



## **Introduction**

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Liberty Global operates next generation hybrid-fibre-coaxial (HFC) networks that pass 33.3 million homes serving 19.6 million customers in 13 countries, including 11 in Europe and employing 22.000 people worldwide. Liberty Global's consumer brands include UPC, Unitymedia, Kabel BW, Telenet, and VTR.

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UPC is committed to achieving the European Digital Agenda objectives. Our company vision simply stated is "Connect, Discover, Be Free". Our market-leading broadband internet, voice and video services and innovative product bundles empower millions of people to discover and experience the endless possibilities of the digital world, and we're constantly striving to enhance and simplify their lives through meaningful innovation

This response is provided by Liberty Global BV on behalf of itself and the other companies in its group (together LGI)<sup>1</sup>

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<sup>1</sup> Liberty Global, Inc. 's ID number in the European Commission's transparency Register is 82853397708-89.

**LGI’s position on the consultation**

In general, BEREC’s proposed framework of analysis for NRAs to assess degradation of an internet access service (IAS), and following such an analysis, the need for an NRA to intervene in the market and use its powers under article 22(3) of the universal service directive, is robust and well thought through.

As BEREC itself concludes there are a very narrow set of circumstances in which the article 22(3) powers should be deployed to address degradation of service.

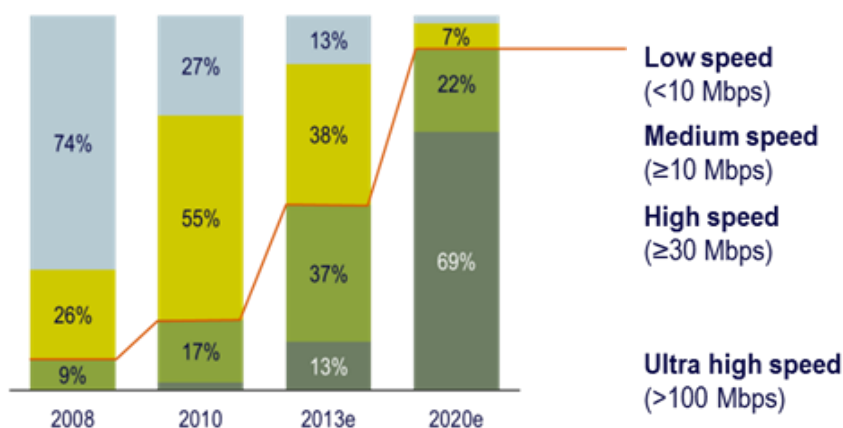
In our view these conditions are narrowed further by the fact that LGI cable operations across Europe are at the forefront of technological innovation, bringing huge leaps in network performance and capacity to public internet access services (IAS).

We invest at a telecom sector-leading investment level of around 20- 25% of revenues in capital expenditures in high speed DOCSIS 3.0 networks. These act as a spur to FTTN/VDSL investment by telecoms incumbents, as noted in the recent WIK report ‘Rethinking the Digital Agenda for Europe’

Further cable is a technology that is capable of delivering ultra-fast broadband services to a large proportion of European consumers. Analysis by Solon consultancy in 2011 found that 55% of EU households (112 million households) will be reached with at least 100Mbps by 2020

The demand for ultra-fast broadband - and our ability to deliver it technologically and cost effectively - means public IAS are only going to improve.

Data produced by Solon Consulting for Cable Europe in March 2011 shows how the predicted distribution of speed levels will increasingly focus around ultra-high speed services e.g. by 2020 the majority of cable broadband subscribers will take more than 100 Mbps services.



As a result, we do not believe the prevailing market circumstances dictate the need for the imposition of QoS obligations. On the contrary in our view the strong competitive retail broadband environment, supported by a broad industry consensus as to the importance of consumer transparency of network management practices, mean this situation will not materially change in the short to medium term.

As the imposition of a QoS remedy is a significant intervention into the network management an operator deploys, and which can significantly impact on the business case for network upgrade, we would discourage NRAs from imposing stringent quality of service obligations on a market which is still relatively immature and which is evolving through competition at real pace.

Premature regulation in this area will only serve to create disincentives to invest in high speed broadband infrastructure, as well as restrict operator's ability to deliver innovative and differentiated service offerings which may, in many instances, provide genuine consumer benefit.

In terms of the relationship between IAS and managed and specialised services, we are concerned that much of the report mischaracterises the broader effect of network investment and evolution, and wrongly concludes that the the development of managed services de facto comes at the expense of maintaining high quality IAS, and automatically leads to the degradation of IAS as a whole.

We would also underline the importance of a full assessment by BEREC and NRAs of the broader dynamics at play within the internet ecosystem, which materially affect the quality of IAS delivered to the end consumer. Determining the extent to which these raise competition issues in the delivery of IAS, and whether these are within the control of ISPs, is a critical and largely overlooked consideration within the proposed framework of analysis required to determine the need to impose QoS obligations on operators of electronic communications networks. Finally, and in light of the strong investment made by LGI and others in high speed broadband infrastructure we would strongly question the validity of scenario A 'The dirt road internet' as set out in section 3.2.1' as it is clear our continuous record of investment and innovation around our HFC platform and in terms of the evolution of DOCSIS technology mean we will continue to increase capacity and network resources to both public IAS and managed services. This renders a situation in which IAS have insufficient performance as highly implausible.

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## **Chapter 4 questions: Degradation of Internet access service as a whole**

Identifying if there are situations that need attention

Monitoring quality of Internet access service – either proactively or reactively – is necessary in order to detect degradation.

Monitoring can be done by checking the contracts and terms of available IAS offers or by performing technical measurements of the services themselves.

Statistical methods are indispensable during technical measurement because of the varying characteristics of today's best effort Internet communications.

There should be monitoring of the quality of Internet access service (IAS) over time, covering all aspects for which ISPs are responsible.

Monitoring should include a range of quality parameters:

- actual vs. advertised speed
- level of congestion in the network
- measurements of timing parameters
- performance of IAS compared to specialised services
- IAS offers on the retail market (e.g. availability and penetration).
- quality as perceived by end users

Is regulatory intervention necessary?

Once information is gathered on quality of the Internet access services, an assessment of the situation at the market level must be conducted.

The identification of causes for concern lies in the comparison of several aspects at the national level (e.g. comparison between IAS and specialised services, between packages, ISPs or categories of end user) or between countries. Significant differences in these comparisons may illustrate a cause for concern.

There is no need for intervention when there is good availability of Internet access service offers with satisfying quality (i.e. without degradation) at a reasonable price and the possibility and ease of switching is sufficient.

If one or more of these elements is not fulfilled, intervention may be necessary.

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### **Comments on the 'Performance of IAS compared to specialised services criteria'**

In the main we think this section is sound in terms of the framework it establishes for NRAs to assess degradation of an internet access service (IAS), and following such an analysis, the need for an NRA to intervene in the market and use its powers under article 22(3) of the universal service directive to impose a 'minimum quality of service' on an operator, and

effectively prevent degradation of IAS. Further, we believe these powers can robustly deal with any scenario in which an ISP would act to deliberately degrade or crowd out the public IAS lane to make its own managed services lane more attractive. However, we see no evidence of this across our network as we set out below.

We would also draw BEREC's attention to the highly competitive nature of the fixed broadband communications market place where choice and the commitment to consumer transparency means that the conditions for regulatory intervention to set quality of service requirements are not fulfilled. To the contrary, it is this strength of competition and transparency requirements that creates the incentive for operators to continue to provide a robust and quality assured minimum IAS.

However, we are concerned that chapter 4 of the report, and the guidelines that it recommends to NRAs, make a fundamentally wrong assumption that operators decisions to divert resource and/or bandwidth to the development of managed or specialised services comes at the expense of maintaining IAS or best effort IAS, and *in fact automatically leads to the degradation of IAS as a whole*.

As an observation, we believe it useful to remind BEREC the co-existence of public IAS and managed services has been a feature of the internet for some time, and that the emergence of this two-lane model is considered desirable by critical observers<sup>2</sup>.

Firstly we would draw BEREC's attention to the fact that we do not differentiate QoS treatment of traffic across our backbone. Within this context all Internet data service traffic to customers is treated as "best effort", in-line with how we receive traffic from 3rd parties.

The only exception to this is to the degree we are offering other services over the same infrastructure, that is to say internet protocol but not internet traffic outside the scope our internet access services. Although these have different treatment, these services can be seen as being on separate logical networks sharing the same physical infrastructure.

From a practical day-to-day perspective the co-existence of managed services lane alongside the public IAS in our experience has no material degrading effect on the quality of public IAS. Indeed best-effort services come to within 99.99% of "assured forwarding" behaviour over our networks. Put simply, we rarely if ever drop packets for public IAS.

To support QoS enhanced managed services, we do need to know capacities in advance to plan for its management across the backbone.

However, and secondly, a bandwidth reservation of this type used to obtain quality guarantees at the managed services lane does not affect the quality of service available through public IAS, as the level of managed services we offer is very low and limited.

If in the future we offer more managed IP services in addition to our internet access service we see no evidence that public IAS will be degraded. We take this view as DOCSIS 3.0 makes it possible to scale the IP pipe to meet growing consumer demand. This is demonstrated by the rapid and recent dramatically increasing download offerings in the market, now peaking at 120 mbit/s but with anticipated growth well beyond 200 mbit<sup>3</sup>.

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<sup>2</sup> Network Neutrality: Challenges and responses in the EU and in the U.S. WIK consult May 2011 – Chapter 4 key findings. Produced for the European Parliament Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy Internal Market and consumer protection

<sup>3</sup> Kabel Deutschland (KDG) recently showed in a field test that an 862 MHz upgraded cable network is able to broadcast download speeds of up to 4.7 Gbps. See KDG Press Release May 31, 2012;

EuroDOCSIS 3.0 represents the current state of the art for Europe as regards delivery of data, voice, and video over a cable television system.

Current Euro DOCSIS 3.0 technology is able to deliver these high bandwidths, but technical progress as to its capabilities is, however, very dynamic. It is therefore to be expected that substantially higher raw bit rates will be available downstream and upstream in the future. Indeed, the equipment available today allows already bonding of 8 channels. This yields 400 Mbps of usable throughput downstream

As a result of the evident growth in data capacity offered by HFC cable, we do not anticipate that public IAS will suffer as the capacity is being developed for both managed and IAS services. And given this level of capacity we think public IAS will have more than adequate network performance available to them over cable to deliver to consumer the services they need, and in good quality.

Fourthly, and looking toward the future, despite the predicted growth of internet traffic as a whole and the consequent rise of managed services over time, we do not see evidence of the growth of managed services over the medium term coming at the expense of the public IAS lane. In this respect, we would fully agree with the WIK report analysis that

*'a gradual but substantial increase in the scope of the managed services lane for both consumer and business traffic..would seem to suggest a steady growth in the importance of the managed services lane, **but not necessarily to the point of crowding out services based on the public lane – at least, not for quite some time**'<sup>4</sup>*

For the reasons set out above, we believe the chapter 4 conclusions should not assess degradation of IAS from the quality parameter 'performance of IAS compared to managed or specialised services'.

As such the most important criterion an NRA should consider is the actual or absolute performance of internet access products. An assessment relative to managed or specialised services is, in this respect, inconsequential.

In our view, the policy environment should seek to promote development of premium consumer and business connectivity products given their ability to stimulate investments and competition between networks. This process occurs without degrading the basic level of internet access services nor undermining the essential openness of the internet. We believe this fundamental in approach is reflected in the wording of article 22(3) which provides powers for NRAs to set minimum QoS in order *to prevent degradation of service*, and accordingly would recommend that BEREC's final guidance make this central to their approach.

### **Comments on the speed and congestion criteria**

With respect to IAS speed and congestion criteria, we do not agree that significant lower performance than the contractually agreed is a de facto indication of degradation, which in turn could warrant the setting of a minimum QoS standard.

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<http://www.kabeldeutschland.com/en/presse/pressemitteilung/unternehmensnachrichten/may-31-2012.html>

<sup>4</sup> Network Neutrality: Challenges and responses in the EU and in the U.S. WIK consult May 2011, page 43.

Produced for the European Parliament Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy Internal Market and consumer protection

LGI in keeping with other cable operators have a strong record in delivering advertised speeds to consumers. We believe that ensuring and monitoring improvements by other operators in this regard is best handled by other regulatory frameworks and measures, such as marketing and consumer protection regulation.

#### **Other comments on chapter 4**

The framework of how to analyse degradation of IAS as whole also entirely overlooks the extent to which extensive interconnection between ISPs through IP peering and IP transit agreements profoundly affects the end quality of IAS delivered to the end consumer. We are aware that BEREC is consulting separately on 'An assessment of IP-interconnection in the context of Net Neutrality<sup>5</sup>' and in that respect we are submitting a separate response.

Nonetheless, we believe this important factor should not be overlooked in the framework guidance given to NRAs to assess degradation of an internet access service (IAS).

In this off-network context, our interconnection commercial experience means we observe congestion and degraded internet data service occurring, in particular when content parties purchase insufficient capacity to send all their traffic to end customers. This can lead to poorer performance of IAS for some end consumers.

Moreover, this situation cannot be remedied by the powers conferred to NRAs under the universal service directive, as the ability to enforce quality of service (QoS) standards are limited to electronic communications networks, and not the broader internet where the bottleneck is often located.

As the imposition of a QoS remedy is a significant intervention into the network management an operator deploys and which can significantly impact on the business case for network upgrade. It is therefore essential NRAs have a full understanding of all the factor which affect consumer instances of internet access service degradation, the extent to which these are within the control of the ISP and based on this, design and deploy a set of remedy measures that a proportionate to the task at hand.

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<sup>5</sup> BoR (12) 33



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### **LGI's position on peering**

LGI manages peering centrally across its European footprint of consumer ISPs which operate behind a single Autonomous System number, as AS 6830. We therefore have considerable experience of the IP interconnection market across Europe. We are present at all major internet exchange points and have numerous public and private peering relationships as well as purchasing transit outside Europe. We therefore feel well positioned to respond to BEREC's consultation in this area.

Our answers to specific questions are set out in the following section.

For ease of reference our principles for settlement-free peering are published on our website at: [www.lgi.com/PDF/UPC-Settlement-Free-IP-Peering-Policy-2012.pdf](http://www.lgi.com/PDF/UPC-Settlement-Free-IP-Peering-Policy-2012.pdf)

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## **Answers to specific questions:**

*Question 1: Are any other important players and/or relationships missing?*

This seems a reasonable conceptualisation of the relationships involved. We wonder if it may be sensible to make a separation between ISPs providing transit services and ISPs responsible for origination/termination of internet traffic. It should be noted that an individual entity may be simultaneously active in more than one role. This is a fast moving area and we suggest this model is closely and regularly reviewed in light of market developments.

*Question 2: Do you agree with the classifications of CAPs as outlined above?*

It seems reasonable subject to the comments we made in answer to Question 1 above.

*Question 3: Do you agree with the classifications of CAUs as outlined above?*

No. We feel it is unhelpful to consider revenues etc with regard to CAUs. We think in the context of IP interconnection it makes sense simply to consider them as end-users. It may be that some CAUs are also, say, CAPs. Merely using internet access for productive purposes does not make a CAU into a CAP. This is the point we make in our answer to Question 1 above that individuals may inhabit more than one category. However, the categories themselves are well described and logically distinct.

*Question 4: Do you agree with the classifications of ISPs as outlined above?*

No. As discussed in the answer to question 1 above, we think it makes sense to further subdivide this analysis. We would distinguish retail ISPs (providing services to CAUs) from transit ISPs (providing services to CAPs). Whilst, say, the running of DNS servers seem to be integral to the business of providing an access service we would discount any activity that ISPs may make on top of their core service of internet access (eg hosting ) from the ISP category. This is the activity of a CAP. The fact that a single person may be active in more than one category is not a reason to blur the categories.

*Question 5: Do you agree with the classifications of CDNs as outlined above?*

Whilst it seems reasonable this is a very fast moving and fluid area. It may be hard to make a general category of CDNs. Perhaps it is better that CDNs are simply seen as activities falling within the taxonomy above of ISP, CAP and CAU.

*Question 6: To what extent are requirements regarding traffic ratios still important in free peering arrangements?*

They remain a relevant consideration. We see peering as a settlement free relationship of convenience for two parties to exchange an economic good where the transaction costs of charging outweigh the benefit of doing so. That is to say that peering happens where it is of mutual benefit to the parties. Traffic ratios are a useful way to determine that this is the case. LGI routinely uses ratios as a consideration in deciding who to peer with.

*Question 7: To what extent does the functioning of the peering market hinge on the competitiveness of the transit market?*

We do not necessarily accept the premise of this question. It is not necessarily the case that peering and transit are separate markets in an economic sense. However, it is clear that they are closely interrelated.

*Question 8: Does an imbalance of traffic flows justify paid peering?*

We do not accept the idea that paid peering requires "justification". This implies to us that there is something negative about the existence of paid peering. To LGI, this seems mistaken. Peering, paid or free, is a service with economic value. In some circumstances, as noted in our answer to question 7, it may be that peering is provided without charge where this is of mutual benefit to the parties. In other circumstances an explicit price may be charged. This simply recognises the economic value of peering.

There is no need to justify paid peering as it is simply an emerging feature of the IP interconnection market characterised by clear economic signalling in the form of paid and/or settlement free peering, dependent on the relative benefits to the transacting parties.

*Question 9: Does paid peering increase (number of contracts and volume handled under such contracts)?*

We do not understand this question.

*Question 10: To what extent does regional peering increase in relevance and affect transit services?*

We have no particular view on this. We feel that a healthy market see a range of relationships between different economic actors. Regional peering is clearly a part of this.

*Question 11: Are any important services missing from the list of services provided by IXPs?*

We have no view.

*Question 12: Are there any further developments regarding IXPs to be considered?*

We have no view.

*Question 13: Should in future Europe evolve to have more decentralised IXps closer to CAUs?*

This question worries us. In asking if this "should" happen it implies that BEREC considers that its members should try and move the market in a particular direction. Absent any market failure this is not something BEREC should consider. The IXP sector seems healthy, growing and developing without obvious structural barrier to entry. There is no need to consider an optimal structure.

*Question 14: Will traffic classes ever become available in practice on a wide scale?*

We have no view.

*Question 15: Will interconnection for specialised services be provided across networks?*

We have no view.

*Question 16: Will other solutions for improving QoE like CDNs become more successful rather than traffic classes?*

We have no view.

*Question 17: Which of the factors impacting on the regionalisation of traffic is most important: language, CDNs, direct peering?*

We have no view.

*Question 18: Are any further issues missing?*

We have no view.

*Question 19: Given the cost reductions and the economies of scale and scope observable in practice, why do network operators call for compensation?*

Network operators seek to make a return on their investments. Any peering imposes a direct cost even if this cost is falling relative to the data transferred. Where it is in the economic interest of both parties then this may be a settlement free relationship. If it is not then there will be money flows or other recompense. This is simply the normal operation of a market.

*Question 20: Do you subscribe to the view that CDNs lead to improvement of QoS without violating the best effort principle?*

In that CDNs can ensure that traffic is delivered onto a best efforts network as close as possible to the end user then, yes, we would agree with this statement

*Question 21: Is there a trend for CDNs to provide their own networks (i.e. integrating backwards)?*

We have no view.

*Question 22: Is there a general tendency for eyeball (CAU) ISPs to deploy their own transit capacities and long distance networks or even to become Tier-1 backbones?*

We have no view.

*Question 23: If an eyeball ISP becomes Tier-1 provider, does this increase the eyeball's market power on the interconnection market*

We have no view.