Response to BEREC Draft Report on the IP Interconnection Ecosystem (2024)

Thank you for the opportunity to respond to the draft of BEREC's third report on the IP Interconnection Ecosystem, following up valuable work conducted in 2012 and 2017.

This is a personal response to the above draft report, based on my 30 years experience working in Internet infrastructure and interconnection, including 14 years at Google and 9 years on the Board of the London Internet Exchange. My comments are not on behalf of any organisation, the views below are mine alone, and I was not commissioned or paid by anyone to write this response.

BEREC is to be commended by its continued analysis of the IP interconnection market in Europe and its most recent draft report. It broadly correctly analyses the current state of IP interconnection in Europe, the continued good functioning of the ecosystem and the highly cooperative nature of almost all interconnection relationships between networks.

The vast majority of networks just want to provide good quality of experience to their users, reduce costs, optimise their networks, and the use of various IP interconnection options, from peering to transit to Content Delivery Network node deployment, allows them to do that.

I would agree with BEREC's conclusions that, contrary to the recent claims of a small number of large incumbent European telecom operators:

- IP interconnection continues along a path of "evolution not revolution"
- That costs are broadly stable as technological advances and efficiencies balance any growth in data traffic
- That there is no fundamental imbalance in the IP interconnection ecosystem that justifies broad regulatory intervention in a well-functioning market
- That the IP interconnection market continues along a path of "evolution not revolution".

Please consider the following points below as minor feedback to guide BEREC on this topic, to assist BEREC's work in future. I would be happy to engage with BEREC further to provide more detail, if this would be helpful.

Data Traffic Growth

On data traffic growth, BEREC's data only considers up to the end of 2022, which as the tail end of the COVID pandemic, was still seeing more rapidly growing demand from users, in particular for video on demand services and working from home. As a result the draft report concludes that data growth is "steady" at 20-27% depending on the region of Europe.

More recent data shows a return to the long term trend of falling data traffic growth rates, for example ARCEP's 2023 report on the state of the internet in France shows traffic growth has fallen to below 8% per annum, and looking at longer term trends shows traffic growth continuing on a downward trend (e.g. Telegeography).

Furthermore, Analysys Mason considers there is now "a crisis of overproduction" of bandwidth, with supply of network capacity running ahead of user demand. This supports the draft report's analysis that there is no issue with the cost of carrying traffic demanded by users, as cost per unit of traffic, such as it is (some would argue there is a zero marginal cost for additional traffic on a network), is falling as fast if not faster than traffic is increasing.

BEREC should take great care in assessing "forecasts" for forward-looking traffic growth, especially from those with a vested interest in promoting the potential of greater traffic growth than may actually arise, and in particular where those forecasts rely on predicted growth from new applications that do not exist yet, such as the Metaverse. In this regard, the report's comment that UHD video *"content could further contribute to the growth of data traffic"* - there is little evidence for this to date. As the report notes, any growth in UHD demand is also balanced by the efforts of content and application providers (CAPs) to reduce traffic through efficiencies from new codecs, and anecdotal evidence suggests that even with the increasing presence of 4K large screen TVs, 4K traffic is not growing fast and the vast majority of streaming viewing is still in HD or below.

Peering - the most efficient market on the planet?

The report correctly notes the highly cooperative, efficient market for peering, with still more than 99.9% of all peering relationships concluded "on a handshake".

Given the vast number of market participants, it is remarkable that only a very small number of relationships even need paperwork, and that the number of disputes related to IP interconnection globally that have ever needed court or regulator resolution can be counted on just a few hands. Could it be considered that this is the most efficient market on the planet?

BEREC's role going forward should be to protect this dynamic, flexible, resilient ecosystem from being harmed, as has been risked in Europe and beyond with recent lobbying and policy proposals. BEREC's evidence-based draft report on IP interconnection is to be welcomed as supporting the peering ecosystem.

The Critical Role of Transit

Transit providers provide a critical role in the IP interconnection ecosystem, in particular, wholesale-only transit providers - those without significant numbers of "captive eyeballs".

Transit is important for providing universal reachability to substantially all endpoints on the Internet, and for providing a viable alternative to peering or CDN delivery, such that peering or CDN deployment can remain optional and voluntary for both parties. Transit is the universal backup or safety valve to failure to agree direct IP interconnection - one that does not exist in voice interconnection.

The draft report notes that "*when low latency and high bandwidth are required, peering is rather a substitute for transit than vice versa".* If this is the case it mainly occurs if the IAS provider seeks to limit their transit capacity in order to initiate direct interconnection

negotiations and seek payment for access to users. This is particularly the case for vertically integrated IAS/transit providers, see below.

In cases where an IAS provider has sufficient uncongested transit, while transit may be less than optimal for both sides due to cost and slightly lower performance, it may well serve as an acceptable substitute where it is not feasible to directly interconnect or where mutually agreeable terms cannot be reached.

The report notes competitive pressure on transit providers from CAPs self-provisioning long haul capacities and deploying CDN platforms, rather than buying transit. While such activity may be a substitute for CAPs buying transit, it should also be noted that CAPs often cooperate and partner with transit providers - for example jointly building long haul and submarine cable capacity, or by deploying CDN platforms inside transit provider networks to reach a “long tail” of small networks that may not qualify for their own CDN deployments. This creates cost savings and revenue opportunities for transit providers.

In addition, all major CAPs are also purchasers of transit, as none are “Tier 1” networks (“Tier 1” being those networks with no transit providers and only peering relationships).

The importance of wholesale-only transit providers should be noted, as providing a true “whole of internet” routing option. These transit providers are under competitive pressure from vertically integrated transit providers who can leverage their large consumer customer bases to drive additional revenues (through paid peering from those seeking to reach that customer base), and cross-subsidisation from their IAS business that is not available to wholesale-only transit providers.

Vertically Integrated IAS/Transit Providers

The draft report notes the behaviour of a few, large, vertically integrated IAS providers with their own wholesale transit divisions. These providers have, over the past 20 years or so, leveraged their millions of IAS customers to expand into the wholesale IP transit business, and ultimately become “Tier 1” or near-”Tier 1” providers.

The report notes that the IAS divisions of these businesses have a lower proportion of traffic delivered by CDNs than medium sized networks, despite having the largest traffic demand of all sizes of network. This indicates that these IAS providers are less likely to be taking advantage of cost-saving content delivery options offered by CAPs such as CDN deployment, when compared to smaller operators. This suggests a lower focus on network costs and more on other considerations.

Where such vertically integrated IAS providers networks do host CDNs, it is possible they will only host commercial CDNs (rather than CAPs CDNs), and will seek payment from the CDN as a per-megabit fee for delivery of traffic. The commercial CDN will then pass on the additional costs of delivering such traffic to their own customers. BEREC may wish to do further research into the nature of the CDNs hosted in the largest IAS provider networks.

Similarly, wholesale-only transit networks may have paid interconnect relationships with such vertically integrated IAS/transit providers, such that they are paying the vertically integrated

provider, or there may be implied terms that they will need to move to such a paid relationship, should traffic ratios (the ratio of inbound to outbound traffic) fall outside those specified by the vertically integrated provider. Given that vertically integrated providers typically have millions of eyeball customers (and the consequent inbound traffic demand) and almost no content (and the consequent outbound traffic), this results in the wholesale-only transit provider effectively having to pass on the paid interconnect costs for delivering traffic demanded by the vertically integrated provider to their own transit customers who are trying to deliver traffic to the vertically integrated provider.

The draft report notes *"some stakeholders reported that CAPs may struggle to find alternatives to reach end-users if practices of vertically integrated IAS and transit providers leverage their termination monopoly"*. Through the practices above, a vertically integrated provider effectively controls all routes "into" their network and can thus set a price for access to their users, either via direct negotiation with CAPs (for peering or CAP CDN capacity), or through third parties (wholesale-only transit, or commercial CDNs) as a proxy. This practice has been coined "access power peering" and has been around for more than a decade. The draft report is to be commended for recognising this problematic practice.

It would be useful for BEREC to break out the composition of peering, transit and CDN in the "self-provided peering and transit" category for vertically integrated IAS providers, as in Figure 8 in the draft report. Similarly, the ARCEP state of the Internet report that is quoted in a number of places would benefit from breaking out similar statistics for the (one) vertically integrated IAS provider in France.

Bargaining Power in Interconnection Relationships

The draft report draws the right conclusion that the vast majority of agreements between IAS providers and CAPs are cooperative and based around mutual benefits, and that there is, broadly, a balance in the IP interconnect bargaining relationship. Contrary to recent telecom operator lobbying, the report also correctly concludes that "must have" content or a high market capitalization does not imply higher bargaining power for CAPs. If that were the case, it would be expected to see CAPs extracting paid peering from smaller IAS providers, which does not occur.

The draft report notes that the smallest IAS providers have the lowest proportion of paid peering, with the largest providers having the largest proportion. This could be considered an indication of the bargaining power that large providers have in negotiating with third parties (CAPs, CDNs and transit providers), in that they can extract paid peering terms.

The report notes there may be the possibility of a reduced quality of experience for users if there is a peering dispute between parties, if this results in congested interconnection points. It could be considered that this is the market working properly - the incentive to resolve such a dispute comes from a user experience impact, which affects both the IAS provider, and the third party. This situation may persist for some time while negotiations continue, but pressure from their mutual users - the IAS provider's customers, and the CAP's users - drives both parties towards a mutually acceptable resolution. There may only be an issue if there is insufficient alternative choice of IAS provider that users have no alternative to the IAS provider in dispute.

Role of Open Internet Regulation

The report considers the role of the OIR and its relation to IP Interconnection. It is true that the objective of the OIR - users being able to access substantially all endpoints on the Internet - is dependent on the successful establishment of interconnection relationships of sufficient capacity to support user demands. However, this involves a set of independent parties (the IAS provider, transit providers, peered networks, CDN providers) working together, and further relationships that those third parties then have with others, resulting in a complex indirect web of relationships enabling the IAS provider to deliver what they have promised to their customers - access to the whole Internet.

In order to avoid harmful and unnecessary interference with the highly cooperative interconnection market more broadly, the focus of BEREC's attention should be on the role of IAS providers, who hold a termination monopoly, and in particular the largest providers who are vertically integrated with their own wholesale transit division and closest to being a "Tier 1" provider.

Ultimately, customers of these IAS providers have paid to access substantially the whole Internet, not just the parts of the internet that their provider has concluded commercial agreements with. This is normally accomplished by using IP transit, and if there is evidence of an IAS provider abusing their termination monopoly to extract payments from the rest of the Internet, a remedy could be to require the IAS provider to purchase sufficient uncongested transit capacity to provide customers with what they have paid for. This will then provide the missing "safety valve" enabling CAPs, CDNs and third party transit providers to exchange traffic with the vertically integrated IAS provider's customers, without being forced into a paid relationship with that provider.

This issue, and the proposed remedy, has been recognised in past EC merger cases (M.7000 and M.8864) and should perhaps be applied more broadly where suitable evidence emerges.

Conclusion

In summary, I would support the report's conclusion: *"BEREC considers that since its creation, the internet has managed to cope with both traffic growth and higher peaks of traffic. These trends reflect changing usage patterns as well as increasing diffusion of IAS throughout societies. Against this background, BEREC's observation that the developments in the IP-IC ecosystem are an "evolution rather than revolution" still holds".*

BEREC is to be commended for their work and I look forward to future engagement on the topic.

Mike Blanche
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