



**BEREC draft Report on the Internet Ecosystem
Netflix observations**

July 2022

Introduction

Netflix is a streaming entertainment service with more than 221 million paid memberships in over 190 countries. Members can enjoy TV series, documentaries, feature films and mobile games across a wide variety of genres and languages. All of the content available on Netflix is either owned by Netflix or is licensed from third parties. The content offered is available for consumers through a subscription for access to the Netflix service. We compete with a large number of entertainment companies for consumers' time and attention. Consumers make, on a daily basis, decisions as to which forms of entertainment -- audiovisual or otherwise -- they will select and engage in. All forms of audiovisual entertainment (films, sports and other TV content, scripted or unscripted) compete with one another, as well as with other forms of entertainment (including cost-free video hosting platforms such as YouTube, online music platforms such as Deezer or Spotify, video gaming, web browsing, and social media services), for consumers' attention and spend.

Netflix is governed by the Audiovisual Media Services Directive (AVMSD), which sets the framework for all audiovisual media services in the EU. Under the AVMSD, Netflix as an on-demand provider is subject to obligations requiring significant financial investment. These obligations include: (i) cultural financial obligations, in the form of either cultural levies or investment obligations that can be introduced by every EU country individually requiring that on-demand services pay into a film fund and/or invest directly; (ii) providing at least 30% European works quota in all 27 national catalogs, with the need to produce or license more European works and (iii) ensuring prominence of European works, including investing in promotion and marketing.

Europe is the birthplace of some of the world's best entertainment and European creators reach audiences around the world thanks to a thriving and competitive internet ecosystem. The European Internet held up remarkably well throughout the COVID pandemic,¹ demonstrating resilience and providing essential connectivity during this unprecedented stress test. An open, competitive Internet and the rules protecting it are foundational to this success. It has driven a virtuous circle of investment in the EU: between 2018-2021, Netflix has invested over €4 billion in European content. We work collaboratively with ISPs to deliver

¹ As noted by [BEREC](#)

this content in the most efficient means possible, enabling ISPs to invest in building out access networks that can support faster broadband services for their customers.

The Internet is the primary way by which we make our content available to Netflix members, and as such we have outlined in this response three suggestions which we hope will contribute to improve BEREC's report and to foster regulations for a healthy internet ecosystem. First, we suggest BEREC emphasize the key role that ISPs play in the internet ecosystem. Second, we recommend BEREC to pay close attention to how IP interconnection practices by vertically integrated ISPs can pose a risk to the Internet's openness and lastly we share some observations of the CDN market developments that differ from BEREC's.

On the critical position of Electronic Communication Service providers providing Internet Access Services (ISPs) in the internet ecosystem

Netflix agrees with BEREC's assessment that Internet access, and the ISPs that provide it, play *"a substantial role in the internet ecosystem as it is a gateway between end users and business users such as CAPs. By exerting technical control over the Internet access, providers of IAS have the ability to influence an important part of the network layer."* (section 7.2.3). The existence of this termination monopoly is one of the reasons for the Open Internet regulations that Netflix strongly supports, and for which the European framework constitutes a global reference. We suggest BEREC also consider the additional information to the market dynamics described in section 5.6 of the draft report, described below.

As the draft report points out, there has been an explosion of Internet connected devices available to consumers. Netflix, like many other streaming services, are available on nearly any of them. The majority of Netflix viewing continues to be on televisions, whether smart TVs or through connected devices. Some ISPs are important players in provisioning such devices to consumers: specifically many Internet plans are commercialized with a TV offer, and come with an ISP-provided set-top-box. These set top boxes provide a gateway to a range of Internet streaming entertainment choices, including in many cases, an ISP's own affiliated video service.

In any given country, an average European user can generally choose from less than a handful of ISPs for the provision of broadband Internet service, a reality not well described by the statement that *"the electronic communications services market is very fragmented"* (section 5.6). What's more, as noted by BEREC², according to the results of the European Commission's Consumer Markets Scoreboard 2018³, consumers *"found it particularly difficult to switch provider in 'telecoms' [...], with 'fixed telephone services', 'TV-subscriptions', [...]"*

² [BEREC, 2019](#)

³ [European Commission, 2018](#)

and ‘internet provision’ ranking at the bottom of the scale (i.e. the most difficult to switch)”. Netflix makes it very easy for members to cancel their monthly subscription. In times of inflation and budget cuts for households, some have found⁴ that end-users are more likely to terminate online entertainment services like Netflix rather than change or terminate their ISP subscriptions. We believe that these facts should be properly assessed and reported by BEREC when considering the competitive dynamics of the internet ecosystem.

ISPs often have affiliated Pay TV and/or streaming services that directly compete with providers of pay-TV or VOD, which may provide incentive for ISPs to favor dominant or their own vertically-integrated content providers at the expense of other competitors. For example, a Dutch ISP doubled the size of its data-caps in 2016 after it launched an Internet television service as it was unable to zero-rate its own video service under Dutch net neutrality rules.⁵

Lastly, BEREC notes that *ECS pro-competitive regulation in the last two decades has played a very important role in ensuring market entry, effective competition and innovation for the benefit of users*” (section 6.1). While some large ISPs have expressed concerns⁶ about the investments needed to achieve next generation networks (FTTH) rollout and their profitability, we suggest BEREC should also take note of new entrants investing heavily in fiber networks, for example institutional funds with a long term capital outlook that seem to contradict those concerns⁷. We note also that there is a high discrepancy between next generation networks deployments inside the European Union: FTTH coverage in the EU passed the 50% mark in 2021⁸, which is higher than the U.S. or OECD average⁹. According to the OECD, there are significant variations between EU member states, some with very high FTTH coverage (Spain, Lithuania or Sweden above 75%) and others much lower (Germany, Belgium or Greece below 10%). This suggests that the policy levers to achieve next generation networks rollout exist.

On the role of IP interconnection as a possible risk to the openness of the Internet Ecosystem

BEREC notes (section 7.2.5) that *“Even though the IP interconnection practices of ISPs are generally outside the scope of the OI Regulation and largely unregulated, issues at this level may have a significant impact on users’ internet experience.”* Indeed, all content requested from the Internet must pass through an interconnection point before reaching the end-user, and ISPs have sole control of the access points onto their networks and how content traverses across their networks.

⁴ [The Guardian, 2022](#)

⁵ [Rewheel / Digital Fuel Monitor, 2015](#)

⁶ [ETNO/Axon, 2022](#)

⁷ [Macquarie, 2018](#) ; [Infravia, 2022](#)

⁸ [ETNO, 2022](#)

⁹ [OECD Broadband Statistics](#)

Customers subscribe to an Internet access service from an ISP in order to be able to connect to *virtually all endpoints of the Internet*¹⁰. ISPs have a duty to their customers to enable global connectivity to serve this purpose, and do so through a mix of transit and peering. Transit is a for-payment service whereas peering overwhelmingly follows the ‘bill & keep’ principle¹¹. This creates an incentive for ISPs and CAPs to peer directly, localizing traffic for their mutual benefit and that of their customers. ISPs and CAPs interconnecting directly and creating a meshed network contributes to the Internet’s resilience, while the availability of global connectivity through transit services is fundamental to the openness of the Internet and its ability to enable “innovation without permission”.

When an ISP has a mix of *uncongested* peerings and transit with ‘Transit ISPs’ (ISPs who provide IP Transit services to third parties), other networks (ISP or CAP) that cannot interconnect directly (because of distance for example) will be able to exchange traffic without degradation through Transit ISPs. The ISP and/or CAP will then pay a competitive fee reflecting the provision of a transit service. In particular, video services like Netflix can work very well going through multiple network “hops” so long as networks are uncongested. Video is not latency sensitive and congestion is the main issue causing video quality degradation or buffering.

Netflix, through its investment in its Open Connect programme, has worked cooperatively with ISPs in the EU to connect directly. Open Connect servers are located in more than 700 locations in the EU. All of Netflix traffic in Europe is delivered via localized Open Connect servers within the EU and the majority of Netflix traffic is offloaded to local Open Connect Appliances embedded in ISPs networks, which are provided free of charge to ISPs as part of mutually beneficial cooperations between ISPs and Netflix. As a consequence, European ISPs’ long haul and core networks are mostly free of Netflix traffic and less likely to face congestion during times of peak demand for Netflix content from their customers.

Recent studies¹² in the EU show how CAPs of all sizes, and the vast majority of ISPs, interconnect cooperatively and efficiently following the ‘bill & keep’ principle, through private interconnections and/or public internet exchange points. The only exceptions generally noted are large ISPs (with large retail market share and/or vertical integration with Tier 1 global transit networks) that enforce “selective” interconnection policies, demanding fees for access to their network (marketed as transit or paid peering), from content providers and smaller ISPs for direct interconnections that would normally follow the bill & keep principle, instead of working to provide the best quality of service under a more cooperative approach. We

¹⁰ [BEREC, 2020](#)

¹¹ [PCH, 2021](#)

¹² [WIK/BNetzA, 2022](#)

suggest that BEREC should focus on these differences in bargaining power as it considers IP interconnection as a “*relevant topic for further analysis*” (section 8).

Indeed, seeking network payments will lead to perverse incentives for the ISPs as the only way to force another network to pay is to ensure the congestion of all alternative routes (through Transit ISPs) into the ISP’s network. Such restrictive interconnection practices have two consequences. First, customers of the ISP will receive poor performance on any content or service not directly connected to the ISP, despite paying for access to the *entire* Internet, and second, the only alternative for a content provider will be to either pay a termination fee or suffer congestion and quality degradation.

Refusing to upgrade interconnection capacity, and therefore limiting an end-user’s ability to access certain content, is contrary to the end-user protections under Article 3(1) of the Open Internet regulations and the equal treatment requirement under Article 3(3). It is essential that BEREC remains vigilant of such possible practices, and explicitly seeks to identify and combat them. We recommend BEREC continues to pay close attention to the availability of uncongested transit capacities, and to the role of Transit ISPs in delivering an open Internet, especially when they are vertically integrated with an ISP or CAP.

On the CDN market latest developments

Netflix launched its in-house CDN, Open Connect, in 2012. The main reason was that at scale, with the relevant technical knowledge and expertise, building a custom, single-purpose CDN would enable Netflix to build technologies specific to Netflix and Netflix traffic making it the most efficient CDN in the world. Netflix has continued to innovate leading to substantial cost and performance benefits for ISPs and consumers including: smart caching technologies, which use popularity prediction to allow us to optimize the offload efficiency of Open Connect ; partner management tools, which enable cache deployments customized to ISP partners network design preferences and personalized cache-filling time windows ; or the development and operation of video compression technologies that allow highly efficient video encodes: Netflix has doubled the efficiencies of our streams in the past 5 years. Netflix has further invested in adaptive streaming technologies that respond to network congestion by automatically reducing video quality.

On demand video, and especially long-form editorialized content such as Netflix’s, is particularly suitable for delivery through a distributed caching network. The library of Netflix’s content¹³ is sufficiently limited and predictable that it can be stored in its entirety with a

¹³ We are continuously looking to expand our content offering to make our service more valuable to our members. As such, Netflix might experiment with new forms of content (live events or games streaming, ads-supported service) that may have different technical characteristics in the future.

relatively small server footprint, including from energy efficient flash disks that are fast enough to accommodate large peaks of requests. These efficiencies have clear environmental benefits as well: recent research from the Carbon Trust¹⁴ showed that the average carbon footprint for Europe per hour of video streaming is approximately 55gCO₂e, equivalent to driving 250 meters in an average petrol car.

Delivering content from a distributed CDN was always the most logical solution from the start of Netflix streaming service in 2007, and is likely to remain so. Netflix is not latency sensitive, but caching content and delivering it close to the end users help make networks more efficient, improving viewing experience, reducing the risks of congestion and helping ISPs reduce the cost of building networks to accommodate their customers' demand.

CDNs deliver traffic according to the cold potato rule, i.e. closest to the users, and as such considerations about traffic ratios (section 7.2.5) are not relevant. While traffic ratios make sense in a hot potato routing environment with multiple interconnection points, where the receiving network shoulders the costs of transporting traffic between distant locations, traffic ratios should not apply in a cold potato environment where ISPs receive traffic next to their users. We have found that 'traffic ratios' have been used as justification to engage in "selective" interconnection policies with perverse effects noted above.

Netflix continuously assesses the best options available for video content delivery, including by comparing in-house and third party solutions. We observe that CDN services are a very competitive space, with fierce competition between well-established market players that have been around for decades (Akamai was founded in 1998), more recent entrants (Fastly, Cloudflare), large cloud platforms offering CDN services (Amazon Cloudfront or Google Media CDN), and local or regional players. A new Internet-based streaming service could launch today, and obtain CDN coverage allowing it to deliver content efficiently around the world in an instant, and indeed we have seen multiple competitors for online video streaming launch in the past few years. As a consequence, we suggest that BEREC should revise or remove the following statements that we believe are inaccurate:

- *"The CDN market on the other hand seems largely concentrated and barriers to entry are high because of the significant investment to have this geographical coverage needed to host QoS-sensitive applications and content efficiently"* (section 6.2.6)
- *"Since large CAPs increasingly use dedicated, private capacity functioning as a backbone in parallel to the shared Internet infrastructure, this may lead to a situation where small CAPs are not able to provide the same quality of service to their Internet-based services. Users expect a relatively fast response of their*

¹⁴ <https://www.carbontrust.com/resources/carbon-impact-of-video-streaming>

services, otherwise they switch to faster services. This leads to problems for innovative start-ups that compete with large CAPs that are able to invest in dedicated capacity and run faster services.” (section 7.2.5)