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Ref: S1034/ab

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Re: Designing the broadband universal service obligation - Call for inputs

Please find attached the Institution of Engineering and Technology's written response submision to the above consultation.

About the IET

The IET is one of the world's leading professional societies for the engineering and technology community, with more than 160,000 members in 127 countries and offices in Europe, North America and Asia-Pacific. The IET provides a global knowledge network to facilitate the exchange of ideas and promote the positive role of science, engineering and technology in the world.

This submission has been approved on behalf of the IET's Board of Trustees, and takes into account the views of IET Members under the guidance of the IET's Communications Policy Panel and should not be taken as representing in any way the individual views of the organisations for which the panel members work.

The IET is happy to discuss these points with the Ministers or Officials.

Yours sincerely,

Paul Davies
Head of Policy
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Enc.

Designing the broadband universal service obligation (USO)

Dear Sirs,

The IET strongly supports the suggested initiative and has some engineering-led suggestions that we believe may help.

Firstly we believe that any USO should be:

- Ubiquitous and seamless/gap-free, or as close to this as is practical
- Service [led] - meaning that it should focus on the service capabilities delivered to the user
- Aligned with the recognition that communications is becoming an essential tool for living
- Seen as important such that the approach taken recognises the global nature of communications, and in particular communications standards.

To expand a little on these items:

Ubiquity
The communications infrastructure is the essential information transport system for modern life. It provides vital support for many functions from health monitoring and calling emergency services to, work, shopping, TV and getting a taxi. It is becoming increasingly frustrating when these services are unavailable even in some small area in a city or for a short time, let alone in wider rural areas.

From an engineering perspective the way to get closer to the kind of ubiquitous uninterrupted service we need is to integrate many diverse communication technologies. Smart handsets already switch automatically between mobile networks and WiFi without the user noticing but this needs to go much further. No one technology can deliver all that is necessary everywhere it is required. This is analogous to the physical transport system - which needs rail/road/air/bus/ship (& foot) etc. to work together in a complementary ('multi-modal') way to deliver the best and most universal service , i.e. not one solution however improved, can deliver this. We need a systems-led approach spanning multiple technologies.

From a regulatory perspective the challenge is to make sure that users, and increasingly systems acting automatically on the users' behalf, can grab whatever communications they can locate in order to offer a seamless and universally-available service. This needs to cover a steeply-rising number of devices that will use communications ('the internet-of-things') not least systems that provide and use other infrastructures like smart power and self-driving vehicles. This should be possible but it needs the early involvement of many new stakeholders, mostly those with a service orientation.

Service focus
The user wants, and buys, a service - or rather many services. These require communications support but the connection between the user's perception of 'unlimited service' and the actual download rate, in Mbit/s, commonly used to describe it is increasingly loose. Modern requirements are often tighter in less obvious respects - for example a health- or vehicle-monitoring system may want to upload video and may place much more emphasis on upload rates than traditional web browsing. Much the same can be said of sharing video on social media and of secure backup support, and of many forms of interaction with 'big data'. However, modern smart systems that involve live adaption to user needs are very effective but much more sensitive to latency (time delay) issues in the network. But if all this can be optimized, techniques are increasingly being applied that can offer the user a near-unlimited experience on limited communications capacity, as detailed in our 'Demand Attentive Network'

initiative[1] (DAN). This is probably the only way to satisfy exponentially-increasing user demand, think 4k smartphones for example, on a network constrained by linear growth.

It is important to note that service 'quality' is a much more complex thing for broadband than it was for voice (for which a USO was first conceived), mainly for engineering reasons but also because of the plethora of providers, even for each single service. Thus the wholesale sales aspect matters.

The essential service

Few would now argue that broadband mobile or 'fixed' systems, noting that all final drops to devices are likely to be wireless, are a luxury, but the degree to which they are vital is still increasing and is still not fully appreciated. There is much more to this than the universal tendency for any luxury to become 'necessary'. Many everyday functions that people are going to take for granted actually require connectivity, without this aspect being generally noted. For example speech recognition by a smartphone, which has already allowed a user who was physically constrained after an accident to vocally summon emergency help, actually requires a remote 'cloud' processor on low-latency to analyse the speech, as well as needing comms to call for help. The same will be true of health monitoring systems that may summon assistance automatically, or of the eCall system that automatically summons aid to a vehicle accident. We need these systems to work - always and everywhere, whether using the 4-5G mobile service or exploiting available 'inside-out' services linked to private fixed fibre communications.

Some services need to work always if any communications connectivity at all can be found, although clearly some are more optional; so 'smart' selection and obligation needs to be standardised and universally available. It must also be scalable to meet longer-term needs - we already rely heavily on e-commerce and are arguably already in a 'Gigabit society'.

An important engineering feature is the mode of 'failure', meaning not just complete failure but failure to provide sufficient capability. This needs to be 'graceful', meaning that the best possible service should be maintained as long as possible. This requires an opportunistic approach and a two-way adaptive optimisation including the smart handset and operating system, and thus needs players developing these technologies to be involved at an early stage.

Quality as a standard

As already argued above quality is now complex - it certainly already needs low latency for some services (but not others) and more complex things like uninterrupted service at some level may also be important. This will become ever-more-important as more DAN techniques, as previously mentioned, are deployed to improve service. Quality could be a basis for competition within a USO - but this does require agreed standards.

End of Submission

[1] www.theiet.org/dan