



Cloudflare Response to BEREC Report on IP-Interconnection Practices in the Context of Net Neutrality - July 2017

Executive Summary

- Cloudflare agrees that the Internet eco-system has proven to be resilient in coping with growing traffic volumes.
- There is a place for both peering and transit, however, we expect the use of transit to decline over time and to be replaced with specific destination network peering.
- Cloudflare supports the view that the lack of regulatory intervention has been instrumental in facilitating market growth.
- A commercial framework is the most appropriate model for this market. Due to the mutual benefits of peering, commercial disputes between parties can be quickly resolved.
- We believe that there is a place for each type of IXP model and Cloudflare does not therefore necessarily agree that a non-profit model specifically has been the best model in Europe.
- Costs are declining within the industry due to scale, and end users are the beneficiaries. Quality and efficiencies are on the rise, innovation and network investment is ongoing and new players are emerging.

Introduction

Cloudflare, Inc. is on a mission to help build a better Internet. Our seven-year old company runs one of the world's largest networks that powers more than 10 trillion HTTP requests per month, which is nearly 10 percent of all Internet requests.

We operate data centres around the world - we are currently present in 116 locations (32 within the EU region) - to help make our customers' websites safer, faster and smarter. We have built the network from the ground up, incorporating technologies that ensure it can withstand the largest DDoS attacks, traffic spikes and other challenges that come from running a website in today's world. Internet properties powered by Cloudflare have all traffic routed through our intelligent global network, which gets smarter with each new site added.

We own and operate all our own equipment, and have direct relationships with our multiple upstream bandwidth providers. Running our own service gives us greater oversight over network design and functionality, resulting in efficient flow control at every level.

Cloudflare provides a global CDN service with unique performance optimization capabilities: we cache static content, accelerate dynamic content, and make it easy to optimize outbound content. It is a massive, horizontally scaled architecture in which every node can perform DNS requests, security checks, and performance transformations. Additionally, Cloudflare employs Anycast routing to ensure web users are automatically routed to their nearest data centre and around any failures. The combination of this architecture and network produces a reliable, high-performance service.

Cloudflare is pleased to respond to the *BEREC Report on IP-Interconnection Practices in the Context of Net Neutrality*, and feels well positioned to do so. We participated in the November 2016 workshop referenced within the Report¹, as well as previous workshops, and we are encouraged to see that industry viewpoints and expert insights have informed the considerations of BEREC.

The IP interconnection market is dynamic and has evolved since BEREC's original assessment in 2012². However, we can comfortably agree with the overall conclusion drawn by BEREC that the Internet eco-system has proven to be resilient in coping well with traffic volumes, and that the lack of regulatory intervention has been instrumental in facilitating market growth.

A place for both peering and transit

IP interconnection can involve both transit and peering. There are very few networks that are 100% peering-based (see the quite heavily edited and contested Wikipedia Tier-1 page³) and most networks have a blended mixture of peering and transit. Cloudflare, along with many other networks in its class, operates in this blended mode. We rely on transit in order to move traffic into networks on which we do not have a direct interconnection or peering relationship. Below we will discuss how these commercial dealings are somewhat self-controlled.

It is important to point out that while BEREC has largely been focused (both in 2012 and 2016) on the peering interconnection model, and perhaps an implied zero-cost peering, there has perhaps unsurprisingly been plenty of growth in all styles of Internet networking and services on top of that highly-interconnected Internet networking.

The average consumer's Internet usage has vastly increased as Cloudflare itself has grown and expanded both its peering and transit interconnections. We have successfully moved traffic from being transit-based to being peering-based and we continue to pursue that move on a regular basis. Everything described below has moved the Cloudflare network forward and has done so within a commercial framework. In line with BEREC's own findings, we have engaged in both hand-shake

1

http://berec.europa.eu/eng/events/berec_events_2016/139-berec-expert-workshop-on-ip-interconnection-in-co-operation-with-the-oecd

2

http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/1130-an-assessment-of-ip-interconnection-in-the-context-of-net-neutrality

³https://en.wikipedia.org/wiki/Tier_1_network

peering deals and in commercial (or contractual) deals.

We do not see an end to the general transit-based Internet interconnect model - we just expect the use of transit to decline over time and, on a per-destination network basis, transit will be replaced with specific destination network peering as time progresses.

Importance of a commercial framework

Commercial dealings are commonplace in the IP interconnection and peering market, and there is a well-established, community framework for facilitating traffic flows and partnerships. Checks and balances are naturally inherent within the system as a result of most players operating within a segment that best fits their solution and offering. As such, service subtleties which may occur from time to time – e.g. involving changing demand patterns – are easily managed.

As in any business environment, commercial disputes may occur, and Cloudflare has been transparent on this aspect in the past⁴. However, in general and due to the mutual benefits of peering, conflicts can be quickly resolved or worked around. Cloudflare has been able to leverage its global network and will always rapidly optimise where it serves its customers to take account of any effective costs or to avoid congestion and improve performance. In reality, most actors in the peering space can weather the occasional issues that may arise from time to time, whether as a result of a commercial dispute over traffic ratios or indeed due to an accidental fibre cable cut.

In 2015, ARCEP presented at the France-IX members meeting⁵, which in itself shows that the regulatory and peering world can come together to have fruitful and mutually beneficial discussions on interconnection. Cloudflare is pleased that after a period spent reviewing interconnection conditions in the French market, the French regulator ARCEP has decided to forego regulatory intervention at this time. While ongoing data collection initiatives on interconnection conditions with licensed entities in the French market are likely to be burdensome for such players, clearly they have endorsed the view held by many, including Cloudflare, that a hands-off regulatory approach is most appropriate for this market.

IXP models and peering

Cloudflare strongly believes that there is a place for each type of IXP model, i.e the commercial model, the membership model and the non-profit / community model. Cloudflare has experience of all such IXP environments - we are currently present in 163 IXPs globally - and each has its own value. Therefore, we would disagree with the assumption made in the BEREC Report⁶ that the non-profit IXP model has turned out to be the most efficient way for traffic exchange in Europe. By

⁴ <https://blog.cloudflare.com/bandwidth-costs-around-the-world/>

⁵

https://www.franceix.net/media/cms_page_media/851/ARCEPs_works_around_interconnection_and_Quality_of_Service_by_Hichem_Miled.pdf

⁶ Pg 10

way of example, Madrid has both a membership model and a commercial model IXP exchange and both augment each other. Again, the marketplace is flexible and is capable of balancing out one model from another and there may be pertinent reasons as to why one model may be more appropriate at a particular exchange.

Equally, while informal handshake agreements are typical in peering, it is not unusual to enter into a commercial arrangement, particularly when it involves a Tier 1 provider and/or an eyeball ISP. Again, Cloudflare has successfully and satisfactorily engaged in both forms of peering.

Additional considerations

In general, costs are declining within the industry due to scale, and end users are the beneficiaries. Quality and efficiencies are constantly on the rise, and network investment is ongoing. Cloudflare continually seeks out ways to upgrade and expand its network. Interconnection is a key part of that expansion.

Innovation is also a feature of this business and we are witnessing new interconnection methodologies and new players on the market. Equally, user demand shows no signs of abating.

Peering has become a core requirement of the global Internet and it also plays a big part in the Cloudflare story. While we want to optimise the path of our network towards end users and provide the best user experience, we also want to optimise the path of nefarious DDoS traffic inbound to our network. Removing an intermediary network that is in the path of a DDoS attack can keep the Internet operating 'cleanly'. Without peering, the Internet could not handle the types of DDoS attacks that are frequently seen these days. Flexibility to deal with such incidents is crucial.

Finally, Cloudflare would like to acknowledge and applaud BEREC's involvement in this topic. In particular, we have welcomed the BEREC workshops which have proven to be of high value for a company like Cloudflare. Expert industry input is essential to understanding the complexities of this dynamic market, and we also welcome the opportunity to share views with our peers.