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# Alternatives to network neutrality – a South African perspective\*

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## **Abstract**

The debate on network neutrality over the past decade has evolved (in the academic sphere but not so much in public) to include sophisticated considerations of the welfare enhancing or reducing effects of mandating network neutrality. For example, in a model by Economides and Hermalin (2012) it can be shown mathematically that among what they term the “feasible discrimination schemes,” it will be the case that network neutrality is welfare enhancing. Other authors, often by looking at the European market, have argued against ex ante regulation of network neutrality Crocioni (2011) and have pointed out other dangers inherent in the mandating of network neutrality Yoo (2005). The issue is in the public eye and has, at the time of writing, lead to occasional (“Save our Internet!”) street protests in various places.

Similarly to Bauer and Obar (2014), this paper suggests a mix of policies and interventions might be the most appropriate way of addressing the concerns raised by activists and industry analysts in the discussion of discrimination on the last-mile network. Our preference is for an approach that can be easily understood by consumers; allows for relatively simple welfare and competition enhancing regulation and allows for the greatest possible degree of freedom for service providers to invest and to pursue their commercial interests.

## **1 Introduction**

Strict network neutrality is defined as prohibiting “Internet service providers (ISPs) from speeding up, slowing down or blocking Internet traffic based on its source, ownership or destination” (Krämer et al., 2013). This is an impractical desideratum from the point of view of the Internet access provider but it has been argued that it is practical to differentiate (Wu, 2003) between legitimate discrimination that has as its sole purpose the management of service quality; and potentially anti-competitive discrimination with a commercial basis. The May 2014 proposal by the US Federal Communications Commission to allow “commercially reasonable” traffic management presumably rests on this assumption and the paper will discuss the extent to which this is reasonable and in fact how and who will be able to judge whether this is the case.

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The literature to date rarely emphasizes that consumers' consumption of data over the network does not necessarily imply intention or consent to consume or transmit the material in question. Internet service providers already block obvious instances such as virus activity and many or most inhibit traffic using protocols (such as peer-to-peer networking) that are clearly not latency sensitive in favour of latency sensitive applications (Krämer et al., 2013). Obviously relatively little is known about how frequently this clearly benevolent network management spills over into anti-competitive behaviour that may include the blocking or slowing down of voice-over-IP or video services that compete with the Internet service provider's own offerings or those of related companies.

A further issue largely overlooked by the literature, in spite of the fairly extensive discussion of virtual private networks by Wu (2003), is that neutrality itself can be a service provided commercially over the access network. A virtual private network (VPN) would be one obvious way of doing this and one could take Blackberry Internet Service as an example demonstrating that this is feasible. In a market with mandated network neutrality, the neutrality does not of course exist as a separate service but there is no reason to suppose that the service cannot exist in a market where there is traffic discrimination. That is to say, consumers might purchase network neutrality should they wish. The paper looks at this distinction with reference to some analytic models from the literature and also by considering consumer preference. It also examines empirical data on existing consumer VPN use for various reasons including to skirt censorship, avoid geographic restrictions on the consumption of streaming content (which in itself contains a lesson about competition among content providers) and for the purpose of enhanced privacy.

In South Africa, a rather peculiar ADSL Internet access market featuring an explicit distinction between "shaped" and "unshaped" (neutral network) bitstream services and users appear to have a clear understanding of the difference. The paper discusses how this affects investment by Internet service providers and whether it has any lessons for the debate around network neutrality. Further, South Africa has mandated unmetered free local ADSL traffic and the paper examines the effect of this on the market, including whether this has fostered an open access type of environment by using VPNs to bypass the primary service provider.

During 2014 the Independent Communications Authority of South Africa (ICASA) conducted an inquiry into the state of competition in the ICT sector in South Africa, including on the topic of network neutrality. Written submissions were received from many players and organisations in the industry (about which more below) but there has been no further policy development. Almost all submissions, with the notable exception of the incumbent Telkom, were in favour of some kind of network neutrality.

## 2 Traffic management

The May 2014 proposal by the US Federal Communications Commission to allow "commercially reasonable" traffic management (Frieden, 2014) acknowledges that ISPs need to employ traffic management in order to provide a satisfactory user experience. One should keep in mind that Internet end users are purchasing a specific experience or package of

experiences (or, media) which is delivered by way of Internet traffic and sometimes billed based on traffic volume. Even when billed by traffic volume, the ISP has an incentive to satisfy the user's demand for latency-sensitive applications by delaying certain kinds of traffic that might be causing congestion. In this, the ISP is attempting to divine the user's actual preference which the latter is extremely unlikely to be able to express in technically useful terms.

Furthermore, consumers' consumption of data over the network does not necessarily imply intention or consent to consume or transmit the material in question. Some traffic will be highly incidental to consumer welfare, whereby we refer to the satisfaction of a specific client or clients of a specific ISP. Consider the uploading of media using a peer-to-peer client which a user X might have employed to download some content without paying attention to the upload settings. The ISP that throttles the upload traffic is acting in the best interest of its client although this might be detrimental to the welfare of the author(s) of the software and definitely will be detrimental to the welfare of the users (wherever they may be!) who are downloading the content from the hapless pirate X. Furthermore, ISPs can and should block traffic generated by known viruses, for the protection of specific users as well as the general user base.

According to Wu (2003) it could be practical to differentiate between legitimate discrimination that has as its sole purpose the management of service quality; and potentially anti-competitive discrimination with a commercial basis. Naturally, this argument would hinge on an appropriate definition of *anti-competitive* (about which more below, in section 3) and the measurement of service quality. Assessing quality of service for broadband access users is much more complicated than on a (mobile or fixed) telecommunications network where the expected standards are well established and correspond to what users experience and expect. Internet content varies greatly in terms of how delay sensitive or interactive it might be, whether it is flexible in terms of bandwidth usage, can be cached and the capacity and networks of content access providers (CAPs). Consumers' preferences are also not easy to determine and especially not in the obvious absence of a content pricing system.

Suppose that one were able to give a satisfactory definition of what would constitute anti-competitive discrimination with a commercial<sup>1</sup> basis on the part of an ISP. How would one go about showing that a specific instance of traffic prioritisation was not intended to enhance quality of service? Since quality of broadband service is not amenable to assessment on a linear scale, given a service configuration A and service configuration B, it is most likely the case that A and B are not comparable, i.e. A might be better than B in certain respects (or preferred by certain consumers) and B better than A in other. Even if a scalar tool for the comparison of different service quality options could be contrived, there is no guarantee that some improvements in service quality might not also be anti-competitive in nature.

In South Africa, as we shall see later, Asymmetric Digital Subscriber Line (ADSL) ISPs are fairly open about some aspects of traffic management policy and market "shaped" services at a discount to the public. The nature of ADSL technology implies that almost

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<sup>1</sup> Presumably non-commercial discrimination against illegal and/or objectionable content is not thought to be controversial.

all of the “shaping” is related to download activities.

### 3 The rationale for regulation and neutrality as a service

Economides and Hermalin (2012) show that in certain circumstances, network neutrality is welfare superior to discrimination. Their analysis, like many other, assumes that consumers cannot have both – that network neutrality is not a feature (like air conditioning) that can be turned on and off as required.

Yoo (2005) argues for *network diversity* in the absence of clear and convincing evidence that allowing traffic discrimination will irreversibly or catastrophically harm competition. In the absence of restrictive measures, there is little reason to believe that non-discriminatory Internet service will not be a product available in the market. For instance, any service provider would have to allow VPN connections and neutral services could be provided over the VPN links. Now, any ISP could still decide to deprioritise traffic over VPN connections or to certain VPN providers but this would be a limited intervention which could relatively easily be monitored and for which the VPN provider could contract with the ISP. As Yoo (2005) and others point out, when the transaction cost involved in strict usage based pricing is too high, a proxy for high usage can be the subject of a surcharge and tiered service is an obvious option.

Using a VPN as circumvention tool in countries where the Internet is censored is quite common. In China only the number of VPN circumvention users is estimated around 5% of the total (Mou et al., 2014). VPNs can also be used to avoid geographic restrictions on the consumption of streaming content (which in itself contains a lesson about competition among content providers) and for the purpose of enhanced personal privacy, just as enterprises use them for security and the secure transmission of proprietary data and confidential communication.

Ma and Misra (2013) show that ISP competition determines the impact of network neutrality on consumer utility. In a competitive market, they argue, there will be no need for regulation to protect consumers since a “Public Option” ISP that provides a network neutral service will satisfy consumer demand. They do however find that in a monopolistic situation, consumer utility is best served by a network neutral ISP.

### 4 South Africa’s ADSL data market

South Africa’s partially privatised incumbent operator, Telkom, is the sole provider of copper-based telephony and ADSL access service. There is not local-loop unbundling (LLU) and very limited competition from fibre for residential Internet service. The main competitors in residential Internet provision are the licensed cellular operators, several licensed wireless ISPs and smaller operators using WiFi (with directional antennae) in rural and semi-rural areas. There are around one million ADSL subscribers (out of a population of some 54 million<sup>2</sup>) and ADSL traffic on the Telkom network is around 25 petabytes per month (Muller, 2014).

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<sup>2</sup> Stats SA 2014 mid-year estimate.

As soon as ADSL was introduced in South Africa in 2002, the basic model was that consumers would pay a monthly access fee to Telkom (in addition to their voice telephony rental) and then separately obtain an ISP account (which could also be from Telkom). These ISP accounts were actually just rebranded South African Internet eXchange (SAIX) accounts from Telkom. Eventually, Telkom introduce IP Connect (IPC) but initially IPC prices were exceedingly high. There have subsequently been reduced very substantially and ISPs are now able to also resell the ADSL part of the line rental so that an existing Telkom voice customer can obtain ADSL service by dealing only with a private provider who makes the arrangements with Telkom.

In spite of the seemingly bleak competitive landscape, the robust competition that emerged in the 1990s in die dial-up Internet access market has survived into the present and end users can select from a large number of data service providers. Switching provider (if Telkom is the provider of the ADSL line) is as simple as changing a username and password on a computer or on the router. It is therefore fairly common for consumers to have more than one ADSL ISP account, for example an *uncapped* account which is subject only to a fair use limit and often heavily throttled as well as a usage-based account on which speed is fairly reliable.

ADSL regulations promulgated in 2006 by ICASA stipulate a number of rather stringent conditions, adherence to which has been patchy or non-existent. One of the curious regulatory interventions by this “Chapter 9” institution was to stipulate that local Internet traffic be unmetered. Since retail ISP operations and peering has not really been designed around discriminating between traffic according to the jurisdiction in which either or both ends of the communication find themselves, this is difficult and there has been little evidence of any rigorous implementation of this desideratum.

Several ISPs do however offer local-only accounts or accounts with a fixed usage and free access to local sites after exhaustion of the fixed traffic allocation. Presumably, these products were introduced to feign compliance with the ICASA regulations. On local-only accounts, access to international IP addresses is blocked so it is generally not possible to access most local websites since these almost universally also include content from international servers and the pages simply never complete loading. Users with local-only accounts can

- access local FTP sites;
- access local company servers;
- play games on local servers; and
- use local VPN providers.

On local-only accounts, VPN provision is yet another (potentially) competitive market through which CAPs can deliver content to end users. The falling cost of ADSL data has made the use of local-only accounts to arbitrage usage-based pricing less attractive than it has been in the past however. There is nevertheless a market for VPN services that provide users with a US or European connection to enjoy services like Spotify and Netflix that are not available in SA.

VPN bypass and ADSL account selection are just two ways in which South African end users can enjoy a fairly competitive market in ADSL traffic even though access is still controlled by the incumbent. The deregulation of backbone provision inside South Africa (and even a relatively liberal environment with regard to trenching on public land) and much improved international connectivity via undersea cable up the east and west coasts of Africa have driven down prices and created a market in which the concepts

- unlimited;
- uncapped; and
- capped

as well as the distinction between shaped and unshaped services are relatively well understood and ISPs are fairly open about the nature of the service that they provide – at least on their websites, if not actually in advertisements and on the customer service line.

Because of these special conditions in the ADSL market, the condition of competitive bottleneck can probably not be said to exist in this specific area. This is a curious consequence of the entrenched position of the South African incumbent and the steady and determined defensive of their territory by the ISPs. In several of the skirmishes between Telkom and the ISPs, a different outcome could have tipped the scales in favour of the former, with fairly dire consequences for end users.

## 5 South Africa's mobile data market

The mobile data market in South Africa is served by four GSM players: Vodacom, MTN, Cell C and Telkom Mobile. The latter two have roaming agreements (mainly in the rural) areas with the former two, much older and larger networks. In addition, Neotel offers a mobile phone network with geographic numbers as well as a Long Term Evolution (LTE) Internet access network in many cities. There are smaller operators offering data only using WiFi, WiMax and HC-SDMA technologies.

For all but a small minority of the population, mobile Internet access will be the only access they have, outside possible access in the office. The operators have invested heavily in 3G and LTE coverage, an investment made possible in part by two decades of sky-high mobile termination rates. By 2016, mobile data is forecast to make up around quarter of the total SA data traffic (MyBroadband, 2012b). According to Vodacom (2014b) 90% of traffic on its mobile network is data. In South Africa, for most people and for a large amount of the time almost all people spend online, the mobile networks are the most important service provider so any focus on the regulation of network neutrality or discriminatory pricing cannot ignore this platform.

It is hardly surprising the Telkom, MTN and Vodacom all opposed mandated network neutrality in their submissions to the ICASA competition inquiry of 2014. Cell C made no submission. Earlier in 2014, MTN lodged a data rate of R25 per megabyte (\$2.28) with ICASA and Vodacom has previously announced a VoIP rate of R10 per megabyte. Cell C on the other hand is offering unmetered access to WhatsApp. The mobile data

market is therefore already far from non-discriminatory and an interesting arena in which to observe possible discriminatory pricing at work.

## 6 Content and access in South Africa

South Africa is a small market for online content and most of the relevant CAPs are abroad. It seems unlikely that any behaviour by the coterie of competing ADSL data providers could prove seriously anti-competitive since consumers are likely to demand access to their YouTube etc. It is far more likely that consumers will for some reason be deprived of content otherwise and elsewhere available without this having any anti-competitive effect on the global industry of content providers. The possible exception is the market for sport and other premium local content (dominated by the MultiChoice subscription television platform of the Naspers group) but this market is already characterised by an almost complete lack of competition anyway.

## 7 Conclusion

The facts reviewed suggest that there is very little reason to regulate the ADSL access market in South Africa since in its current incarnation it provides more than enough room for market solutions to address possible adverse welfare effects proceeding from traffic discrimination by ISPs. There is a diverse markets and consumers and service providers are likely to find ways to satisfy end user demand in the absence of a competitive bottleneck in the data market. The mobile Internet market has already escaped from the possible hackles of mandated network neutrality and it seems likely that they will remain in the position to argue in favour of allowing various kinds of discrimination. Given how crucial mobile networks have become to everyday life, necessity seems likely to remain a strong argument for a considerable time.

The peculiar position of the South African incumbent, the very limited penetration of residential or office fibre services and the absence of local-loop unbundling have conspired to produce an interesting ADSL data access market which is probably quite competitive and efficient at satisfying consumer demand in the narrow space where it operates. Unfortunately, this papers over the facts that so few people have fixed-line Internet access and the fact that there is almost no competition in the fixed-line access market.

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