BEREC
Body of European Regulators for Electronic Communications

BoR (22) 137

BEREC preliminary assessment of the underlying assumptions of payments from large CAPs to ISPs

Disclaimer: This paper only focuses on the underlying assumptions regarding the need to regulate remunerations of large content and application providers (CAPs) to internet service providers (ISPs).

7 October 2022

Contents

1. Background

This paper sets out a preliminary assessment, in relation to the discussion on the mechanism for "direct compensation"[1] also referred to as "fair share" proposed by ETNO members[2] during 2021/2022[3], which resembles the "sending party network pays" (SPNP) charging regime[4]. The paper has a limited scope and assesses the grounds for such a proposal and similar approaches, considering market developments that have occurred in recent years and the investments made by the different stakeholders. BEREC's preliminary assessment is based on several internal workshops with invited speakers, a large number of received written contributions and position papers published by various stakeholders and the previous BEREC work.

At this stage, this paper only focuses on the underlying assumptions regarding the need to regulate remunerations of large content and application providers (CAPs) to internet service providers (ISPs).

Considering the ongoing debate and the foreseen public consultation by the European Commission in the first half of 2023, BEREC will continue to contribute to the debate regarding CAPs' contribution to network investments, to the development of the internet ecosystem and to the achievement of European Union 2030 objectives.

BEREC remains available to provide further analysis to the European institutions along with the questions they will raise. Beyond the "direct compensation" mechanism discussed in this paper, a further and broader analysis could be carried out on other approaches related to the debate. It might also be interesting to look at the practices of large CAPs to take account of their impact on the internet ecosystem and society, and their accountability to this regard.

BEREC takes a holistic approach to this issue, considering that users buy and pay for internet access services (IAS) from their ISPs and use/subscribe to content and applications provided by CAPs. In particular, this paper presents BEREC's preliminary assessment whether the assumptions underlying the claims put forward by the large European ISPs are substantiated.[5] To contribute to the debate and to assist the European Commission's analysis, another upcoming BEREC paper will discuss the potential impacts such different proposals could have

[1] Axon Partners Group, "Europe's internet ecosystem: socio-economic benefits of a fairer balance between tech giants and telecom operators" (May 2022), p. 43-47, https://www.etno.eu/library/reports/105-EU-internet-ecosystem.html

[2] https://etno.eu/news/all-news/717-ceo-statement-2021.html

[3] Axon Partners Group, "Europe's internet ecosystem: socio-economic benefits of a fairer balance between tech giants and telecom operators" (May 2022), https://www.etno.eu/library/reports/105-EU-internet-ecosystem.html

[4] Telekom Deutschland, "Why Internet companies should pay for their data traffic" (5 February 2022), https://www.telekom.com/en/blog/group/article/why-internet-companies-should-pay-for-their-data-traffic-1003714

[5] The assessment in this paper is mostly grounded on the historical analysis of the cost evolution and on available forecasts, which leaves some part of uncertainty regarding the expected volumes of data traffic and corresponding network costs on a longer horizon (for example considering the European connectivity objectives of 2030).

(inter alia) on end-users[6], competition, innovation and investment, net neutrality and on the internet ecosystem.

BEREC's experience[7] shows that the internet has proven its ability to cope with increasing traffic volumes, changes in demand patterns, technology, business models, as well as in the (relative) market power between market players. These developments are reflected in the IP interconnection mechanisms governing the internet which evolved without a need for regulatory intervention. The internet's ability to self-adapt has been and still is essential for its success and its innovative capability[8]. BEREC and some of its member NRAs have been monitoring IP interconnection markets as well as the underlying charging mechanisms for a considerable period.[9]

The debate around IP interconnection has been revived in 2021/2022 and has gained momentum, particularly with large European ISPs' call for a financial contribution from large CAPs. These calls also refer to the aim of fostering investments in high-speed access networks and therefore have to be seen in the context of the European Commission 2030 targets for the digital decade[10]. These targets (inter alia) aim at the digital transformation of businesses and the digitalisation of public services: by 2030 at least 75% of European enterprises should have taken up cloud computing services, big data and Artificial Intelligence.[11] Furthermore, the ambition is that by 2030 all online provision of key public services are available for European citizens and businesses.[12]

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[6] According to the European Electronic Communications Code (EECC), "end-user" means a user not providing public electronic communications networks or publicly available electronic communications services. In turn, "user" means a natural or legal person using or requesting a publicly available electronic communications service. On that basis, BEREC understands "end-user" to encompass individuals and businesses, including consumers as well as CAPs.

[7] For example "BEREC Summary Report on the status of internet capacity, regulatory and other measures in light of the Covid-19 crisis" (BoR (21) 184), https://www.berec.europa.eu/en/document-categories/berec/reports/berec-summary-report-on-the-status-of-internet-capacity-regulatory-and-other-measures-in-light-of-the-covid-19-crisis-14

[8] This is besides openness issues on which BEREC called for action and which are now mainly dealt within the Digital Services Act (DSA) and Digital Markets Act (DMA).

[9] E.g. BEREC, "BEREC Report on IP-Interconnection practices in the Context of Net Neutrality" (BoR (17) 184), https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-ip-interconnection-practices-in-the-context-of-net-neutrality
BEREC, "An assessment of IP interconnection in the context of Net Neutrality" (BoR (12) 130), https://www.berec.europa.eu/en/document-categories/berec/reports/an-assessment-of-ip-interconnection-in-the-context-of-net-neutrality

[10] "Europe's Digital Decade: digital targets for 2030", https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

[11] Proposal for a Decision of the European Parliament and of the Council establishing the 2030 Policy Programme "Path to the Digital Decade", https://eur-lex.europa.eu/resource.html?uri=cellar:6785f365-1627-11ec-b4fe-01aa75ed71a1.0001.02/DOC_1&format=PDF

[12] Notwithstanding this growth in digital services, BEREC also assessed a wider need for reducing the environmental footprint of the digital sector, which might also hint at more traffic-efficient services. See "BEREC Report on sustainability: Assessing BEREC's contribution to limiting the impact of the digital sector on the environment" (BoR (22) 93),

BEREC notes that the current claims from large ISPs are not entirely new. Previously, at the World Conference on International Telecommunications 2012 (WCIT 2012), ETNO proposed to implement a "sending party network pays" charging mechanism. At that time, BEREC assessed this proposal and concluded that deviating from the current principles might be of significant harm to the internet ecosystem, as ISPs could exploit their termination monopoly[13] in a similar manner to the traditional telephony termination monopoly. Payment disputes between ISPs and CAPs can result in a loss of quality of the connection (as for example the dispute between Comcast and Netflix in the US demonstrated)[14]. To whom ISPs' customers attribute this problem and whether they are more likely either to switch the ISP or to switch or unsubscribe from the CAP, shapes the extent to which ISPs can exploit excessive charges, which are ultimately paid by consumers.

BEREC notes that the internet traffic has grown steadily over the years. Even though the current traffic volumes are notably higher than those analysed by BEREC in 2012 and 2017, there has been no fundamental change in the general growth tendency compared to 2012. For example, Cisco predicted that IP traffic would increase 4.6 fold in Western Europe 2009-2014 (with 36% annual growth rate)[15] and that the IP traffic annual growth rate in 2017-2022 would be 22% in Western Europe. Similarly for mobile data traffic, Cisco predicted an annual growth rate of 38% in 2017-2022 in Western Europe.[16] Also, WIK in its study concludes "*(…) the trend of growing data traffic identified in the BEREC Report 2017 continues globally for the time being, but with growth rates for Europe that are no longer falling, but rather constant*."[17].

There have however been changes in the traffic patterns. For example, Cisco predicted content delivery network (CDN) traffic to grow in Western Europe by 30% annually in 2017-2022 and that the growth rate is increasing[18]. BEREC notes that on-net CDNs may help ISPs to cope with the increasing traffic load. Also data from ARCEP shows that the asymmetry in favour of incoming traffic is rising[19] and that 51% of all traffic to the customers of France's

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https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-sustainability-assessing-berecs-contribution-to-limiting-the-impact-of-the-digital-sector-on-the-environment

[13] BEREC, "BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines" (BoR (12) 120 rev.1), https://www.berec.europa.eu/sites/default/files/files/document_register_store/2012/11/BoR%2812%29120rev.1_BEREC_Statement_on_ITR_2012.11.14.pdf

[14] The "BEREC Report on IP-Interconnection practices in the Context of Net Neutrality" (BoR (17) 184) provides details on the assessment of interconnection disputes.

[15] Cisco Visual Networking Index (VNI): Global IP Traffic Forecast 2009–2014 https://www.cisco.com/c/dam/en_us/about/ac78/docs/Cisco_VNI_Global_and_WE_IP_Traffic_Forecast.pdf

[16] Cisco Visual Networking Index: Forecast and Trends, 2017–2022 https://twiki.cern.ch/twiki/pub/HEPIX/TechwatchNetwork/HtwNetworkDocuments/white-paper-c11-741490.pdf

[17] WIK-Consult, "Competitive conditions on transit and peering markets – Implications for European digital sovereignty" (February 2022), p. 6, https://www.wik.org/en/veroeffentlichungen/studien/weitere-seiten/transit-and-peering-markets

[18] Cisco Visual Networking Index: Forecast and Trends, 2017–2022 https://twiki.cern.ch/twiki/pub/HEPIX/TechwatchNetwork/HtwNetworkDocuments/white-paper-c11-741490.pdf

[19] ARCEP data interconnection barometer, https://www.arcep.fr/fileadmin/cru-1662485189/user_upload/grands_dossiers/interconnexion/2022-4-Taux_d_asymetrie.png

main ISPs come from five providers: Netflix, Google, Akamai, Facebook and Amazon[20]. However, BEREC is of the opinion that this does not change the underlying assumptions regarding the sending party network pays charging regime and considers that the 2012 conclusions are still valid. BEREC considers to study the evolving traffic patterns and their implications further.

Additionally, BEREC notes that not all European ISPs support the suggestion made by the larger incumbent operators calling for a financial contribution from large CAPs. Rather, other network operators and/or ISPs (like smaller and medium-sized network operators/ISPs), which are also actively investing in high-capacity networks have expressed concerns about the large ISPs' proposals.[21] They mention that there is sufficient capital available for investments in fibre networks, especially by private investors. There is a concern that a direct compensation from large CAPs to large ISPs could endanger the principle of net neutrality and lead to a competitive distortion putting smaller and medium-sized ISPs at a disadvantage despite the fact that such alternative players often account for a considerable amount of the fibre network roll-out.

From a legal and economic point of view, there needs to be a justification for any intervention in the market, given its impact on the different players. Thus, any measure would need to be thoroughly assessed including an assessment of existing measures to mitigate a problem in the market. Moreover, from an economic point of view, such measures would have to require that the market likely fails to function properly. A relevant indication as to whether there is a need for regulatory intervention would be if there were a significant number of disputes between the different players.

- The internet has proven its ability to self-adapt to changing conditions, such as increasing traffic volume and changing demand patterns.
- There needs to be an adequate justification for any measure intervening in the market.
- The "sending party network pays" (SPNP) model would provide ISPs the ability to exploit the termination monopoly and it is conceivable that that such a significant change could be of significant harm to the internet ecosystem.
- Therefore, SPNP would require regulatory oversight and could require regulatory intervention.

[20] ARCEP data interconnection barometer, https://www.arcep.fr/fileadmin/cru-1662485189/user_upload/grands_dossiers/interconnexion/2022-9-Decomposition_du_trafic_par_origine.png

[21] Contribution of BREKO to the public consultation on the draft BEREC Guidelines on the Implementation of the Open Internet Regulation (BoR PC05 (22) 06), p. 4., https://www.berec.europa.eu/en/document-categories/berec/public-consultations/contribution-of-breko-to-the-public-consultation-on-the-draft-berec-guidelines-on-the-implementation-of-the-open-internet-regulation
MVNO Europe, "MVNO Europe expresses concerns about discussion on potential network investment contributions to finance telecom infrastructure" (30 August 2022), http://mvnoeurope.eu/mvno-europe-position-paper-on-network-investment-contributions/

- A further and broader analysis could be carried out on other approaches related to the debate.

2. Traffic causation

The large European ISPs base their call for a regime of CAPs payments to terminating ISPs on the argument that *"most of the data traffic growth over the last decade has been driven by a small number of leading Over-The-Top (OTT) providers"*.[22] As ISPs refer to higher costs due to increasing data traffic, their calls for a financial contribution are to remunerate such higher costs (see next section on cost drivers). In particular, ISPs argue that large CAPs are "causing" the increase in data traffic.

In 2012, BEREC refuted the argument that traffic is "caused" by CAPs[23]: "*ETNO's proposals do not seem to have taken account of the fact that the request for the data flow usually stems not from the CAP but from the retail Internet access provider's own customer (who "pulls" content provided by the CAPs, and from whom the ISP is already deriving revenues). Ultimately, it is the success of the CAPs (from whom ETNO wishes to extract additional revenues) which lies at the heart of the recent increases in demand for broadband access (i.e. for the ISPs' very own access services)"*. The fact that the flow of data is done at the request of the ISPs' customers could for example be seen during the COVID-19-crisis where internet traffic increased significantly for a period based on end-user demand[24].

The fact that the ISPs' customers are requesting a service from the CAP and therefore causing the data traffic involved is acknowledged by the European legislator. Article 1(1) lit. b Directive (EU) 2015/1535[25] defines "Information Society service" as "*any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services*" (emphasis added).

Nevertheless, CAPs are also able to optimise the data efficiency of the content and applications they provide. For this purpose, CAPs have a variety of levers to manage the amount of data of their services, through technical choices (e.g. transmission through CDNs, efficient video codecs, adapting the bitrate to the screen size and to the network capacity) or

[22] Axon Partners Group, "Europe's internet ecosystem: socio-economic benefits of a fairer balance between tech giants and telecom operators" (May 2022), p. 1, https://www.etno.eu/library/reports/105-EU-internet-ecosystem.html

[23] BEREC, "BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines" (BoR (12) 120 rev.1), https://berec.europa.eu/eng/document_register/subject_matter/berec/others/1076-berecs-comments-on-the-etno-proposal-for-ituwcit-or-similar-initiatives-along-these-lines

[24] BEREC, "BEREC Summary Report on the status of internet capacity, regulatory and other measures in light of the Covid-19 crisis" (BoR (21) 184), https://www.berec.europa.eu/en/document-categories/berec/reports/berec-summary-report-on-the-status-of-internet-capacity-regulatory-and-other-measures-in-light-of-the-covid-19-crisis-14

[25] Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (codification), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015L1535&qid=1661349077698#d1e245-1-1

user interfaces and design incentives (e.g. autoplay features). Assessing those levers might be of relevance, for example, in the context of reducing the environmental footprint of digital services.

Furthermore, the argument about traffic asymmetry is frequently raised in the debate about SPNP. This is closely related to the discussion about traffic causation. The argument regarding ISPs' remuneration from CAPs, due to *reception* of traffic requested by end-users, is actually in the opposite direction when large ISPs require remuneration from smaller ISPs when *sending* traffic towards their end-users.

When ISPs build access networks, they tend to build networks to *receive* more traffic than they *send.* This takes place in mobile networks with higher download than upload speed. In fixed networks, technologies such as fibre to the home (FTTH) enable symmetric bandwidth, even though providers still offer asymmetric xDSL (x Digital Subscriber Line) services. Mobile ISPs even facilitated data cap exemption for selected content in their zero-rating offers (prior to the judgments of the European Court of Justice). Based on this, the argument about traffic asymmetry does not seem to be in line with the actual behaviour of ISPs.

- Traffic is requested and thus "caused" by ISPs' customers.
- CAPs are also able to optimise the data efficiency of the content and applications they provide.

3. Cost drivers

In their letter from November 2021, the CEOs from large European ISPs claim that "*large and increasing part of network traffic is generated and monetised by big tech platforms*."[26] They also refer to the aim of fostering investments in gigabit networks. Studies conducted for these ISPs conclude that traffic driven by OTTs will generate yearly infrastructure costs of up to 36-40 bn EUR for them[27].

Against this background one of the **assumptions** underlying the major ISPs' proposals for CAPs to contribute to network costs is – in simplified terms – **that an increase in traffic directly translates into higher costs.**

BEREC considers that the debate about network investments, traffic volumes and cost drivers needs to be carefully analysed.[28] Above all, a distinction must be made as to which network segments are being discussed in detail and how the costs are distributed accordingly because, in general, the costs of IP network infrastructures are not very traffic-sensitive. Existing

[26] ETNO, "Joint CEO Statement: Europe needs to translate its digital ambitions into concrete actions", https://etno.eu/news/all-news/717-ceo-statement-2021.html

[27] Axon Partners Group, "Europe's internet ecosystem: socio-economic benefits of a fairer balance between tech giants and telecom operators" (May 2022), p. 1, https://www.etno.eu/library/reports/105-EU-internet-ecosystem.html

[28] In this context, both capital expenditure and operational expenditure are relevant.

capacity can be utilised up to a certain point without additional costs, and only when higher peak capacity is required, investments in network expansion are necessary. **The costs of IP network upgrades that are necessary to handle an increased IP traffic volume** are **very low compared to the total network costs** and upgrades come with a significant increase of capacity. See further details below.

BEREC considers in this regard the incremental costs necessary for the upgrade in capacity on a given network to handle more incoming traffic. These costs can incorporate to some extent technological upgrades as far as they are relevant for solving capacity issues. These costs have to be differentiated from the total network costs, which are mostly coverage costs (i.e. building a new network coverage such as a fibre network to a certain area, which represents costs that are inherent to the business model of an ISP).

3.1. Access networks

The proposal for a contribution from large CAPs is basically about generating revenues for investments in access networks as these are the segments that require significant investment.

Fixed access networks are to the largest extent **not traffic-sensitive** and their costs are recovered from customer subscriptions over time[29]. This is also reflected in ISPs' retail price where they typically offer flat rates. Furthermore, this is acknowledged in the ISPs' study conducted by Frontier Economics, which states that "*For fixed networks, the access network components closest to the end user generally tend to be dimensioned according to the number of customers served or potentially served. (…) costs within the access network (i.e. costs relating to any access equipment up to the first switching layer) are considered 'subscriber sensitive' and recovered from per user charges.*"[30].

Mobile networks exhibit **some degree of traffic-sensitivity**. BEREC acknowledges that the cost related e.g. to build additional base stations to increase the capacity in certain areas is traffic-sensitive. However, BEREC considers that the cost of building new network coverage is not traffic-sensitive. Nevertheless, the marginal costs of additional data usage are quite low, as also demonstrated by Ericsson[31]. However, this is also reflected by mobile network operators (MNOs) as the price of their offers is typically tied to the data allowances included.

[29] In some instances the costs for building FTTH connectivity are (partially) carried by the home-owner or a state aid program.
[30] Frontier Economics, "Estimating OTT traffic-related costs on European Telecommunications Networks – A report for Deutsche Telekom, Orange, Telefonica and Vodafone" (31 March 2022), p. 6
[31] Ericsson (2022), "Understanding the Economics of 5G Deployments" (June 2020), p. 12, "*As shown in Figure 18, CPGB [= cost per gigabyte] declines as user traffic increases because traffic grows more than investment does, reducing the cost of each additional GB delivered.*", https://www.ericsson.com/496678/assets/local/ericsson-blog/doc/paper_5geconomics-digital.pdf

BEREC considers **that increasing traffic volumes do not directly lead to significant incremental costs,** when compared to total network costs[32].

3.2. Backbone networks

Backbone networks (just like access networks) are dimensioned according to peak traffic load.[33] This implies that additional traffic at off-peak times generates no incremental costs. If the peak traffic volume increases such that the existing capacity is no longer sufficient, this indicates that the backbone hardware (routers and switches) need to be **upgraded**. While this is a one-off investment cost, such an upgrade typically results in an increase in capacity by a multiple of what would be required by latest technologies. Against this background, the **cost of increasing backbone capacity** can be considered **very low**, in particular when **compared to the cost of building access networks and** therefore the **total network cost**.

Backbone networks exhibit **significant economies of scale**. In its reports on net neutrality and IP interconnection[34], BEREC has shown that competition and technological progress have led to declining per unit costs for data traffic, thereby allowing the Internet to cope with increasing traffic volumes. Accordingly, BEREC concluded in 2017 *"(…) that the Internet ecosystems' ability to cope with increasing traffic volumes is still given"*[35]. Furthermore, BEREC notes that given the aim of investment in high-speed access networks, it is not relevant to refer to the costs associated with increasing the capacity of backbone networks. This is not the area that needs large scale investments in particular when compared to the costs of investing in access networks.

3.3. IP interconnection links

Typically, IP interconnection disagreements are about **insufficient capacity at the interconnection links** towards access networks as BEREC set out in 2012: "*IP interconnection agreements only involve the provision of capacity of the interconnection link and not the end-to-end transmission of particular data flows across different autonomous IP networks.*"[36] In practice, the costs for increasing this capacity are **often shared** by the parties

[32] Even though this analysis on incremental costs can vary in the long run, threshold effects may appear when traffic volumes significantly rise and may require a wider network upgrade, especially on mobile networks.

[33] Backbone networks in the SPNP context should be understood as a backbone for an individual network rather than global Tier 1 backbone networks.

[34] BEREC, "An assessment of IP interconnection in the context of Net Neutrality" (BoR (12) 130), p. 46.

[35] BEREC, "BEREC Report on IP-Interconnection practices in the Context of Net Neutrality" (BoR (17) 184), https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-ip-interconnection-practices-in-the-context-of-net-neutrality (Conclusion d), p. 26)

[36] BEREC, "BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines" (BoR (12) 120 rev.1), https://www.berec.europa.eu/sites/default/files/files/document_register_store/2012/11/BoR(12)120rev.1_BEREC_Statement_on_ITR_2012.11.14.pdf

involved (i.e. CAPs and ISPs). This reflects that it is mutually beneficial for both parties to increase the interconnection links. More importantly, the absolute costs for increasing interconnection capacity are very low.

Technically, interconnection between two networks is realised by connecting two routers of the involved networks. Each party needs either a free network interface (port) at an existing router or else needs to set up a new router with free ports. The **hardware costs for routers** (and associated cables) can be considered **very low** compared to the total network costs**,** in particular given the pace of **technological progress**. Added to this are the cost of setting up, administrating and running this router but none of these costs are traffic-sensitive. If traffic volumes increase to such an extent the existing capacity is no longer sufficient, then the hardware (router) for the interconnection would need to be **upgraded**. While this implies one-off costs, such an upgrade typically results in a capacity increase which is significantly more than that required by the latest technologies. Against this background, the **cost of increasing interconnection links can be considered very low, in particular when compared to the cost of building access networks**. These access networks are at the heart of European's connectivity targets and seem to be the focus of the current debate at stake.

- Fixed access networks costs exhibit a very low traffic-sensitivity, while mobile networks experience some degree of traffic-sensitivity.
- IP-interconnection disagreements are typically about increasing the capacity of the IP interconnection link.
- The cost of network upgrades that are necessary to handle an increased IP traffic volume are very low when compared to the total network costs.

4. Mutual interdependence

The internet ecosystem consists of several interwoven elements[37]. The network layer providing the transmission capacity and the application layer providing the content that is transmitted are essential for this ecosystem. Neither the network nor the application layer run without each other. Building "empty pipes"[38] for transmission is not a viable business without something to transmit and developing content without "pipes" transmitting content is not viable either. Furthermore, it is a prerequisite that ISPs customers request content from the CAPs to make the content flow through the "pipes".

On the one hand, the content provided by CAPs is driving the demand for IAS capacity provided by ISPs, since it can increase end-user demand for more bandwidth and for IAS with

[37] BEREC, "Draft BEREC Report on the Internet Ecosystem" (BoR (22) 87), https://www.berec.europa.eu/en/document-categories/berec/public-consultations/draft-berec-report-on-the-internet-ecosystem

[38] The analogy with of the term "pipes" is derived from AT&T CEO Edward Whitacre whom in 2006 declared that companies like Google should not be able to "use the pipes for free".

higher speed and larger data allowances. In other words, the ISPs are "using" the content of CAPs in order to increase revenues.

BEREC already stated in 2012: "*Ultimately, it is the success of the CAPs […] which lies at the heart of the recent increases in demand for broadband access*"[39]. Or, from a different perspective, traffic growth is beneficial to ISPs. This holds both for fixed and mobile networks and is due to a) ISPs' ability to reflect costs structures in their retail pricing structures and b) the cost implications following from increases in data volumes (see Chapter 3 on cost drivers). As Ericsson expressed: "*Growth in mobile traffic is among the foremost economic drivers of next-generation wireless networks*"[40].

On the other hand, IAS capacity provided by ISPs is used to deliver the content when requested by the ISP's customer and then delivered by CAPs. An increased demand for "faster" internet access lines or for higher data volumes drives the development of new content and applications. This again supports the demand for content and applications. One could notice a mutual interdependence in which increasing demand for content and applications leads to higher uptake of internet access bandwidth and vice versa.

Furthermore, ISPs are able to differentiate offers according to customer demand. Many customers are willing to pay an additional price for higher internet speeds and additional mobile data volume. Increased consumption of video streaming services by customers shifted demand to IAS with higher speeds and higher data volumes, enabling ISPs to charge end-users according to their usage pattern.

- CAPs and ISPs are mutually dependent on each other.
- The demand from ISPs customers for content drives demand for broadband access.
- Availability of broadband access drives demand for content.

5. No evidence of "free-riding"

One of the **underlying assumptions** of the ISPs claims for payments from large CAPs is that the latter are "**free-riding"** on ISPs infrastructures. Thus, CAPs would use this infrastructure without ISPs being (fully or partially) compensated for it and, therefore, costs incurred by ISPs would not be covered.

[39] BEREC, "BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines" (BoR (12) 120 rev.1), https://www.berec.europa.eu/en/document-categories/berec/others/berecs-comments-on-the-etno-proposal-for-ituwcit-or-similar-initiatives-along-these-lines;

[40] Ericsson, „Understanding the Economics of 5G Deployments" (June 2020), p. 4, https://www.ericsson.com/496678/assets/local/ericsson-blog/doc/paper_5geconomics-digital.pdf.
See also Vodafone CEO Nick Read (18 May 2021): "*We see a compelling opportunity for high growth given the step change we've seen towards a digital society over the past year. Importantly, this growth opportunity exists in both Europe and Africa.*", https://www.reuters.com/article/vodafone-results-idCNL5N2N51AT

These claims are **not new**. As mentioned in Chapter 1, these claims and assumptions were also the basis of the proposals made by ETNO in the context of the WCIT 2012. In its response to these proposals, BEREC concluded that "*both sides of the market – CAPs on the one hand and users of these applications on the other hand – already contribute to paying for Internet connectivity. There is no evidence that operators' network costs are already not fully covered and paid for in the Internet value chain (from CAPs at one end, to the end users, at the other*)"[41]. BEREC's preliminary assessment is that this **still holds true in 2022 as it did in 2012**.[42]

Under **competitive conditions**, there is typically **no room for free-riding**. Back in 2012 and 2017, BEREC had referred to the competitive nature of IP-interconnection markets stipulating that disputes were typically solved in the market without regulatory intervention. WIK's study from 2022[43] confirms that the IP-interconnection ecosystem is largely competitively driven. Against this background, BEREC is not aware of any empirical evidence to suggest that the market has become non-competitive in recent years.

A closer look suggests that there is no evidence of "free-riding" along the value chain. ISPs' customers buy internet connectivity and pay for sending and receiving traffic. Costs for deploying and upgrading the **access networks** are typically covered by payments from ISPs' customers[44] (except for parts of the network coverage which require public funding). Under Bill & Keep[45], there is no wholesale payment and accordingly, Frontier Economics in a report for several European ISPs states "*costs within the access network (…) are considered 'subscriber-sensitive' and recovered from per user charges*".[46]

BEREC, similarly found no evidence of "free-riding" in **backbone networks and IP interconnection**. Decreasing transit prices and costs over a period of more than two decades

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[41] BEREC, "BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines" (BoR (12) 120 rev.1), https://berec.europa.eu/eng/document_register/subject_matter/berec/others/1076-berecs-comments-on-the-etno-proposal-for-ituwcit-or-similar-initiatives-along-these-lines

[42] See WIK-Consult, "Competitive conditions on transit and peering markets – Implications for European digital sovereignty" (February 2022), Chapter 3, https://www.wik.org/en/veroeffentlichungen/studien/weitere-seiten/transit-and-peering-markets

[43] WIK-Consult, "Competitive conditions on transit and peering markets – Implications for European digital sovereignty" (February 2022), https://www.wik.org/en/veroeffentlichungen/studien/weitere-seiten/transit-and-peering-markets

[44] Note that payments from ISPs' customers do not only cover the costs of access networks but also the wide area networks / backbones of the customer's ISP and upstream connectivity bought by him (see https://www.berec.europa.eu/system/files/2022-07/erg_08_26_final_ngn_ip_ic_cs_081016.pdf, figure 2 "Payment and data flows in IP-based networks").

[45] Under the Bill & Keep charging mechanism each network agrees to terminate connections from the other network without any charge. BEREC had extensively worked on charging mechanisms, e.g. ERG, "ERG Common Statement on Regulatory Principles of IP-IC/NGN Core – A work program towards a Common Position" (ERG (08) 26), https://www.berec.europa.eu/sites/default/files/files/publications/erg_08_26_final_ngn_ip_ic_cs_081016.pdf; ERG, "Final report on IP interconnection" (March 2007), https://www.berec.europa.eu/sites/default/files/files/documents/erg_07_09_rept_on_ip_interconn.pdf

[46] Frontier Economics, "Estimating OTT traffic-related costs on European telecommunications networks - A report for Deutsche Telekom, Orange, Telefonica and Vodafone" (31 March 2022), p. 6

indicate that this part of the value chain is highly competitive[47]. On-net CDNs and network investments by large CAPs gained further relevance during the last years thereby increasing the competitive pressure on transit providers.[48]

Studies conducted for ISPs point at traffic-sensitive network costs incurred by ISPs between 36-40 bn EUR p.a. across Europe[49]. It would be reasonable to assume that if there had been such a significant free-riding, this **would have been reflected in ISPs financial statements** and also in **loss warnings,** however, BEREC has noted neither.

Furthermore, a number of studies indicate that the provision of telecom access infrastructures is a profitable business with a relatively attractive risk return.[50] The attractiveness of access network investment is reflected in the annually increasing capital investors' investments in fibre access networks. Generally, the risks of developing content and applications are typically higher compared to the risks of the business model of investing in infrastructure. Such findings would not be plausible if a free-riding problem existed at the expense of such networks. Therefore, besides public funding such as State-aids contribution to network deployments, costs incurred by network investments are largely covered by payments from ISPs customers at the access network level and by wholesale payments at the backbone level.

By taking a holistic view to the discussion, it is essential to consider contributions from the different stakeholder categories to the internet ecosystem. In the same way as investment from ISPs in network infrastructure is contributing to the internet ecosystem, investment from CAPs in content itself and in the platforms where content is made available, are contributing to this overall ecosystem. Furthermore, CAPs also invest in network infrastructure bringing content close to ISPs. As described about large CAPs in the draft BEREC Report on the Internet Ecosystem[51], "*their role is extending from the provision of content and intermediation services to significant investment in infrastructure and in the design and quality of various software*".

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[47] Arcep, "Barometer of data interconnection in France 2022", section 1.5.1, https://www.arcep.fr/cartes-et-donnees/nos-publications-chiffrees/interconnexion-de-donnees/barometre-de-linterconnexion-de-donnees-en-france.html

[48] See WIK-Consult, "Competitive conditions on transit and peering markets – Implications for European digital sovereignty" (February 2022), e.g. chapters 2.3, 3.2.3, 3.2.4., https://www.wik.org/en/veroeffentlichungen/studien/weitere-seiten/transit-and-peering-markets

[49] Axon Partners Group, "Europe's internet ecosystem: socio-economic benefits of a fairer balance between tech giants and telecom operators" (May 2022), p. 1, https://www.etno.eu/library/reports/105-EU-internet-ecosystem.html

[50] See .e.g. a study prepared for the European Commission on "Investing in local and regional Gigabit broadband deployment: Opportunities and challenges for market investors in the EU", https://digital-strategy.ec.europa.eu/en/library/study-investing-local-and-regional-gigabit-broadband-deployment-opportunities-and-challenges-market
Also see GSMA, "The Internet Value Chain 2022" (May 2022), p. 33, https://www.gsma.com/publicpolicy/wp-content/uploads/2022/05/Internet-Value-Chain-2022.pdf

[51] BEREC, "Draft BEREC Report on the Internet Ecosystem" (BoR (22) 87), https://www.berec.europa.eu/en/document-categories/berec/public-consultations/draft-berec-report-on-the-internet-ecosystem

- There is no evidence of “free-riding”.
- Costs for internet connectivity are typically covered and paid for by ISPs customers.

6. Preliminary findings

In this paper, BEREC has focused its preliminary assessment on the implementation of a “direct compensation” mechanism proposed by ETNO members. BEREC has found no evidence that such mechanism is justified given the current state of the market. BEREC believes that the ETNO members’ proposal could present various risks for the internet ecosystem.

To wrap up, the BEREC preliminary findings regarding the “direct compensation” mechanism are:

1. The internet has proven its ability to self-adapt to changing conditions, such as increasing traffic volume and changing demand patterns.
2. There needs to be an adequate justification for any measure intervening in the market.
3. The “sending party network pays” (SPNP) model would provide ISPs the ability to exploit the termination monopoly and it is conceivable that that such a significant change could be of significant harm to the internet ecosystem.
4. Therefore, SPNP would require regulatory oversight and could require regulatory intervention.
5. Traffic is requested and thus “caused” by ISPs’ customers.
6. CAPs are also able to optimise the data efficiency of the content and applications they provide.
7. Fixed access networks costs exhibit a very low traffic-sensitivity, while mobile networks experience some degree of traffic-sensitivity.
8. IP-interconnection disagreements are typically about increasing the capacity of the IP interconnection link.
9. The cost of network upgrades that are necessary to handle an increased IP traffic volume are very low when compared to the total network costs.
10. CAPs and ISPs are mutually dependent on each other.
11. The demand from ISPs customers for content drives demand for broadband access.
12. Availability of broadband access drives demand for content.
13. There is no evidence of “free-riding”.

14. Costs for internet connectivity are typically covered and paid for by ISPs customers.
15. A further and broader analysis could be carried out on other approaches related to the debate.