

Public Consultation on the Open Internet and Net Neutrality in Europe

Contribution by Cogent Communications

Introduction

Cogent Communications is a Tier one internet Transit Provider. Cogent was created in 1999 with a single focus: providing the most cost-effective internet transit services across its network. In order to achieve this, Cogent decided at the onset to build its network on what is now referred to as the Next Generation Network (NGN's) technology; or IP over Ethernet over DWDM. Over the past 11 years, Cogent has grown to become one of the three largest players in this area, and its network has extended in Europe to become the largest, densest and most pervasive of the other Tier one providers.

While Cogent derives approximately 50% of its revenues from its US access activities in over 1,000 Multi Tenant Office Buildings, Cogent's European activities and the rest of its US businesses are exclusively focused on the "wholesale" internet protocol (IP) transit market, where it continues to lead the industry on price. Importantly Cogent does not have other related businesses and is therefore a pure play on internet "transit" bandwidth connectivity. This market has developed in a truly competitive environment and completely outside of regulatory intervention.

As such Cogent is best placed and would like to focus its answers to the Commission's Questionnaire on the interconnection market between Access, Content and Transit Providers. Because all content delivered on access networks is ultimately requested and generated by the end users themselves, the neutrality and openness of this specific interconnection market is critical to ensure that end users can access the contents, services and applications of their choice.

The importance of this interconnection market cannot be underestimated in the context of Net Neutrality and Competition Promotion. In fact, it constitutes one of the keystones of the Internet. This market is however under serious attack by incumbent operators and its competitive nature is under threat.

In their quest to move up in the internet value chain, several Incumbent Operators are trying to develop internal content platforms. While this is a laudable venture, those operators are however trying to do so by shielding those internal ventures from outside competition. Access to outside content is voluntarily restricted, impaired and deteriorated or subjected to artificially high prices imposed by Incumbent Operators themselves. Cogent happens to stand in the middle of that battleground.

Ensuring that competition thrives, as it has in the past, in this "higher level" market (i.e., before the content even reaches the access networks) will solve many other potential competition distortions lower down the internet chain and in related markets.

The competitive nature of the interconnection market needs to be preserved for two critical reasons.

- Without a truly neutral interconnection area, it is simply impossible to guarantee end users proper access to all the contents, services and applications available on the internet.
- Without a truly neutral interconnection area, any attempt by access providers to develop vertical integration will not operate in full competition with other content, services or applications located outside of that access provider's network.

In short, both citizens' civil liberties and the market economy depend in no small part on this fairly narrow and unknown IP interconnection market.

Answers to the questions raised by the Commission

Question 1: Is there currently a problem of net neutrality and the openness of the internet in Europe? If so, illustrate with concrete examples. What are the bottlenecks, if any? Is the problem such that it cannot be solved by the existing degree of competition in fixed and mobile market access markets?

Yes. There is currently a problem of net neutrality and the openness of the internet in Europe. Cogent observes a breach in Net Neutrality at the hands of European Incumbent Access Providers, primarily Deutsche Telekom and France Telecom.

Question 2: How might problems arise in the future? Could these emerge in other parts of the internet value chain? What would the causes be?

Yes. Additional problems will arise in the future. In fact they are already visible through the distortion of competition in the Content and Transit markets and will undoubtedly stretch to the Retail market as well.

Question 3: Is the regulatory framework capable of dealing with the issues identified, including in relation to monitoring / assessment of subsequent enforcement?

The regulatory framework is probably capable of dealing with the issues Cogent has identified. However, it may require a clarification of the extent of the obligations imposed by the Access Directive on networks controlling end users.

Cogent would like to expand on the above three short answers and explain how this is happening, why this is happening and present an elegant, simple and non-onerous solution to resolve it.

A - How is Net Neutrality currently compromised?

To understand how this is happening requires a description of the world of interconnections, the technical differences of direct versus transit connectivity, peering practices, traffic asymmetry and the arcane domain of internet packet routing.

Interconnection and Interconnection.

The term « interconnection » is used to describe two very different situations:

Within the context of the European Directives, “interconnection” is described as a special case of “access”. Indeed, in order to promote competition in the access market (through the process of unbundling) it is necessary for alternative providers to connect in a non-discriminatory fashion to the incumbents’ networks. Alternative providers then compete for end users with the incumbent, and, if successful, are taking away revenues from that incumbent while also using a small portion of their network. It is therefore logical that the incumbent should be remunerated for usage of its network. NRA’s across Europe are paying a lot of attention to that interconnection (or access termination) charge as they search to promote competition and avoid margin squeezes. NRA’s have however made it a principle that such interconnection needed to be paid for by the alternative providers. This definition of interconnection, as a special case of access, is too narrow and restrictive to cover the market in which Cogent operates.

The interconnection market in which Cogent operates is very different from the one described above. Transit operators, like Cogent, are not competing with incumbents for end users. Transit operators are not looking to take away revenues from incumbent operators or to replace the contractual relationship between the incumbent and their end users.

To the opposite, Transit operators are actually offering Access Providers, access to the full routes to the public internet and are therefore the conduit through which end users are able to access all the contents and services available on the internet. To the opposite of the access and interconnection retail market where Incumbent operators receive payment for access, the market structure in the “wholesale” IP transit market is one where Access Providers buy transit from one or more Transit providers.

Net Neutrality, to the extent it includes the ability for end users to access all those content and services in an uncongested and unrestricted way, would naturally be impaired if Access Providers were able, through manipulation of that interconnection, to prevent their own end users from reaching the contents, services and applications of their choice.

Peering and Transit definitions

Cogent’s interconnections world is structured around the concepts of peering and transit; without even looking at the financial flows associated with each of those, let us first look at the technical differences between the two. The internet is defined as a network of networks. It is composed of over 50,000 networks (called Autonomous Systems or AS’s) and no single network can connect, on its own, to all of them at the same time. Global connectivity is instead achieved collectively. As a point of comparison,

Cogent's is the most connected network in the world, but "only" has 3,329 AS's connected directly. Global connectivity is achieved collectively through a combination of transit clients and peers.

In a peering relationship, two networks agree to exchanged each others' prefixes, and propagate the other network's prefixes to its own direct clients, but to those clients only. As a result, traffic between the clients of the two networks can flow freely.

In a transit relationship, the prefixes of one network (the client's) are propagated by the other network (the transit provider's) not only to the transit provider's other clients (as in a peering relationship), but also to the transit provider's peers. Each of those peers will then further propagate these prefixes to their own clients.

From a financial standpoint, peering can be either "free" (typically subject to symmetry ratios) or "paid" for (with the network receiving the payment being the one with the most incoming traffic). Transit is a simple contractual relationship where the transit provider receives the payment, irrespective of the direction of traffic. Transit Providers have two types of clients: Content Providers and Access Providers, and are paid by both. Content Providers pay their Transit Providers to allow distribution of their services to the entire Internet, and Access Providers pay Transit Providers to offer their end users a complete view of the internet. This "double payment" coupled with the adoption of NGN's in the transit market is directly responsible for the consistent price declines observed in this market over the years.

While most of the concerns seem to be raised about the management or prioritization of traffic on an Access Provider network, it is worth remembering that for this to happen, such traffic first needs to reach that Access Provider network. The interconnection market where Cogent operates is located ahead of the Access Provider networks and any congestion or restriction imposed at those interconnection points effectively prevents or impedes end users from reaching all the contents, services and applications available on the internet.

To the extent that the Commission desires to further define the concept of "internet access" it seems important to Cogent that such definition include the obligation for access providers to offer their end users access to full routes of the internet in a non-discriminatory and un-congested fashion. As we will see later, this obligation is not onerous and will only further competition in the wholesale market, between the two transit and peering ways to achieve it.

Peering versus Transit business models

Before digging any further in the world of interconnections, it is important to understand that the current Transit system, which developed spontaneously and without regulatory intervention is inherently more efficient technically than the system based on direct connectivity or peering.

Transit operator networks are characterized by their large international resilient footprint, by their global connectivity to the large number of networks which constitutes the internet and by their peering relationships with other transit providers. As we have noted above, the transit prefix propagation rules allow for global connectivity to be achieved with a minimum of one single connection to a single transit provider.

By contrast, direct bilateral peering connections between Access Providers and Content Providers in a single location (called “private peering”) or in a centralized point of exchange (called “public peering points” or internet exchanges) is significantly less efficient technically and economically.

In order to achieve the same level of resiliency and network reach, every Access Provider and Content Provider would need to replicate multiple transport links either with each others directly and/or to various internet exchanges. All those different links would then need to be dimensioned to accommodate the expected maximum level of traffic, independently from each other. The required capacities on those links would therefore be naturally under-utilized. This inefficiency would also be replicated across time zones, as links to Asia for example would hardly be utilized during the day time in America, and vice versa. In addition, all participants in this model will suffer from additional costs in human resources dedicated to the constant management of those links.

Aside from the technical and financial superiority of the transit model, it is also critical to observe that the direct connection model, if it were to be generalized, would tend to distort competition. Indeed, because of its higher costs, it would become a barrier to entry for smaller Access and/or Content providers. Only the larger, more established and more profitable players, both in the Access and in the Content market, would stand to benefit from it.

Traffic Asymmetry and Peering Policies

Several Incumbent operators are arguing that video distribution on the Internet is generating an imminent and exponential explosion of traffic on their networks. This would in turn exert an intolerable pressure on their capital investments and those incumbents are using the argument to justify charging content and transit providers in order to “terminate” their traffic on their networks.

The internet, as an alternative video distribution media, is undoubtedly generating an increased level of traffic across the internet. However, this is nothing new. What we are observing is the continuation of the internet historical growth rate (about 50% a year), rather than an exponential acceleration in that growth rate.

In fact, various reports (Cisco Visual Network Index or Telegeography / Global Internet Geography) confirm that such growth is happening much faster in developing regions or countries (Asia, Eastern Europe, Africa and South America) rather than in the so-called developed world (America, Western Europe). Paradoxically, traffic growth is slower in those countries where the “volume explosion” argument is most in evidence.

In reality, video distribution mostly creates an increased asymmetry in the traffic direction. This asymmetry has two consequences, one well known, and the other less so;

Firstly, the need to invest in network capacity is undeniable. Yet it applies equally to both Transit and Access networks. Some networks have reacted to it more speedily and flexibly than others.

Network capacity planning is naturally gravitating towards the most advanced and economical technologies, namely, the so called Next Generation Networks. This technology (IP over Ethernet over DWDM) was implemented by Cogent eleven years ago and is directly responsible,

together with the existence of a proper competitive environment in the Transit market, for the steep price declines witnessed in that market. The worldwide economic growth driven by the internet is a direct consequence of those price declines.

For some Access Providers currently operating predominantly copper based networks, this transition to NGN's generates a need for replacing old, end of life technologies with optical fibers, or in the case of mobile operators, a need to transition to 4G technologies. In all cases, however, the level of capital spending depends on the existing technology deployed in their networks (copper, fiber, cable or wireless).

The steady growth of the internet and the consequent necessary transition to NGN's has been in evidence for many years. The desperate call from incumbent operators for sudden massive investment needs is more a result of their own lack of proper planning and vision than of a sudden unpredictable turn of event.

The second consequence of the increased traffic asymmetry is less well known, because it touches the more obscure world of interconnection between Access and Transit operators. It implies a re-definition of the term "peering".

Historically, peering practices (in the sense of "free exchange" of traffic) were justified by the relative symmetry in the amount of traffic exchanged. Networks were relatively similar in terms of end users and / or the profile of their respective clients.

The advent of asymmetrical access technologies (ADSL) combined with the new internet video distribution role is forcing a redefinition of internet operators based on the profile of their respective client base. Content Providers have a naturally "outgoing" traffic, Access Providers have naturally "incoming" traffic and Transit Providers have a naturally neutral profile (with no internal traffic consumption, they face similar levels of incoming and outgoing traffic). As a consequence, symmetrical traffic exchanges, which justify historical peering policies, can only be observed between operators of the same kind (Transit/Transit or Access Providers / Access Providers).

Despite this undeniable evolution, several large European Access Providers (primarily France Telecom and Deutsche Telekom) continue to try and force their historical peering policies on their relationships with Transit operators, and insist on being paid (whether in cash or in return businesses) by those Transit operators for the amount of traffic that exceeds the symmetrical level.

According to those Access Providers, their peering practices are non-discriminatory because they are applied equally to all their peers. In reality of course, that peering policy is irrelevant in a relationship that sees naturally occurring asymmetrical traffic.

The routing of IP packets from a technical standpoint

Physically speaking, an IP interconnection (whether Peering, Paid Peering or Transit) is very simply the connection of two interface cards (typically Gigabit Ethernet or 10 Gigabit Ethernet) through an optical fiber cross-connect. Of course, the simplest way to influence or degrade the traffic between two networks is not to have enough capacity between them to accommodate the observed or anticipated level of traffic. Congestion on a specific interface occurs when the technical limit of the ports is reached occasionally. Saturation is reached when the technical limit of the ports is reached consistently. As a general rule, most Transit Providers plan for increased physical interfaces when usage on the ports reaches 75% of the rated capacity.

From a software standpoint, the “BGP” (Border Gateway Protocol) session associated with the connected interface ports controls the routing of the data packets exchanged on those ports. Importantly, there may be many different ways to reach the same destination. BGP was originally conceived to automatically route internet traffic to its destination through the shortest path (defined as smallest number of « hops », or jumps from one network to the other). BGP, however, is not all encompassing. Specifically, it does not account for latency or packet loss differences (symptomatic of congestion, saturation or trombone effects) between the various routes available. When an alternative route exists and is of better quality than the congested shortest path, it falls on IP engineers to manually intervene and modify the BGP parameters to allow a better path to the final destination. Incoming and Outgoing traffic paths are managed independently from each other.

Outgoing traffic, typically from Content Providers to Transit Providers can be influenced

- Through different levels of priorities (local preferences) depending on the final destination.
- Through the addition of artificial hops (AS-path prepending) depending on the final destination. Because BGP does not make the difference between actual or artificial hops, this prepending lengthens the BGP perceived path to final destination.

Outgoing traffic is managed on the internal routing tables of the Content providers and is therefore not visible to Transit Providers connected to this client. Those manipulations can be made in a narrow manner (prefix by prefix), wider (geographical or AS specific) or even wider still (for the whole of the global internet).

Consequently, if the same Access Provider can be reached through two different Transit Providers, one with “good” connectivity and the other with “congested” connectivity, the Content Provider can easily direct its traffic to the “good” connectivity provider, even though the “congested” Transit Provider might be the cheaper or shortest path option. The “congested” Transit Provider will never notice that choice, apart maybe from an inexplicable decline in traffic levels coming from the Content Provider. In other words, Access Providers can, by deliberately congesting connectivity with a specific Transit Provider, influence the path chosen by the Content Providers’ IP engineers and distort as a result the state of competition in the Transit market.

As a practical illustration of such practices, Cogent has been suffering from such congestions or saturations in its interconnections with both France Telecom and Deutsche Telekom. The situation

with Deutsche Telekom has abated somewhat in the past year, as Deutsche Telekom has agreed to increase its interconnections with Cogent. But the situation with France Telecom has reached complete saturation and all attempts to reach a satisfactory increase in capacities have failed.

Incoming traffic to an Access Provider from a Transit Provider can be influenced by the Access Provider

- Through partial announcement of its prefixes to its Transit Providers. For example, if an Access Provider controls twenty same-size prefixes and is connected to two Transit Providers, it can choose to announce ten prefixes to each of them, and balance its incoming traffic that way. This choice is not frequent as it cancels out the desirable redundancy between Transit Providers. Indeed, each prefix is only visible to the world through a single Transit Provider and if that Transit Provider were to suffer an outage, the prefix would be left with no internet at all.
- Through the addition of artificial hops (AS-path prepending). This is similar to the mechanism described for outgoing traffic, but the artificial hops are placed here in front of the prefixes announced by the Access Provider to each of its Transit Providers.
- Through “BGP communities” made available by Transit Providers to their clients. Those BGP communities define how prefixes are propagated by the Transit Provider to the rest of the Internet (client and peers) and can shape traffic in many different ways. For example, an Access Provider can easily ask its Transit Provider “A” for a community that excludes the propagation of its prefixes to another Transit Provider “B” (who would typically be a peer of “A”). When that happens, traffic coming from “B” and destined to the Access Provider cannot reach its destination through “A” at all.

As a practical illustration of such practices, Cogent has been suffering from those BGP communities blocking practices implemented both by Deutsche Telekom and by France Telecom for years. All demands by Cogent to remove those communities have been refused.

Consequently, an Access Provider can easily block or degrade all or parts of the traffic coming from a specific Transit Provider, either by lack of physical connectivity or by BGP manipulations or by a combination of the two.

Contrary to the management of outgoing traffic, which happens on the clients’ internal routing tables and is not visible to the rest of the Internet, manipulations of the incoming traffic is reflected in the routing tables of Transit Providers and is therefore easily visible. As such any attempt or practice by Access Providers to manipulate incoming traffic on their network, and which therefore is the most relevant with regards to Net Neutrality can be easily verifiable by regulators.

Cogent is currently observing such practices, as illustrated above. We have been consistently asking a few of those Incumbent Operators to increase the interconnection capacity between our networks. Despite the fact that the traffic would be asymmetrical and would therefore be in the realm of a transit relationship, Cogent has offered those operators to establish those connections on a settlement free basis, to limit the propagation of their prefixes to our clients only, and to deliver the traffic requested by their end users at the point of egress nearest to those end users. Cogent has faced a determined refusal and has been left with completely saturated or congested interfaces. In addition, those Incumbent Operators have also implemented specific BGP communities to prevent their end users from accessing the content originated from Cogent’s network through their existing Transit Providers. We believe this is in

contradiction to the principles of Net Neutrality as expressed by the Commission and are pursuing legal and regulatory relief at the national level and considering the same at the European level.

Now that we have seen how Net Neutrality is impacted through the settings of physical connections and BGP configurations, let us move on to why Cogent is singled out.

B - Why is Net Neutrality compromised and where would problems arise in the future

Cogent believes that the reason it has been singled out in its relationships with some Incumbent Operators is because its supportive Net Neutrality and pro-competition stance threatens the various business models that Incumbent Operators are trying to build.

Distortion of competition in the Transit Market.

Some Incumbent Operators, controlling a disproportionate part of end users, have been able, through the dubious application of so called peering policies, to make Transit Providers pay to access their end users. Cogent has always refused to pay these “access charges” and is facing congested and saturated ports as a result.

It is critical however, to understand how the levy of such “access charge”, if it were to be generalized across all Access Providers would fundamentally changes the workings of the internet, and would be detrimental to the development of the internet in Europe as a whole.

- The marginal return on investment for Transit Providers looking to increase their network capacities would necessarily become negative. Why would Transit Providers invest in increased interconnection capacities when each of those increases would result in increased payments to Access Providers? The inevitable consequence would be a massive retreat from Transit Providers’ investments in next generation networks across Europe.
- Since Transit Providers are paid both by the Content and the Access Providers and have no natural bandwidth consumption themselves, such reversal of payment flows at the Access Provider level would immediately cancel out approximately half of the industry’s revenues. Transit Providers would have no other choice but to raise prices significantly, meaning by an order of magnitude, on their Content clients. Indeed Transit Providers would have not only to double the price to recover their lost revenues, but also to recover the “access charge” as well.

It is ironical that such a small change in financial conditions between internet operators could produce such large and detrimental results. Indeed this would threaten the existence itself of the Transit market, which is ultimately responsible for producing the lower prices that are themselves the foundations of the economic revival generated by the multitude of smaller content, service and application providers on the internet.

It is also critical to realize that the transit model does not exclude direct connectivity between Access and Content Providers (in the form of paid peering). Rather, the transit model only serves as a healthy competitive alternative to the paid peering connections. Even if we know that those paid peering

bilateral connections are technically less efficient than the transit model, Content and Access Providers can compensate those with cheaper access charges or even with free “peering”.

This competition from paid peering connections is also healthy for the Transit market, and Cogent welcomes it whole heartedly. Yet, it is important to repeat that the paid peering model, because of its increased costs, benefits only the larger, more profitable and more established Content and Access Providers.

Several Access Providers are justifying this necessary “access charge” by their needs to invest in their large retail network. This is an extremely dubious argument. It is indeed well known that wherever it is possible, those same Access Providers are forcing their own retail networks (in their home markets or outside their home markets) to exclusively or quasi-exclusively purchase transit from them.

The direction of those internal payments completely invalidates their investment claims and serves instead as a proper justification in favor of the transit model. Needless to say that those same transit services could be offered by dedicated Transit Providers at a fraction of the prices charged internally by the Access Provider itself.

Distortion of Competition on the Content Market.

The instauration of a generalized “access charge” in favor of Access Providers would have dramatic consequences on the Content market, and would bring incredible benefits to those Access Providers. Cogent believes that this is the paramount reason behind its own discrimination.

We have already seen how the advent of a generalized Access Provider “access charge” would trigger a generalized increase in the price for transit charged to Content Providers. While it would undoubtedly reduce the profitability of all Content Providers, only the larger and more profitable ones would be able to shoulder it, some without even noticing it. Yet, the price increase would naturally create a higher barrier to entry in the content market and will certainly slow down, if not stop, the rate of business creation and the development of new business models. This hardly seems to be in line with the pro-competition objectives articulated by the Commission.

Access Providers would also benefit immediately in the negotiation of direct “paid peering” interconnections. The “access charge”, by raising the price to Transit Providers, would create a “pricing umbrella” under which Access Providers could then operate to compete against Transit Providers for direct paid peering with its Content Provider clients. Again, those direct connections naturally favor large Content and Access Providers and it is unlikely that smaller and more dynamic Content Providers could negotiate on equal terms with Incumbent Operators. There is no doubt that the Content market would find itself starved of competition and innovation, and would consolidate as a result.

For Access Providers, however, the best is yet to come. This pricing umbrella would naturally benefit those contents, services or applications providers that would not be subject to it. Prime among those will be the content platforms developed internally by the Access Provider themselves. Not only will they not have to pay the charge, the charge could be directed immediately, as an external subsidy, to the development of those competing services. Access Providers would benefit from a sustainable competitive advantage in the development of their vertical integration strategies. Even if Access

Providers do not have the required internal competencies for such development, they would have a strong argument for acquiring those competencies or existing businesses at a lower cost. Again, this does not seem compatible with the pro-competition stance of the Commission.

Cogent would like at this stage to draw the Commission's attention to the report it mandated in 2002 from wik-Consult (Executive Summary, page xviii, paragraph 1). The wik report had shown great foresight and had already properly identified the risk of "network tipping" due to the ability for Access Provider to differentiate between on-net and off-net traffic.

From a financial standpoint, this is the holy grail of Incumbent Operators. Indeed, the potential benefits of charging their millions of end users a couple of additional Euros a month for additional (internally generated) content or services, vastly exceeds the costs and regulatory risks associated with not providing their end users a properly neutral access to the internet. This is why, with its uncompromising stance on paying for access and its offer for free client-to-Incumbent Access Provider connectivity, Cogent is discriminated against.

Distortion of Competition on the Retail Market

A reversal of payment flows at the Transit/Access Provider level would also have negative consequences on the retail market. It is likely that the Access Providers most capable of developing or vertically integrating new content platforms will be those Incumbent Operators with the largest number of end users. Their scale advantages would naturally allow them to derive more revenues from advertising or obtain better terms from licensing companies and right owners for premium services.

By favoring larger incumbents in their quest for vertical integration, and allowing them to offer content and services that would not be available to other smaller access networks, competition for end users on the retail market would naturally suffer as well. In fact, it is not unconceivable that another case of "network tipping" would develop, in which large access networks would be able to attract more end users and that those would only reinforce the large access providers' ability to obtain better advertising and licensing terms, which would again contribute to more end users joining the strongest network.

C - A simple and elegant solution available now through a simple clarification from the Authorities

Net Neutrality at the IP interconnection level can easily be preserved, and only requires a simple confirmation from the regulatory authorities. Because the solution involves BGP route announcements, it can also be easily monitored by the market and by the regulators.

Ensuring that Access Providers offer their end users the complete, unrestricted access to the internet and to the contents, services and applications of their choice can be narrowed down to a simple question of very visible BGP configurations. It can be guaranteed by a simple regulatory obligation: Access Providers need to announce all of their prefixes to their existing transit provider, in a non-discriminatory manner, and those connections need to remain uncongested. Specifically, such announcements shall not be made using propagation restrictions (like BGP communities) targeted at any specific other Transit Provider. It is worth stressing again that the relevant Incumbent Operators are already purchasing transit from at least one Transit Provider

This obligation is not onerous. It does not preclude Access Providers from concluding other interconnection contracts, either peering, paid peering or transit, with other Transit, Access or Content providers directly. In all cases, BGP will prefer the shortest path and those direct connections will naturally prevail over the indirect path offered through the current “default” Transit Provider.

However, if the direct path were to become inaccessible (either physically through a fiber cut or through congestion or saturation) the alternative path through the “default” Transit Provider would remain available (through BGP manipulation by IP engineers) and end users would continue to enjoy unrestricted internet access.

This indirect path through the “default” Transit Provider would play the role of a simple safety valve. Permanently in place, it would only spring into action when Net Neutrality becomes compromised.

This indirect path could be cheaper or more expensive for the Access Provider, but there is no doubt that it would trigger additional negotiations with other Transit and Content Providers in order to generate the best technical and financial solution for the all parties. This non-onerous obligation would immediately re-inject competition in the transit market. .

With the consequent disappearance of the pricing umbrella, competition will be restored simultaneously in the content / access provider “paid peering” market. Artificially high prices charged by Incumbent Operators will fall in line with international transit levels, bringing a sight of relief to financially stretched emerging online businesses and spurring economic growth. Similarly, vertical integration content ventures by Incumbent Operators will be subjected to proper outside competition and the consolidation cloud overhanging the retail market would dissipate rapidly.

Question 4: To what extent is traffic management necessary from an operator’ point of view? How is it carried out in practice? What technologies are used to carry out such traffic management?

Traffic management only becomes an issue on an under-dimensioned network. On its own network, Cogent does not apply any restrictive traffic management measures. It currently utilizes only 18% of its lit capacity and offer all its customers fully redundant and non-oversubscribed bandwidth.

As described above, Cogent observes some Access Providers’ traffic management practices. Those are carried out through the conjunction of voluntary imposed congestions and saturation on interconnection interfaces and through the voluntary and discriminatory manipulation of the BGP sessions with those Access Providers’ other transit providers.

Question 5: To what extent will net neutrality concerns be allayed by the provision of transparent information to end users, which distinguishes between managed services on the one hand and services offering access to the public internet on a “best effort” basis on the other?

Transparent information to end users is a very powerful weapon. The internet, with its inherent deflationary trends is the Access Providers’ worst nightmare. If left to those Access Providers, the internet “best effort” would become the internet “no effort at all” and would vanish entirely to be replaced by managed services only.

Quality of Service for the internet “best effort” must be enforced by the regulator in order to preserve Net Neutrality. Cogent only operates in the realm of the public “best effort” internet. It is critical that, if quality of service measures are applied, they should apply equally and non-discriminatorily for all sources of content, services and applications, irrespective of where those contents originate and irrespective of the way in which those content reach the Access Provider network in the first place.

Question 6: Should the principles governing traffic management be the same for fixed and mobile networks?

No comments.

Question 7: What other forms of prioritization are taking place? Do content and application providers also try to prioritize their services? If so, how – and how does this prioritization affect other players in the value chain.

As already mentioned in the explanations above, content, service and application providers can influence the direction of their outgoing traffic to specific Transit Providers. In particular, they would override the BGP session default choices when the shortest path to a destination suffers from unacceptable congestion, saturation or latencies. The voluntary creation of those congestions, saturations or latencies distorts competition in the transit market, and has a significant impact on the entire value chain, as described above.

Question 8: In the case of managed services, should the same quality of service conditions and parameters be available to all content/application/online service providers which are in the same situation? May exclusive agreements between network operators and content/application/online service providers create problems for achieving that objective?

Cogent does not operate in the world of managed services. It is important however that the same condition of quality of service be guaranteed between all services offered through the public “best effort” internet. Please refer to answers to question 5.

Question 9: If the objective referred to in Question 8 is retained, are additional measures needed to achieve it? If so, should such measures have a voluntary nature (such as, for example, an industry code of conduct) or a regulatory one?

No comments.

Question 10: Are the commercial arrangements that currently govern the provision of access to the internet adequate, in order to ensure that the internet remains open and that infrastructure investment is maintained. If not, how should they change?

Cogent hopes to have demonstrated, through the rather lengthy explanations above, that there is a clear and present danger to the current structure of the internet, and to the maintenance of an open and neutral internet.

The commercial arrangements currently in place, based on Transit and Peering, have developed in a very competitive market and have proven effective in lowering prices and enabling and promoting economic growth around the world. While this competitive environment is under threat by Incumbent Operators, regulators can easily preserve it. Please refer to answers on questions 1.2 and 3 above for a description of the solution proposed by Cogent.

Cogent cannot answer for the Access Providers' ability to maintain network investments. It only wants to reiterate that those investment trends have been place for a long time, that the NGN technology has been available for a long time and that Access Providers have simply been late in recognizing the trend and in planning for the inevitable needs to invest adequately. In their search to move up the value chain of the internet, they are now taking their end user hostages by denying them an open and neutral internet and are resorting to practices that are manifestly anti-competitive. It is Cogent's belief that those should be stopped.

Conclusion

Cogent would like to thank the Commission for this wide ranging consultation on the subject of Open Internet and Net Neutrality. Cogent hopes it has been able to contribute positively and constructively to the Commission's reflections on this matter, and would like to summarize below the main messages it has tried to deliver.

- The IP interconnection market between Access, Transit and Content Providers is one of the keystones of the internet. Its competitive, open, non-congested, fluid and non-discriminatory character needs to be preserved in order to ensure Net Neutrality.
- The IP interconnection market is under current attack. In their quest to move up on the value chain of the internet, several Incumbent Operators are trying to develop internal content platforms. While this is a laudable venture, those operators are however, trying to do so by shielding those internal ventures from outside competition. The battle ground where that shield is erected is the IP interconnection market where Cogent operates. Access to outside content is currently voluntarily restricted, impaired and deteriorated or subjected to artificially high prices imposed by Incumbent Operators themselves.
- A reversal of payment flows between Transit and Access Providers would have disastrous consequences on the future of the internet in Europe. Every market gravitating around the internet value chain would be affected. All would suffer from serious reductions and distortions of competition. The final result would be an increased market concentration in the Access and the Content market. Incumbent Operators would see their already strong position reinforced thanks to their new internally developed and vertically integrated content ventures. Similarly in the Content market, only the largest, more established and more profitable companies would continue to flourish, while their smaller competitors would suffer and possibly disappear.
- The Commission should clarify the extent of the current obligation for Access Providers, who control end users, with respect to the "ensuring end-to-end connectivity". It should include, at a

minimum, the provision of unrestricted, uncongested peering or transit connections as well as the prohibition from using discriminatory BGP prefix propagation rules. This obligation is simple to execute, completely transparent, easily verifiable and absolutely non-constraining or onerous for Access Providers. This Net Neutrality “safety valve” will only come into play when neutrality comes under threat, and would otherwise encourage proper competition in the Transit / Peering, Content and Retail market.