on this.

Question 43. What other technical issues need to be considered in relation to PSTN interconnection with 21CN?

No comment.

Question 44. Would broadband access and interconnection need to evolve to allow derived voice services to be provided in an efficient manner over an entry-level broadband connection, and still provide similar quality of service to PSTN voice?

It would be difficult, at this stage, to make a definitive statement on technology evolution without drawing a conclusion on where a perceived design should end. Innovative technologies which overcome short-comings in interconnect and access capabilities are always in development. An example of evolution would be Channelized Voice over DSL (CVoDSL): a technology specifically designed to enable service providers to bundle new, profitable voice over DSL services to their residential and small office customers. This service delivers high-speed Internet access and POTS plus multiple voice lines and dial-up data/fax modem connections on a single copper pair, enabling the transition of DSL from a data-centric technology to a complete voice and data solution.

This CVoDSL solution transports voice within the physical layer, allowing transport of derived voice channels over DSL bandwidth while maintaining both POTS and high-speed Internet access. It reserves 64 kbps "channels" of DSL bandwidth to deliver broadband voice from the DSL modem to the remote terminal or central office, much like regular POTS. The access equipment then transmits the voice directly to the circuit switch. This approach eliminates the need for packetisation of voice traffic over the local loop into higher protocols such as ATM and IP. This technique provides the voice service with lower bandwidth consumption, in turn preserving more bandwidth for Internet access and other applications and allows a transition to NGN packetised soft-switching platforms.

BT should not be allowed to implement any network strategy or design which precludes implementation of reasonable yet innovative solutions to end user demands or Altnets opportunities.

Question 45. What other issues need to be considered in relation to derived voice services?

The use of IP to carry voice substantially increases complexity in the network. As is the case with native ATM, a separate virtual circuit is required to carry IP packets containing voice in order to guarantee the necessary QoS; with an additional requirement for IP routers in the network to distinguish between voice and data packets so as to map each type of packet to the appropriate virtual circuit. IP routers in the network also have to implement some kind of weighted fair queuing scheme to make sure that voice packets are treated with the appropriate priority at the IP level. In the absence of agreed standards for QoS in IP networks, even these measures cannot guarantee that the QoS requirements for voice can be met.

Using IP to deliver local telephony services also puts additional burdens on any Altnet in dealing with administration and security issues. With VoIP, the service provider has to manage end user IP addresses for the delivery of voice services, and implement some kind of authentication scheme to prevent service theft and other abuses.

Accurate transfer of signalling and speech requires application and end-to-end delay and jitter control across the network. Toll-quality speech requires less than ~20 ms of average delay and ~10 ms of jitter in the broadband access network.

BT needs to provide a product that allows an Altnet to provision and control voice services in their primary and backup end-to-end paths for voice IP packets – one with a minimum of BT network management delay. Alternatively, BT needs to provide a competitive dark fibre product so the Altnet can control network characteristics and QoS for the voice packets by providing their own networking devices. At the points at which Altnet packets must traverse BT networks, BT services and support needs to be implemented transparently and efficiently regardless of the competitive position of the given Altnet.

Question 46. What range of business ISDN services is there a need for 21CN to support?

VNL has no authoritative view on this.

Question 47. What scope is there for withdrawal of some legacy ISDN services?

VNL has no authoritative view on this.

Question 48. Do next generation Voice VPNs raise any service-specific requirements in relation to 21CN?

VNL has no authoritative view on this.

Question 49. What options should be considered for managing the migration of current generation Voice VPNs to next generation Voice VPNs and IP VPNs?

VNL has no authoritative view on this.

Question 50. What other issues need to be considered in relation to next generation business voice services?

VNL has no authoritative view on this.

Question 51. Once broadband is available to most UK consumers would it be appropriate to agree a process and timetable for the withdrawal of FRIACO?

VNL has no authoritative view on this.

Question 52. If FRIACO is withdrawn, over what timescale should this take place in order to allow an orderly migration, and what process issues need to be considered?

VNL has no authoritative view on this.

Question 53. Is there likely to be a long-term need for some form of flat-rate dial-up internet access service, to cater for those consumers unable to receive broadband services?

VNL has no authoritative view on this.

Question 54. What form of entry-level internet access service would be appropriate for those consumers who only occasionally access the internet, and who therefore do not have a strong incentive to migrate to broadband?

VNL has no authoritative view on this.

Question 55. What other issues need to be considered in relation to consumer narrowband data services?

No comment.

Question 56. Is it likely that consumer broadband services will in the future require some form of managed QoS, or some other specialised capability, due to the introduction of new multimedia services such as real-time video?

If a consumer takes all their broadband services from the same service provider then under some network designs the management of QoS is in the service providers domain. QoS can be provided in a cost effective manner in this case.

If more than one service provider provides broadband service to a consumer then some form of managed QoS will become necessary.

Question 57. If so, might this be best delivered through changes to the underlying generic access and interconnection services associated with 21CN, or by the introduction of new forms of access and interconnection specifically designed to support such requirements as real-time video?

The bandwidth requirements of real-time video are significantly higher (in the range 10 to 50 times higher) than the bandwidth required for voice and “best effort” contended broadband services. It is therefore possible, but not desirable, that new forms of access and interconnection would be required. In order to build a network platform that can handle all currently envisaged service types it would seem more cost effective to built support for video services into the generic access and interconnection services unless it proved infeasible to source network components with the required capacity.

Question 58. Is it reasonable to consider replacing the two existing forms of broadband interconnection (IPStream and DataStream) with a single converged IP interconnection service, incorporating the option of MPLS-based QoS management, in addition to a basic ‘best-efforts’ service?

VNL has no authoritative view on this.

Question 59. If some form of layer 2 (e.g. ATM or Ethernet) broadband interconnection continues to be required, as well as IP interconnection, how is this likely to be affected by the migration from ATM to Gigabit Ethernet?

VNL has no authoritative view on this.

Question 60. What other issues need to be considered in relation to consumer broadband data services?

No comment.

Question 61. Which legacy leased line services are likely to continue to be provided directly over optical transmission network, and which might be provided using circuit emulation technology over NGNs?

VNL has no authoritative view on this other than our answer to question 29 concerning backhaul products.

Question 62. What technical and commercial issues might be raised if BT were to use circuit emulation technology to provide leased line services over 21CN?

VNL has no authoritative view on this.

Question 63. Which legacy leased line services are likely no longer to be needed over 21CN?

VNL has no authoritative view on this.

Question 64. Would it be appropriate for next generation leased line services provided over 21CN to focus on new transmission technologies such as Gigabit Ethernet?

Yes.

Question 65. What would be the desirable characteristics of an Ethernet based wholesale leased line, and which variants of the Ethernet technical standards should be considered (100Mbps Fast Ethernet, Gigabit, 10 Gigabit, Long Reach Ethernet, Resilient Packet Ring, etc)?

VNL has no authoritative view on this to express here.

Question 66. Are there certain types of business services that will continue to need PDH/SDH-based transmission, or will PDH and SDH increasingly become legacy services?

VNL has no authoritative view on this.

Question 67. Might selective access to dark fibre, in those geographies where there is no alternative supply, be a more targeted means of addressing the underlying access bottleneck than a general requirement to provide wholesale leased lines?

Our answer to question 21, although not related to business services, would support selective access to dark fibre as a solution.

Question 68. Might access to dark fibre be more likely to result in significant service innovation, because of the ability to deploy new transmission technologies (e.g. new variants of Ethernet)?

Yes. See the answer to question 21.

Question 69. Might some form of QoS-enabled bitstream interconnection, similar to the current DataStream service, be an effective means of enabling competition in the market for business data services?

VNL has no authoritative view on this.

Question 70. If so, would ATM or IP/MPLS be appropriate, and what technical issues would need to be resolved in order for the service to be effective?

VNL has no authoritative view on this.

Question 71. If Ofcom was to focus regulation on just one of the three different means of addressing the access bottleneck associated with the business market (dark fibre, leased lines, QoS-enabled bitstream), which would you choose?

VNL has no authoritative view on this in the business market. If LLU backhaul were in the business market then VNL would suggest focussing on dark fibre.

Question 72. What other issues need to be considered in relation to business data services?

VNL has no authoritative view on this.