

Broadband Universal Service Obligation

The introduction of a Universal Service Obligation will be hugely important by all of us who live in rural parts of this country. Given the repeated failure of previous Government promises to address the digital divide – for example the Labour Government's promise of a Universal Service Commitment of 2mbps by 2012, the Coalition's promise of the same commitment by 2015, and the Coalition Government's launch of a "rural broadband programme" in 2010, none of which delivered any improvement in broadband speeds to rural areas – it is critically important that for once the Government finally successfully addresses this problem before the digital divide gets wider still.

These previous programmes failed for a number of reasons. Firstly there was no sustainable economic or funding structure put behind them; secondly the Government played into the hands of BT Openreach the monopoly service provider creating perverse incentives for them to deliver the worst outcome for the most money; and finally the choice of technology (VDSL/FTTC and Satellite) gave the illusion of providing faster speeds without actually improving the actual speed of user's connections.

This means the USO must be designed carefully to prevent these issues reoccurring.

1. How should the technical performance of the USO be specified?

I find it deeply troubling that Ofcom which should be a technical expert on the subject, and the Government which should have done its homework, repeatedly refer to a "speed" of 10Mbps. Both should know that 10Mbps is a measure of the bandwidth of a connection not its speed. This is a very dangerous mistake to make and if adopted as the USO will lead to a failure of the whole proposal.

Unfortunately when comparing the speeds of different internet connections it has become common practice to refer to the bandwidth of the connection as the speed. The bandwidth (for example a 2mbps or 24mbps connection) is a measure of the width of a pipe in layman's terms, and is not actually a measure of speed.

Describing an internet connection of 24mbps as being "faster" than a 2mbps connection is like saying that a cruise liner is faster than a fighter jet given that it can carry more passengers.

For a road system, bandwidth would be the equivalent of the number of lanes on a motorway. For the same reason a 24 lane motorway is not necessarily "faster" than a 2 lane motorway.

What matters to users of the internet is the actual time it takes in milliseconds to load a typical webpage. In the road analogy this would be equivalent to the total travel time between say, London and Birmingham, and is a function of the number of lanes on the motorway, the number of other drivers on the road, the amount of congestion on the local roads in London and in Birmingham, the distance between London and Birmingham and the speed limit.

In the same way the speed of an internet connection is a function of a number of elements including: the bandwidth, the number of other users using the same connection in parallel, the speed of the home network, the speed and design of the host website's system, the distance the signal must travel, and the speed of light.

For a wired connection the constraining factor out of all of these factors is typically the bandwidth, and hence this has been taken as the most easily understood and comparable measure of speed. However this is only true when comparing one fixed wired connection to another. It is meaningless to compare a 2mbps satellite service to a 2mbps wired connection – they will operate at very different speeds.

The reason is due to “latency” or round trip time (“RTT”) of satellite connections – the time it takes for the broadband signal to travel the immense distances from the customer’s home to the satellite and down to Earth, and then back again. For a satellite connection the RTT is around 1.5 seconds, whereas for a wired connection it is typically 0.03 seconds. Although 1.5 seconds may not sound a lot, in practice the average webpage has around 100 objects of code on it, each of which needs to be transmitted and received taking 1.5 seconds to make the round trip. Many of these can be transmitted in parallel, but even if there are 10 round trips required this will take 15 seconds on a satellite connection (ie $10 \times 1.5\text{s}$) compared to 0.3s ($10 \times 0.03\text{s}$) on a wired connection. In comparison the average size of a webpage is typically 1600KB (12.8mb) and so takes a further 6 seconds to transmit on a 2mbps bandwidth connection. This simplified example shows that the 2mbps satellite connection would take 21 seconds (ie 15s round trip time + 6s download) to load the webpage compared to 6 seconds on a 2mbps wired connection (0.3s round trip time + 6s download). Indeed even a 20mbps satellite connection is slower (at 16 seconds) than a 2mbps wired connection, and has a roughly equivalent speed to a 0.8mbps wired connection.

In my frustration at my inability to obtain access to a connection faster than about 0.7mbps from BT I also subscribe to a satellite broadband connection. In practice I have found that on a typical day my 20mbps satellite service offers about the same speed as my 0.7mbps wired connection confirming the above approximations.

The Government, faced with yet again failing to meet its Universal Service Commitment of 2mbps, recently launched a satellite service offering 2mbps instead. Returning to the road analogy this is the equivalent of making a universal commitment of providing a two lane road from everyone’s houses to London. Then when it fails to build the roads, for the Government to say that although it can’t provide you with a two lane road direct from your house to London, it can provide you with a two lane road via Australia to London, which should be of an equivalent “speed”. This is plainly nonsense.

However given the common usage of a measure of bandwidth as a proxy for speed there is a strong argument for Ofcom to continue to use this. To address the issues I describe above, while keeping the USO solution technology-independent, the USO should be expressed as a guarantee that all customers can access **the speed of a fixed wired connection with bandwidth of 10mbps** or put simply “10 mbps-equivalent”.

To measure this speed Ofcom should also define the other parameters of a standard test – for example this test should take account of typical contention ratios, be measured against the time to open the average sized webpage, and should take the slowest times measured over multiple downloads to take into account the issues of jitter, poor weather (which affects satellite) or other variations in the connection speed. The test should also be measured as the speed a user obtains after they have already downloaded at least 1-2x the UK average data usage that month. This will avoid providers arguing that they are meeting the USO when in fact they are imposing “throttling” on the bandwidth provided to their customers above a very low capacity threshold.

It should be up to the providers to prove to Ofcom in practice that their technologies meet this standard test.

A failure to define “speed” correctly in this way would make a mockery of the whole USO process – after all it is the case today that 100% of the population of the UK already have “access” to a 10mbps internet connection by using satellite broadband. Indeed 100% of the population already have access to a 20mbps satellite internet connection. If providers were able to point to the availability of satellite as a way to dodge having to provide a USO-compliant connection then then the USO will provide no improvement to slow connection speeds in practice.

2. How should Ofcom ensure the USO is affordable?

This is another extremely important issue. Currently BT Openreach is able to price discriminate on the basis of geography. For example BT would currently charge me a monthly price at least 24 times more than a customer who happened to live closer to the broadband cabinet for the same internet speed (this is because I would have to pay for a Fibre-on-demand service to even access a 10mbps connection, and BT has repeatedly increased the price of this service to astronomical levels). This is outrageous.

There is a simple way to address this which is that **all customers of each provider receiving a certain speed have to be offered the same price** (and this price would clearly have to be lower than that offered to customers receiving faster speeds). In this way a 10mbps connection would cost the same whether it was delivered to a customer in the centre of London or in a rural location. The same would be true for 20mbps connections etc. This approach also puts the onus on the provider to actually deliver the speeds that customers are paying for – to the extent that customers find they are receiving slower speeds than promised they should be able to move to a lower price.

3. What might the potential demand for the USO be?

It should be fairly obvious that if Ofcom correctly addresses the two issues described above – ie making sure that the speeds offered are actually equivalent to 10mbps on a wired connection, and that the service is affordable, that the take-up from customers who currently receive less than 10mbps **will be close to 100%**. Note that the reason the take-up of “fibre” (ie FTTC) broadband has been a lot less than 100% is very simple – it has been offered to the same people who already have access to fast broadband (because they live near a cabinet) who have little need of the increased speed. If the roll-out of fast broadband had been prioritised to those with the slowest speeds first – which would have been a more logical strategy of course – then the take-up would have been much greater.

Indeed it will be a measure of the success or failure of the USO scheme if take-up is not close to 100%.

4. Cost Evidence

As a customer rather than a provider I can’t answer this question. However it is very important for Ofcom to take into account that the incentive on BT will be to hugely exaggerate the cost of providing a decent broadband service. Any cost estimate from BT must therefore be taken with a pinch of salt.

For example BT is doing everything it can to avoid rolling out FTTP (even though this is likely to be the long-term solution to the UK’s broadband issues), by claiming the cost would be extortionate. In fact fibre optic cable is actually cheaper than copper cable which BT continues to install despite all its technical limitations. Many other European countries with more dispersed populations than the UK are moving straight to an FTTP solution which demonstrates that BT’s claims on this point cannot be correct.

5. Proportionality of a reasonable request

This question suffers the same drawbacks as the question on cost evidence, in that BT will have a huge incentive to claim that any property requesting access to decent broadband would be extortionately expensive to serve, and then charge them an exaggerated amount.

To give a recent example, our local community of 50 houses recently requested that BT install a 4km length of fibre optic cable along existing poles and ducts. The initial quote was for £100,000 despite the fact that the cable can be purchased on-line for about £6,000. Furthermore since BT Openreach is a monopoly we have no way of market testing the reasonableness of such a quote by asking third party contractors to install the cable.

BT will also have the incentive to charge each customer individually even if there are a large number of customers in the same local area who can be served by the same infrastructure - effectively charging for the same installation multiple times.

The possible solutions to these issues are as follows:

- The maximum reasonable cost should be set relatively high – this removes the incentive for a provider to exaggerate the installation cost and instead creates an incentive to deliver the service at the lowest possible cost. For example for the BDUK scheme the maximum cost was set at £1,700 per property. This failed to deliver broadband to rural areas, so the cost of the USO scheme must be set materially higher than this in order to deliver an improvement to rural broadband speeds.
- BT must assess the cost of providing 10mbps to any property assuming 100% of other properties on the same cabinet that are currently not able to receive 10mbps are upgraded at the same time.
- Require BT to provide three third party quotes for any installation if they claim that the cost of installation is above the reasonable maximum.

A further, and more simple solution would be to define any property that currently is served by a copper telephone line, as one that should be served at no extra cost by a fibre connection. (Given that copper cable is more expensive to install and maintain than fibre).

Ofcom suggests that providers could be allowed to install inferior technologies with worse technical specifications in “hard to reach areas”. This would defeat the whole purpose of the USO since it is only properties that are “hard to reach” (ie rural), that need the USO in the first place. It would be like saying we have an obligation of providing 10mbps to every property except those that today currently can’t receive 10mbps.

6. Funding of the USO

It is very important that the funding of the scheme is borne by the industry, rather than the Government. Not only would it be wrong to levy the cost on taxpayers, but like the BDUK scheme this would only result in an incentive for the provider to exaggerate the costs and minimise the delivery.

The most appropriate method of allocating the cost to the industry is to levy the cost proportionately on the number of broadband subscribers. This spreads the cost across all broadband customers, and ensures that it would not distort competition for broadband.

7. Review of the USO

Although Ofcom points out that too short a review period creates a lack of clarity and certainty for USO providers; if the period is too long it would encourage providers to only think short-term rather than installing a future-proof solution in the first instance.

This is exactly one of the reasons for the failures of the BDUK scheme since it encouraged local councils to install an ineffective and expensive technology, FTTC, which is already proving to be too slow for most users, and will rapidly become obsolete.

One very sensible proposal is that rather than having to review the USO in defined periods, Ofcom sets a formula today, for how the USO will increase in the future. For example it could define the USO **as equal to half the average broadband download speed in the UK**. The USO would then rise automatically every year keeping in line with the general improvements in broadband technology and take-up. Such a formula provides certainty and clarity to providers to allow them invest for the long-term in futureproof solutions. It would also prevent the digital divide getting any wider in the future.