



Innovation in the 'Middle Mile'

We need radical change in telecoms products to ensure the UK can compete in the future

To: Dougal Scott Esq
Ofcom

From: The Access to Broadband Campaign

Telecommunications Review Phase 2 Submission

Dear Mr Scott

The Access to Broadband Campaign (ABC) welcomes the strategic review of telecommunications by Ofcom.

1. ABC believes that the current approach in UK is leading to evolutionary solutions to the problems, rather than the revolutionary solutions which could return UK to a competitive position in the world regarding next generation broadband.
2. ABC believes there is a 'middle mile blockage' and believes Ofcom needs to encourage new middle mile access and pricing models to promote best use of the network. ABC expands on this in the enclosed documentation, published in November 2004.
3. ABC believes that there is substantial UK national market failure with regard to next generation broadband, particularly in light of recent announcements about FTTH from Japan, Korea, and US, and that direct and urgent intervention is required to bring fibre closer to the end user nationwide.

I attach our paper for your inclusion in the review and look forward to hearing from you in due course.

Yours faithfully,

Lindsey Annison, Erol Ziya and Brian Condon

For the Access to Broadband Campaign

Innovation in the ‘Middle Mile’

We need radical change in telecoms products to ensure the UK can compete in the future

The technology infrastructure has changed but the products remain the same

Everything has changed at the technical level of how data/services are moved/provided over networks. A landmark was recently reached with BT’s announcement that the dominant old world PSTN will no longer exist at all in the near future.

Despite this fundamental revolutionary and total paradigm shift in how networks operate there has not been a comparable shift in the services. The retail and wholesale products that are offered over the new network, the commercial basis for these services and the costs to end-users relate to an old world network infrastructure.

What we have is a radical new network infrastructure and the same old services and basis for services that relate to a network that no longer exists, an all IP network providing old world PSTN services using old world PSTN models. To drive the creation of a world leading BB Britain, then we must close the chasm between the actual network infrastructure and the basis for the products and services delivered over it.

New products must reflect the needs of users and the capability inherent in an ‘all-IP’ world

We need new products that reflect the full capabilities of the new network infrastructures used to deliver them. These products need to be as radical as the radical change in the means of provision that is represented by a move from an old circuit switched PSTN network to a packet switched all IP network.

The products we envisage will:

- Enable network operators to compete directly in terms of network efficiency and not in terms of pre-capture of traffic
- Promote innovation in both local first/last mile distribution and in middle mile transit
- Present the lowest possible barriers to entry to first/last mile operators, middle mile operators and service providers alike and protect against a market dominated by scale players
- Ensure the benefits of an all IP infrastructure are shared directly with the end-users of the networks and not just held by the network owners who may or may not ‘trickle down’ these benefits as and when they see fit and on their terms

Our aim is to propose a basis that will enable the UK government to set an important target for 2010 – the UK must aspire to be the cheapest place in the world to move data *within*. To make this happen, we propose a radical new basis for middle mile transport that seeks to solve ‘the Middle Mile’ problem.

Tackling the middle mile problem – deal with the ‘thin pipe’!

The Middle Mile Problem is sometimes described as the ‘fat pipe – thin pipe – fat pipe’ problem. Within a home or small office one can cheaply and easily build a ‘fat pipe’ (100mbs or gigabit) data network. Once you’ve built this network your costs are fixed with no incremental cost dependent on usage.

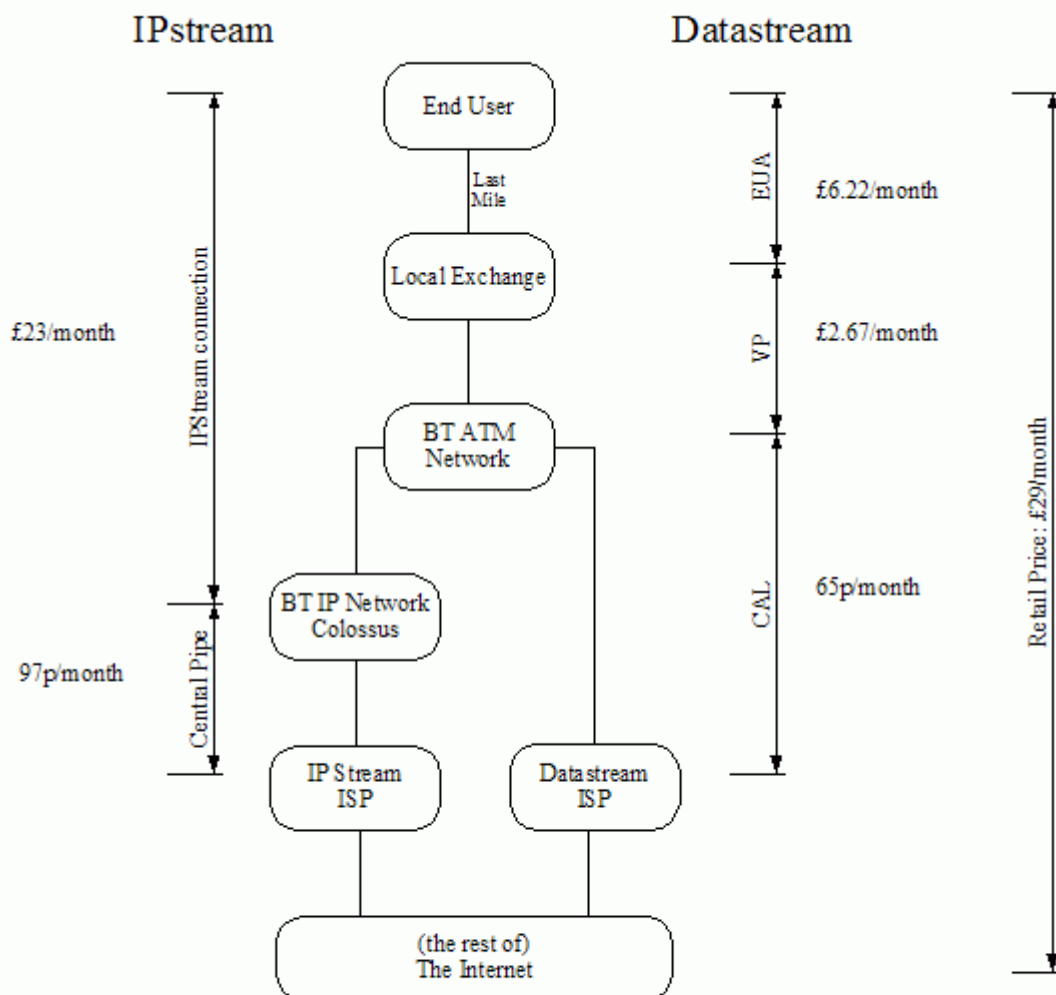
Within a geographical area, ‘fat pipe’ local networks can be relatively easily and cheaply connected together and their usage aggregated either by community based projects or by innovative commercial companies using technologies like licence free wireless and using existing products like LLU. From a suitable internet peering point like the LINX exchange or Manap such networks can gain the benefits of near zero cost interconnection to other UK networks as well as to cost-effective and competitive external connectivity.

Where such networks cannot easily and cheaply be built is in the connection from a local aggregation point to a point like the LINX exchange. In this area the only viable option is to use someone else’s network. The problem is that the products that are available for this kind of transit, which are all based on and priced on a model of an old world PSTN network. The key point is that these products are neither competitive nor truly related to the actual costs of a new all IP network.

We can illustrate this simply by looking at the costs of some of the available products and using their costs to deduce the proportion of cost due to the middle mile transit.

To get an idea as to the extent of middle mile costs one can look at the BT wholesale products DataStream and IPStream which are used to provide 90%+ of DSL based BB in the UK. DataStream provides wholesale access for a connection from an end user as far as the local telephony exchange and is only suitable for ISP of scale – because the network components that are then needed to move data from this point to the ISP are purchased in bulk blocks and with significant advantages in scale. IPStream provides wholesale access for a connection from an end user to a point close to an ISP or peering point like LINX exchange and are suitable for smaller ISPs because they are charged on a per user basis. In simple terms by subtracting the costs of DataStream from IPStream you get a good guide as to the middle mile costs for smaller ISPs – those using IPStream. For a 50:1 contended 1024kbs downstream / 256kbs upstream connection, which would typically retail in the region of £35 pm inc vat or £28.88pm ex vat, the DataStream cost is £6.22 pm ex vat and the IPStream cost is £23pm ex vat. So for a product with a retail cost of £28pm the costs for transit from the end user to close to a peering point like LINX exchange is £23pm or about 80% of the cost. Further by subtracting the DataStream cost (£6.22) from the IPStream cost (£23) we

get the cost for the middle mile transit that is £16.78 or about 58% of the retail price. There are alternatives to these wholesale products from BT for both sections, end user to local exchange/local aggregation point and for transit from local aggregation point to internet peering point but the figures above give an accurate idea of the scale of the middle mile costs in general and also make clear the 'penalty' in cost of provision for smaller ISP players.



Prices for 50:1 1000/256 service assuming 50% utilisation on Central Pipe/CAL and 4Mbps Regional VP at 50% utilisation for Datastream

In an all IP world there is no reasonable relation to cost of provision that should lead to middle mile costs being so proportionately high or so punitive to smaller players. That they currently represent such a significant proportion of the cost of the retail BB product and also happen to be the one area where small-scale competition can not bypass (like it can in say the last/first mile section with a community based wifi network, or a local based innovative commercial operator) should be cause for concern and be setting alarm bells ringing.

The implications of the middle mile cost imbalance are huge

The middle mile problem affects every innovative operator or community group that does not have access to its own middle mile network, or is not big enough to cut a scale based deal with such an operator. The implications of this for the industry and the UK economy are huge.

There is currently much talk from the industry and the regulator about LLU costs, which offer an alternative route for access from and end user to a local exchange / aggregation point. However to drive down the cost of LLU access, without dealing with middle mile costs is to merely limit the use of this product to the largest operators only, who either own their own middle mile networks or through scale can command a decent deal from such network owners. To do this is to severely cripple true innovation, which in a rapidly changing environment like this almost always comes first and foremost from small-scale local based operators and community groups.

The proportion of the cost of BB to end-users that is related to middle mile costs is too high, especially so for smaller scale players and not justifiable on a cost of provision basis in an all IP network world. Addressing the middle mile problem should be at the forefront of all current efforts to drive forward BB Britain.

An alternative basis for middle mile transport – deliver abundance

We need an all-IP middle mile solution, which matches the capabilities of the all-IP infrastructure. The solution should create an environment where middle mile network owners are encouraged to 'deliver abundance'.

'Delivering abundance' is about realising the inherent benefit of an all IP infrastructure and not 'managing scarcity' which is the basis in the old world network. Competition between middle mile operators must be based on the concept of how efficiently they can deliver abundance and not on how well they can capture, manage and maintain scarcity.

Our solution seeks to deliver the fundamental benefit of aggregating traffic all the way down to the end users and not allow this benefit to accrue solely to the owners of the middle mile network. The solution should look to not just aggregate specific blocks of aggregation (like say public sector traffic) but should seek to aggregate ALL possible traffic and then deliver the benefits of this aggregation directly back down to those whose traffic is the basis for this aggregation. By aggregating all traffic we can:

- Specifically seek to remove any benefit of scale, which currently exists, thereby allowing the smallest and most innovative local operators, community groups or indeed individual users to directly gain as much benefit from this aggregation as the largest. This is vital if we are to truly promote innovation and not just create an opportunity for a cartel of players of scale.

- Deliver other inherent benefits of an all IP network to end-users. The benefits that are obtained by the removal of the control layer from the network infrastructure in an all IP network allows a network owner to deliver any product to any customer without the need for a 'truck roll'. This kind of benefit can and should also be delivered to end-users, allowing them to select any service from any provider directly and without any need for a truck roll

We need an all IP solution to how middle mile transit is transmitted to match the realities and potentials of an all IP network infrastructure. The cost of such a solution and the cost basis should match the costs and cost basis of the cost of provision in an all IP world. If the basis of the cost of provision for middle mile transit is a fixed capital cost with little or no incremental cost of usage thereafter (and it is in an all IP world), then a middle solution should also be so based.

A specific proposal for a middle mile trial

We propose a specific trial to assess the feasibility of new models for middle mile transport that seek to incorporate those ideas expressed above. The purpose of the trial will be to establish if such a model could be used throughout the UK. The trial initially be would be based on a single or small set of local area/local exchanges, which has more than one middle mile infrastructure in place. The basis for the trial would be that there is a fixed cost for the transport of data from the local aggregation point to a suitable Internet peering point. This fixed amount of revenue would be distributed between the operators that have a physical network capable of carrying the traffic. The revenue would be apportioned based on the proportion of traffic carried by each of the competing middle mile network operators. Traffic would be automatically routed onto whichever competing operator's network had the most unused capacity at any given moment. Competitors would 'capture' traffic (and thus revenue) by providing more capacity between the local aggregation point and a suitable internet peering point than their competitors. The implications of this are that:

- End users would typically pay a fixed fee for internet access to their chosen ISP – as they currently do now. Instead of traffic then being routed on a predetermined middle mile competitor's network, based on how well the middle mile operator has 'pre captured' the traffic, through deals with specific ISPs – it would be routed onto whichever middle mile competitor is most able to carry it at the time it needs to be carried (i.e. which has the most capacity at the given time). The ISP then pays the proportion of the end-user revenue that represents middle mile transport to the middle mile operators, based on the proportion of traffic they have captured.
- Any ISP could offer services to the trial area by simply picking up the traffic from the internet peering point and from there routing it onto their own networks for the provision of services (content, email, newsgroup access and web space etc) and the provision of external internet

access. Users would be free to assign whichever ISP they chose to do this for them and free to change from one to another directly within in the limits of the minimum terms of service they have agreed with the ISP.

- Any company or community group that wished to offer innovative last/first mile solutions to distribute access from the local aggregation point out to end user would be free to do so. The external traffic from these networks would then be routed as per existing ISPs' middle mile traffic above. They would then pay a contribution to the middle mile costs just as the existing ISP would. As more and more end users are connected the middle mile cost for each would reduce to each.
- Local operators would be free to use any existing products for first/last mile access like BT's DataStream products or LLU or to build their own alternative local distribution infrastructures.

The benefits of a middle transit solution as outlined above are summarised below

- Middle mile operators will compete on the basis of who can most efficiently move aggregated data from a local aggregation point to a suitable internet peering point (i.e. who can best and most efficiently deliver the abundance inherent in an all IP network infrastructure) and not based on who can best 'pre capture' such traffic (i.e. manage and maintain scarcity).
- Any middle mile operator able to move data at a lower cost than its competitors will be free to 'capture' traffic and thus revenue directly, without any need to sell its superior network capacities to individual and separate service providers and ISPs.
- Middle mile competitors will compete on the basis of who has the 'best' network infrastructure (with best meaning which infrastructure can move the most data at the lowest costs).
- Middle mile operators will capture market share (proportion of the fixed 'pool' of revenue) by being able to move data more efficiently than their competitors, thus driving the fastest 'delivery of abundance' possible to end-users that the new technical capabilities make possible.
- Middle mile operators will achieve growth by building out to more and more local aggregation points. As the largest revenue opportunities will be defined by those areas where current transport is most limited this build out we match exactly those areas where it is most needed. The more 'congested' a current middle mile links is from a given location the greater the opportunity to 'capture' traffic and thus revenue.
- By providing a generic middle mile transit system innovation in last/first mile, access will be promoted to its maximum and not limited and

reserved to only those operators who through ownership of their own middle mile networks or through scale deals with such operators are able to obtain a competitive advantage over smaller operators.

- Government attempts to use aggregation of its own network services procurement as means of driving BB will be easily met and exceeded in such a model. Simply by ensuring that all public sector network services use products that route over the generic middle mile transport system, they will automatically aggregate such public service traffic. There will be no need for any 'standardisation' or discussion between government departments, local or national. Further these aggregation benefits will automatically benefit not just public services but also any other traffic routed over the generic middle mile transit
- End-users will automatically be 'cut in' to the inherent benefits of an all IP infrastructure both in terms of the cost benefits of aggregation and in terms of flexibility of service choice that are possible and not have to rely and hope for some form of 'trickle down' of these benefits.

End users MUST have a voice in this process.

It is vital that end users of these new networks have a voice and a strong voice in these discussions. This need for an end user voice is totally different in nature from their traditional importance as customers. In terms of these new networks and indeed in general terms of the digital revolution, end users have played and need to play a vital role.

In digital domains end users:

- Design and define large numbers of applications that make technologies compelling to the mass market. Just as it was not IBM or Intel who drove the creation of whole industries like the computer games industry or major applications like spreadsheets, so it will not be the network owners that create whole swathes of applications and uses for the new network that will make it compelling to the mass market.
- End users encourage, promote and support the adoption and use of new technologies by those of lesser knowledge and experience. Millions of PC's have been purchased and are used by the mass market via the promotion and support of end users.

To make this happen, we need to benefit from the successes and failures of the past. There are important lessons to be learnt and understood from what happened to FRIACO IP. End users played a significant and vital role in the successful creation and implementation of FRAICO and FRIACO ST. They were then explicitly excluded from the negotiations around FRAICO IP. FRIACO IP failed; it never materialised and simply disappeared off the radar all together. If the end users voice had been heard this failure and missed opportunity almost certainly would not have been allowed to happen.



End users are at the forefront of identifying and driving the issues that matter. This can be seen historically in end user groups like CUT and currently in groups like ABC and in documents such as this one that is a product of the end user voice. There are literally hundreds of end user based initiatives driving innovation around the country. All it needs is government, the regulator and industry to really pay attention to the voice of the user and help implement the solutions.

To drive forward the creation of BB Britain end users must have a role and voice in the process that is separate from and different to their role merely as consumers. Working together on the solution to the middle mile problem would be a start!