Over-the-top – hindering or helping achieve European Digital Agenda goals?

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Some have argued that over-the-top applications are undermining the capacity of network operators to invest and are free riding. We find that growth of internet based over-the-top applications is a key driver of investment in ubiquitous higher speed higher capacity access networks, and far from free riding creates the demand conditions that will support investment in next generation networks and contribute to the achievement of European Digital Agenda goals for high speed broadband.

Has over-the-top disrupted telcos?

The open internet supports innovation, and innovation that expands the economy and opportunities for consumers and citizens is disruptive to established business models.

In Europe the telecoms sector has had a relatively high level of dependence on service revenues, as opposed to broadband access and data revenues. Mobile termination rates were high and some operators were particularly dependent on voice and text revenues.

The telecommunications sector was therefore vulnerable to innovation by internet based over-the-top application providers, who offer network independent applications.

Whilst over-the-top communications applications have existed for some time, the rapid adoption of smartphones, apps and improved broadband access have enabled communications applications including Skype, WhatsApp, Facebook and Google+ to reach a wider customer base and offer an array of communications services.

Competition from such applications has benefited consumers whilst disrupting the telecommunications sector's reliance on legacy voice and text revenues. It has also improved the prospects for monetising investment in ubiquitous higher speed higher capacity broadband access.

A telecommunications industry adjustment is required – away from reliance on voice and text revenues and towards broadband access and data revenues. As AT Kearney put it:

"…it is the industry's own price structures… and customers' efforts to optimize the monthly bill that have the greatest impact on core revenue decline."
AT Kearney, October 2012[2]

In the US the FCC policy statement of September 2005 - *"To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet"* – encouraged a win-win equilibrium outcome.

For example, Verizon, which has invested in fibre to the home and will complete LTE rollout in 2013, views demand and traffic growth – including that driven by over-the-top applications - as an opportunity rather than a problem.

Verizon fibre is offered on the basis of speed-price tiers which allow increasing demand for bandwidth to be monetised:[3]

"*…video web traffic is fuelling the need for faster bandwidth…more than half our residential customers already use at least a 20 Mbps Internet connection.*"
Verizon, 2012

Mobile data is offered on a tiered data plan basis with options for family and multiple device plans:[4]

"…we saw that we had opportunity from a tiered structure and the proliferation of video through the LTE network that we would grow our revenue streams. And that is what we are seeing…" Verizon, 2012

The opportunity has also been recognised in Europe:[5]

"…the business model of the future is access...a growing business" Swisscom CEO Carsten Schloter, 2012

Over-the-top applications, by increasing demand for more ubiquitous, higher capacity higher speed networks, support rather than hinder achievement of Digital Agenda goals.

[1] We acknowledge the financial support of the Computer & Communications Industry Association (CCIA) in preparation of this Plum Insight.
[2] A.T. Kearney. October 2012. "A future policy framework for growth."

[3] http://newscenter2.verizon.com/press-releases/verizon/2012/verizon-ushers-in-new-era-of.html
[4] http://www22.verizon.com/investor/DocServlet?doc=4q11_vz_transcript.pdf
[5] FT-ETNO Conference October 2012. http://www.key4biz.eu/etnodigital/newsletter/video/carsten-schloter.html

Is over-the-top purely about arbitrage?

A paper for an OECD hearing argued that:

"*VoIP largely exists because it exploits arbitrage opportunities. If it were a cheaper way to deliver calls we would expect mobile networks to have adopted it themselves.*"[6]

The fact that over-the-top is often free to the user and offers pan-European (indeed global) services benefits consumers and businesses, but has its growth been driven purely by arbitrage?

Over-the-top applications and services have global scale – which lowers costs. However the benefits go well beyond cost considerations. Over-the-top allows innovation and entry at the edge of the network. This has seen rapid and wide ranging benefits for consumers, business and the economy.

Examples of beneficial innovations introduced by over-the-top include video communication, enhanced voice quality, read receipts, active response indication, presence, group chat, personal profiles, social sharing, screen sharing, location sharing, video messaging, chat multi-tasking, multi-device chat and the ability to operate over Wi-Fi as well as cellular. Over-the-top offers innovative services that are valued by consumers and businesses. Further, the nature and pace of this innovation far exceeds that for processes focused on development of integrated network services.[7]

Is there too much traffic growth?

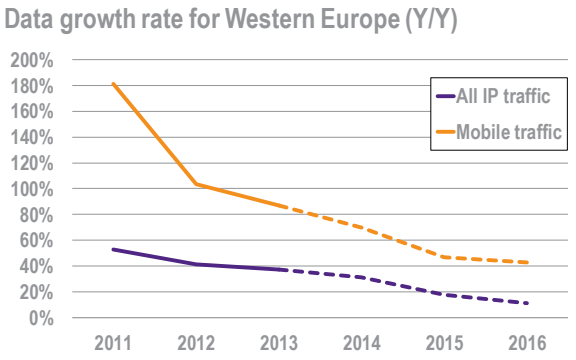
"Data volumes are increasing much faster than the infrastructure needed to carry it…"
ITU Secretary-General, Dr Hamadoun I. Touré, 20 June 2012

Predictions of data volumes overwhelming internet infrastructure are not new, as the following illustrates:

"I predict the Internet will soon go spectacularly supernova and in 1996 catastrophically collapse." Robert Metcalfe, 1995

Such predictions have proved false in the past; nevertheless is there too much traffic growth relative to investment? If demand growth did exceed capacity growth one might expect congestion and declining speeds, yet end-to-end connectivity speeds have risen over time.

Further, networks have coped in the past with higher growth rates than those today, with growth rates expected to decline further as illustrated below.



Source: Plum Consulting, Cisco VNI

The implications of traffic growth for network costs and revenues differ between core and access networks, and fixed and mobile broadband access.

In relation to core networks that link data centres and continents, fibre optic capacity has grown according to Butters' Law (that the cost of transmitting a bit over an optical network decreases by half every nine months). Capacity comes not only from laying new cables, but also by upgrading existing ones – with no end in sight to innovation.[8] Core network costs are a small part of overall end-to-end connectivity costs, and costs may fall as innovation outstrips declining data growth.

In relation to the last mile fixed networks, fibre upgrades may meet demand for higher speeds, but are not required to keep pace with traffic growth. Last mile networks – from the exchange or cabinet to the premise – are uncontended, i.e. there is one line per customer. A 10 Mbps connection, whether copper or fibre, can support around 3 TB per month per household – 100-fold more than existing demand.

The rationale for upgrading the fixed access last mile is to increase access speed, not to cope with traffic growth. Further, whilst traffic growth improves the revenue prospects for fibre, it does not increase fixed network last mile costs.

In relation to mobile access capacity is shared and additional capacity is required to meet traffic growth. However, substantially greater spectrum availability and the transition to more spectrally efficient LTE (4G) technology will not only increase capacity and speed, but also lower the cost of meeting traffic growth. Further gains, including a transition to heterogeneous networks incorporating small cells and greater Wi-Fi offload, are anticipated. The means

[6] Martin Cave. June 2011. "Working Party No. 2 on Competition and Regulation - Hearing on net neutrality." http://www.oecd.org/regreform/sectors/48848979.pdf

[7] The Rich Communication Suite industry initiative begun by industry players in 2007 with standards defined through 3GPP and the Open Mobile Alliance, saw services launched in 2012. Innovation at the network edge, and leveraging cloud computing on a global scale, has developed faster and offers richer capabilities than network based service innovation.

[8] January 2013. "NEC and Corning achieve petabit optical transmission." http://optics.org/news/4/1/29

to deliver a 1000-fold increase in mobile network capacity at reasonable cost appear within reach.[9]

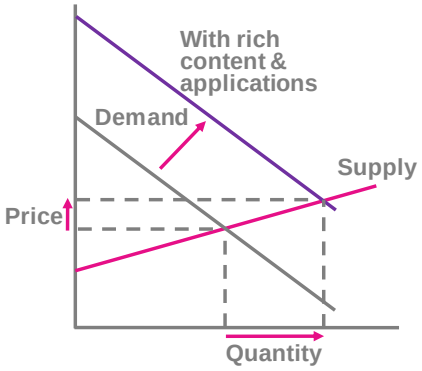
Is there a disconnect between traffic and revenue?

"…some have said that there is a need to address the current disconnect between sources of revenue and sources of costs, and to decide upon the most appropriate way to do so." ITU's Dr Hamadoun I. Touré, 20 June 2012

The debate over whether there is a disconnect between sources of revenue and sources of demand was brought into focus by proposals made in the context of the ITU's World Conference on International Telecommunications for 'sender pays' in relation to internet traffic. A number of papers have argued that sender pays is neither practical nor necessary to support investment.[10]

The current model, whereby consumers and businesses pay for connectivity to their own premises, has worked well. A virtue of this payment model is that those causing demand, namely consumers requesting services such as a video stream, face the associated costs.

Content and application providers use efficient compression, content caching and invest in infrastructure since they pay for carriage and have an incentive to deliver a positive end user experience. Further, over-the-top service providers offering rich content and applications also enhance demand for broadband access, thereby supporting telco investment, as the following diagram illustrates.



BEREC, the body of European regulators, recognise that content and application providers (CAPs) stimulate demand:[11]

"Ultimately it is the success of the CAPs that lies at the heart of the recent increase in demand for broadband access…" BEREC, November 2012

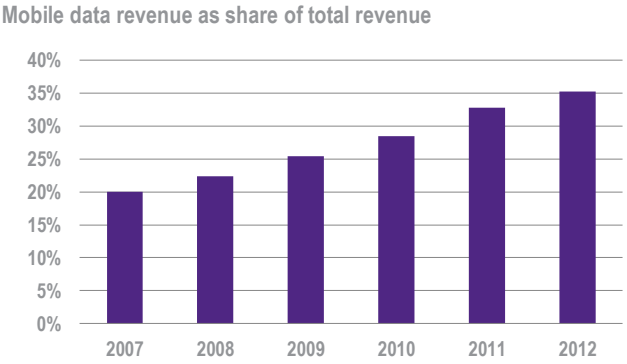
The additional demand creates an opportunity for network providers to increase their revenue by offering appropriately priced data plans to their customers.

Whilst overall telco revenues in Europe have declined in recent years (in contrast they have increased in other regions), revenues attributable to broadband access and mobile data paint a much healthier picture.

In relation to fixed broadband access revenues the typical approach is to count only direct broadband revenues, and attribute fixed line rental to voice. Yet with two-thirds of households now having fixed broadband and primarily purchasing the fixed line for broadband rather than voice, this approach is no longer appropriate.

If instead we attribute fixed line rental revenues to broadband access for those households with fixed broadband, broadband revenues are then the major share of fixed revenues and rising over time.

Measuring mobile data revenues as a share of overall revenues using the Merrill Lynch mobile matrix for the UK, France, Germany, Spain and Italy combined, shows that mobile data revenues are growing strongly.



Source: Plum Consulting, Merrill Lynch

In conclusion, applications and traffic growth drives demand for ubiquitous higher speed higher capacity broadband access. This, in turn supports revenue growth for access providers. There is no disconnect.

[9] http://www.qualcomm.com/solutions/wireless-networks/technologies/1000x-data

[10] Michael Kende. September 2012. "Internet global growth: lessons for the future." http://www.analysysmason.com/internet-global-growth-lessons-for-the-future

Plum. October 2011. "The open internet – a platform for growth." http://www.plumconsulting.co.uk/pdfs/Plum_Oct11_The_open_internet_-_a_platform_for_growth.pdf

Robert Kenny. August 2011. "Are traffic charges needed to avert a coming capex catastrophe? http://www.commcham.com/storage/publications/TrafficChargesATKReview.pdf

WIK. May 2011. "Network Neutrality: Challenges and responses in the EU and in the U.S." http://www.europarl.europa.eu/committees/en/studiesdownload.html?languageDocument=EN&file=36351

[11] http://berec.europa.eu/files/document_register_store/2012/11/BoR_%2812%29_120_BEREC_on_ITR.pdf

Is there evidence of harmful discrimination in Europe?

BEREC investigated existing practices and found that several fixed and mobile network operators apply restrictions including blocking or slowing down certain services affecting a significant number of subscribers in Europe.[12]

Existing practices go beyond legitimate traffic management and differentiation of service offers and involve harmful discrimination including blocking, degradation and anti-competitive discrimination; but also opportunistic behaviour (the so called "hold-up" problem) where the aim is to extract favourable terms and/or payments but not to discriminate against competitors *per se*.[13]

Should anything be done about discrimination against over-the-top?

European Commissioner for the Digital Agenda, Neelie Kroes, made her position clear in May 2011:[14]

"I am ready to prohibit the blocking of lawful services *or applications. It's not OK for Skype and other such services to be throttled."*

Whilst Europe has a policy framework which supports competition based on network access, this has not prevented anti-competitive discrimination and does not address the hold-up problem.

Such conduct harms consumers and businesses in Europe since it harms innovation in content and applications, thereby harming the overall internet ecosystem including networks. Harmful discrimination and opportunism also makes Europe a less attractive place to startup and stay in the rapidly growing global market for applications.[15]

This suggests that a rebalancing of the policy focus, as service competition moves from dependence on network access to dependence to consumer access to internet based applications, is appropriate.

[12] BEREC. May 2012. "A view of traffic management and other practices resulting in restrictions to the open Internet in Europe." http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Traffic%20Management%20Investigation%20BEREC_2.pdf

[13] The "hold up" problem can undermine incentives to invest, see Weiser. 2009. "The future of internet regulation." http://lawreview.law.ucdavis.edu/issues/43/2/articles/43-2_Weiser.pdf

[14] http://europa.eu/rapid/press-release_SPEECH-11-285_en.htm

[15] http://online.wsj.com/article/SB10001424127887323293704578334401534217878.html
https://ec.europa.eu/digital-agenda/en/startup-europe-initiative-european-commission-strengthen-environment-web-entrepreneurs-europe/

What should be done?

Network investment and applications innovation both generate economic benefits. The aim should be to seek a win-win arrangement. Both network operators and applications providers and developers seek a predictable framework within which to innovate, invest and compete.

On the network access side the 12 July 2012 statement by the European Commission proposed copper price stability and pricing freedom for fibre, subject to non-discrimination ("equivalence") in relation network access seekers. Pricing freedom is intended to support innovation and service-price differentiation. Whilst it is legitimate to differentiate on the basis of service characteristics such as latency, speed or capacity, discrimination by network operators in favour of traffic generated by their own services as opposed to traffic generated by an over-the-top provider is illegitimate.

The latter would include blocking, degradation and inclusion of over-the-top service data within data caps whilst excluding their own integrated services from such caps. Further, the threat of opportunistic behaviour by either over-the-top players or network operators would discourage specific investments which depend on access to end users or content and applications respectively.

Over-the-top players also seek freedom to innovate, invest and compete; the right to innovate without permission and freedom from harmful discrimination and opportunism.

Finding the right balance of policy is challenging. However, the following options – which aim to discourage or prevent anti-competitive discrimination and opportunism whilst ensuring that both network operators and over-the-top providers have the freedom to compete, innovate and invest – should be considered:

- Promotion of the principle that consumers should have access to lawful applications and content of their choice.
- Limiting use of the term "internet access" to those access providers who offer full and non-discriminatory access to lawful internet based applications.
- Extending the concept of equivalence to internet applications in addition to network access and requiring equal treatment for over-the-top and vertically integrated services.

Conclusion

Over-the-top applications, by increasing demand for more ubiquitous, higher capacity higher speed networks, support achievement of Digital Agenda goals. Experience of discrimination to date suggests policy action to support the freedom of over-the-top to innovate and compete is required and would benefit all in the value chain, including the telecommunications industry.