

The next telecom frontier: a ‘net neutrality’ primer

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“There is no consensus on precisely what ‘Network Neutrality’ means – and thus no consensus on what rules are required to achieve it [...]”²

Within the past year, the debate over net neutrality has emerged from academic obscurity to the front pages of leading national newspapers, with full-page advertisements from advocates on both sides.³ The United States Senate Judiciary Committee devoted a day to hearings on the issue.⁴ Net neutrality bills were introduced in the current session of congress, but failed to garner sufficient support.⁵

The growing public debate over the merits of net neutrality follows the US Federal Communications Commission’s (FCC) adoption of a policy statement embodying four general ‘principles’ to govern relations among consumers, broadband providers and providers of content and applications:

- consumers are entitled to access the lawful internet content of their choice;
- consumers are entitled to run applications and services of their choice, subject to the needs of law enforcement;
- consumers are entitled to connect their choice of legal devices that do not harm the network; and
- consumers are entitled to competition among network providers, application and service providers, and content providers.⁶

In commenting on these principles, FCC Chairman Kevin Martin noted that “cable and telephone companies’ practices already track well the internet principles we endorse today. I remain confident that the marketplace will continue to ensure that these principles are maintained. I also am confident, therefore, that regulation is not, nor will be, required.”⁷

This chapter reviews the economic issues that underlie the net neutrality debate. We start with a simplified statement of each side’s position. Net neutrality proponents claim that the evolution of the internet can be traced to the success of the so-called ‘end-to-end’ principle (explained below), and that regulation is required to enshrine that principle against changes by network operators. Those who oppose net neutrality regulation argue that the success of the internet arises from the absence of regulation, and that free market competition, rather than regulation, should be allowed to foster the continued vitality of the internet. These divergent views turn on whether one believes that the current networks will ‘work’ for the foreseeable future or whether, as some have argued, we are headed for a ‘train wreck’ unless there are adequate economic incentives to expand broadband networks. The ‘regulation versus competition’ debate will continue, so it is useful to understand the full parameters as they relate to potential antitrust law issues.

Today’s internet – how did we get here?

To understand the net neutrality debate, it is essential first to unpack the premises on which each side bases its arguments. Net neutrality proponents generally desire to protect a high level of agnosticism in the way the internet treats data packets. In other words, net neutrality proponents prefer the network to be ‘dumb’ at the core, and ‘smart’ at the edge. As Professor Edward Felten of Princeton University puts it:

“Putting the intelligence in the edge computers has several advantages. (1) Edge computers account for most of the devices involved in the network, so the edge computers collectively have most of the memory and processing power available to the network, and it makes sense to put the intelligence where these resources are available. (2) Edge computers have a better idea what the network’s users want, because they are owned and controlled directly by users. (3) Innovation usually happens faster at the edge of the network.”⁸

Innovation at the edge creates among content and applications “a battle for the attention and interest of end users.”⁹ In this view, “it is [...] important that the platform be neutral to ensure the competition remains meritocratic.”¹⁰ Professor Lawrence Lessig of the Stanford Law School agrees, arguing that the “diversity of [internet] innovators is no accident. By minimizing the control by the network itself, the ‘end-to-end’ design maximizes the range of competitors who can innovate for the network.”¹¹

Opponents of network regulation, in contrast, assert that the internet has succeeded because the government has properly concluded not to regulate it, but to let the market work.¹² In their view, freezing a set of operating principles by regulation will stifle innovation and investment, forestalling continued expansion, investment and experimentation. The result would be that the internet will end up working about as well as most urban ring roads or beltways work at rush hour – clogged with traffic that prevents anyone from getting anywhere at any meaningful speed.

The congestion is itself a function of the innovation that has occurred to date. Gone are the days when the internet was simply used to send e-mail and access static web pages. Internet users today are far more heterogeneous, requiring large, non-bursty bandwidth (streaming video), or high quality of service (QoS), such as gaming, VoIP or IPTV.¹³ These “fundamental changes in user demands [...] are placing increasing pressure on the continued adherence to a uniform, TCP/IP-based architecture.”¹⁴ The explosion in the number of internet users using ever-more demanding applications to access data in different ways has “greatly complicated traffic management” and “plac[ed] increasing pressure on network capacity,” while being “less tolerant of variations in throughput rates.”¹⁵ The result has been “[d]issatisfaction with endemic congestion on the public internet, which makes even web surfing annoying [...]”¹⁶ In the future, underinvestment will lead to a “crisis” that will “hurt the makers and users of networks and all of their upstream complements, including content, applications, services, and devices.”¹⁷

To the extent that proponents of net neutrality accept the need for increased investment in networks, they generally propose to solve this problem by “provid[ing] greater bandwidth and keep[ing] the charging algorithm simple”.¹⁸ But simply building enormous new pipes, and continuing to operate a system that lacks the capacity to intelligently route and manage traffic, has several serious shortcomings. First, such a system makes it “too expensive, at least for the public internet, since more than two decades of experience have shown that any bandwidth gets saturated quickly.”¹⁹ Second, the amount of investment required would vastly exceed what would be needed in a managed traffic environment. If a particular network pipe requires 50 per cent more capacity but only for short bursts of

time, building to avoid congestion would leave extensive capacity unused most of the time. This effect is compounded by unmanaged capacity, which has to be big enough to provide the QoS demanded by the most demanding application available at the peak time, or risk constraining the development of such applications.

Regulation opponents thus advocate the use of ‘smart pipes’ that allow network operators to manage traffic appropriately, and thus to optimise the level of new capacity investment that is required. “Allowing network owners to employ different protocols can foster innovation by allowing a wider range of network products to exist. Conversely, compulsory standardization can reduce consumer surplus by limiting the variety of products available.”²⁰ In fact, commentators believe that the move toward networks that can prioritise different kinds of data according to non-standard protocols “represent[s] nothing more than the natural outgrowth of the underlying heterogeneity of consumer preferences.”²¹ As Verizon’s chief technology officer, Mark Wegleitner, says: “There’s a lot of difference between a best effort network that will just choke in the event of an overload and one that will manage through that period preserving as many sessions as possible with adequate performance [...]”²²

Regulation to preserve network architecture

Net neutrality believers are not convinced by any plan to use more sophisticated protocols in the network core to improve traffic flow. Vinton Cerf, now a spokesperson for Google, believes that broadband providers do not need to develop smarter networks to improve quality of service for recent and future application types.²³ In his view, “plac[ing] the functionality in the physical or logical layers of the network, rather than in the application layer where they belong [...] is contrary to many of the fundamental architectural principles of the internet.”²⁴ Thus, net neutrality proponents seek to preserve an architecture principle through a regulatory regime.

Specifically, proponents of a ‘neutral’ internet advocate for regulatory rules to prevent network operators from engaging in conduct that, in their view, would constitute ‘discrimination’ against traffic. Beyond this simply stated proposition, however, the positions range from total preservation of the ‘smart edge–dumb core’ paradigm, to allowing some network management to occur, but without charges to content and application providers.

The end-to-end principle

The pure end-to-end proponents have argued that the internet should have “no gatekeepers over new content or services”²⁵ at all; in other words, network operators should not even be able to give preference to different types of content, but should simply process all data together on a ‘best efforts’ basis.²⁶ Under this regime, network operators would be required to treat streaming video and VoIP calls with the same best efforts as they would junk e-mail.

Central to the end-to-end proponents is the absence of charges to any internet user for anything other than the bandwidth connection. Thus, although networks can charge end users and content or access providers for their ‘on-ramp’ access to the internet, any additional charges that vary by type of content or application are seen as problematic. Professor Lessig asserts “[t]here is something especially wrong with network owners telling content or service providers that they can’t access a meaningful broadband network unless they pay an access-tax.”²⁷ Thus, regulation is seen as necessary to prevent network operators from attempting to do so.

Less restrictive principles

Perhaps recognising that the explosion in, and increasing diversity of, internet traffic justifies some network management, some views of net neutrality would allow network owners to assert control over

internet traffic within narrow limits. Thus, more recent iterations of the end-to-end principle seek regulation to ensure that “all like internet content must be treated alike and move at the same speed over the network”.²⁸ Under this version of net neutrality, a network operator could, for example, prioritise VoIP packets over e-mail, but would have to move all VoIP packets at the same priority level, regardless of which VoIP provider was being used by the caller.²⁹

Even under this view, however, net neutrality proponents seek to push the costs of any service level commitments exclusively onto the subscriber, although they concede that network operators should have some flexibility to create additional pricing models with respect to end users. Such plans would induce heavy users to move up to bigger pipes, to more accurately reflect their usage levels, and thus the network congestion they cause. Other possible plans might include charges specifically geared to the quality of service assurance desired by the customer. For example, a customer might pay a monthly fee to guarantee that the connection will specifically prioritise data related to applications like video or VoIP in order to ensure that those applications work properly. Both kinds of pricing innovations redress a cross-subsidisation between heterogeneous users that may now be leading to a suboptimal level of broadband investment and capacity.

Any attempt to regulate pricing will undoubtedly be fraught with challenges at best and anti-competitive effects at worst. For instance, bundling is ubiquitous in the internet space already – cable companies, for example, are exploiting the ‘triple-play’ of video, broadband access and VoIP by bundling the three together at prices not much higher than cable and broadband together. The telcos are responding with their own bundles of broadband access, VoIP and IPTV. The clear winner in these bundle wars is the consumer,³⁰ yet certain net neutrality proposals would ban bundles. In the absence of strong evidence that competition is not working, price regulation would be ill-advised.³¹

Competition policy and incentives to support infrastructure investment

Although both sides of the net neutrality debate agree on the need for additional network investment to support the volume and range of internet applications being developed,³² they disagree on how such new infrastructure investments should be paid for. Net neutrality proponents argue that any necessary additional capacity can be paid for through innovations in pricing to the end-user: “Applications [requiring more capacity] could be subject to additional customer charges, based on the access speeds required – but without discriminating based on who is providing the service.”³³

Opponents of net neutrality regulation disagree. They believe that, under today’s revenue models, broadband providers do not have any incentive to support never-ending increases in bandwidth along with increasingly complex data traffic patterns. An MIT Working Group report explains that “[i]f broadband operators do not shift their pricing away from today’s flat rates, they will be increasingly motivated to curtail rather than encourage many innovative uses of their networks.”³⁴ For that reason, opponents of net neutrality regulation advocate for the ability to innovate, develop new revenue streams, and attempt to match their pricing to the underlying heterogeneity of the demands of network users.

Inevitably, the debate turns to the emotionally charged issue of network operators charging content providers. Yet the model is both familiar and long-standing, and used by newspapers and magazines, among others. If 100 per cent of the newspaper’s costs were to be borne by the readers, the price to the readers would be very high, and the size of the readership correspondingly low. The value of such a low readership to advertisers would also be low. If the newspaper can charge the advertisers a fee and reduce the

charges to the readers, however, the readership grows, the value of that readership increases, and the amount that advertisers will pay to reach the readership likewise increases. Eventually, a balance is reached between charges to advertisers and charges to readers.

The network, like a newspaper, is a platform that brings together end users and content providers. At present, most costs are charged to the end users (though content providers also pay for internet access), but there is no reason to assume that the current model is the most efficient outcome.³⁵ Economic theory indicates that, if network operators can charge content providers, they would be likely to use the new revenue streams to decrease prices to the end-user.³⁶ The logic of such behaviour is obvious, as demonstrated by the newspaper example above.

The 'broadband bottleneck' and the costs of regulation

The discrimination that net neutrality proponents fear does not rise to a competition law concern so long as there is no significant market power at any stage of the network. Absent market power, both end users and content providers can vote with their feet, moving among networks to avoid those that would engage in discrimination viewed as unacceptable to them. Thus, the competition policy aspect of the net neutrality debate focuses on regulatory proponents' claims that there is too little competition among network providers to sufficiently discipline future attempts to discriminate. To them, "[m]ost consumers face few choices among broadband carriers [...]" As a result, carriers increasingly will have an economic incentive to use their power to block competitors, seek extra payments to ensure that internet content can be seen, and generally control consumer activity online.³⁷

The evidence indicates that broadband competition is quite robust, and choices are growing, not shrinking, as time goes on. The market for broadband services that network neutrality advocates worry about is "the upstream market in which last-mile providers meet ISPs and content/application providers."³⁸ According to Professor Yoo of Vanderbilt University, that market is appropriately characterised as a national one, in which content providers face a relatively disaggregated market with a national scope as they seek to maximise the number of 'eyeballs' they reach through broadband providers. Professor Yoo points out that concentration in this market for broadband services is low.³⁹ Since most content is neither specific to narrow geographic areas nor even to broadband transmission itself, concerns that broadband providers will exercise their market power against content providers are overstated.

Opponents of regulation rely on the fundamental proposition that regulation should be resorted to only when it is evident that competitive market forces have failed. Regulation imposes significant costs on both the regulated parties and the regulators, and also has anticipated, as well as unintended, consequences. Professor Hazlett of George Mason University, for example, concludes that the early share lead taken by cable modem broadband over DSL can be traced to the FCC's regulations requiring incumbent telecoms, but not cable companies, to share broadband infrastructure with competitors. These rules provide a 'natural experiment' on the effect of blanket regulation on broadband services. During the period that DSL was encumbered by the obligation to share, while cable was not:

"Unregulated cable modems sprinted to a commanding lead among broadband subscribers, dominating regulated DSL networks nearly two-to-one, 1999 through year-end 2002. When DSL network access obligations were reduced in early 2003, however, the trend quickly switched. By 2004, new DSL subscribers pulled even with new cable modem customers. By 2005, DSL subscriber additions surged ahead. Overall, broadband penetration in the US increased from trend. The empirical evidence demonstrates that

regulating open access failed to improve broadband networks."⁴⁰

Providers currently building new fibre broadband networks have reacted similarly to the prospect of net neutrality regulation. In a letter to the FCC, a competitive local exchange carrier in Kansas, QComm, stated that "[t]o the extent Net Neutrality becomes law [...] [QComm] will have no choice but to immediately stop the build out of our rural FTTP [fiber to the premises] networks."⁴¹

Conclusion

Net neutrality advocates have a strong faith that freezing the current architecture of the internet as a large, relatively unsophisticated router of data packets will continue to drive innovation around the edges of that network. Opponents of net neutrality regulation attribute the internet's phenomenal growth in size, sophistication, and economic importance to the 'hands-off' regulatory regime that has governed it from the outset. They believe that as new and more complex content and applications and higher volumes of data traverse the internet, they have started to bump their heads on the technical ceiling of the network's traditional structure.

As Professor Yoo points out, "regulatory intervention is especially problematic when, as here, it is meant to forestall a perceived danger that has not yet materialized."⁴² The asserted risks of creating perverse incentives in the market for broadband services are significant, and the feared harm to be addressed by such intrusive regulation is still unknown. To the extent that net neutrality proponents criticise competition law as leaving 'gaps' in enforcement against discrimination that may not rise to the level of an antitrust violation, the FCC has already shown that it is quite capable of quickly stamping out discriminatory conduct deemed contrary to the public interest.⁴³

The net neutrality debate is likely to rage on for some time to come. Until and unless there are specific, anti-competitive actions that cannot be effectively remedied under existing antitrust laws or FCC regulatory powers, however, broad-based regulation to preserve the neutrality of the internet would, in the words of FCC Chairman Martin, be "premature".⁴⁴

Crowell & Moring acknowledges the significant contributions of, and dedicates this chapter to the memory of, our partner Robert Halperin.

Notes

- 1 The authors credit the substantial contribution of their colleague Ryan Tisch to this analysis.
- 2 Ford et al, Phoenix Center Paper No. 24, 'Net Neutrality and Industry Structure', Phoenix Center for Advanced Legal & Economic Public Policy Studies at 2, (April 2006).
- 3 Martin Bosworth, 'Net Neutrality May Derail Telecom Bill', www.consumeraffairs.com/news04/2006/08/net_neutrality.htm. The net neutrality debate has been fuelled by remarks made by AT&T chairman Ed Whitacre in late 2005 indicating that then-SBC was considering charging application providers Google, MSN and Vonage for network usage. "At SBC, It's All About 'Scale and Scope'", www.businessweek.com/@n34h*IUQu7KtOwgA/magazine/content/05_45/b3958092.htm (7 November 2005). Materials supporting both sides of the debate can be found on advocacy sites like <http://handsoff.org/>, <http://thefuturefasteraction.com/>, www.google.com/help/netneutrality.html, and www.netcompetition.org/.
- 4 Hearings before the Judiciary Committee, 7 February 2006.
- 5 HR 5417, 109th Cong (2006); see also Communications, Consumer's Choice and Broadband Deployment Act of 2006 section 2686, 106th Cong (2006); and Network Neutrality Act of 2006, HR 5273, 106th Cong (2006).
- 6 'FCC Adopts Policy Statement: New Principles Preserve and Promote

- the Open and Interconnected Nature of Public Internet', http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260435A1.pdf (5 August 2005).
- 7 Kevin J Martin, 'Comments on Commission Policy Statement', http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260435A2.pdf (5 August 2005).
 - 8 Edward Felten, 'Nuts and Bolts of Network Neutrality', <http://itpolicy.princeton.edu/pub/neutrality.pdf>, at 2.
 - 9 Tim Wu, 'Network Neutrality, Broadband Discrimination', 2 J on Telecomm & High Tech L 141, 146 (23 April 2005).
 - 10 Id.
 - 11 Lawrence Lessig, testimony before the Senate Committee on Commerce, Science and Transportation (7 February 2006).
 - 12 See 47 USC section 230(b)(2), declaring as the policy of the United States "to preserve the vibrant and competitive free market that presently exists for the internet and other interactive computer services, unfettered by Federal or State regulation".
 - 13 Broadband Working Group, 'The Broadband Incentive Problem', MIT Communications Futures Programme, at 5 (September 2005).
 - 14 Christopher Yoo, 'Would Mandating Broadband Network Neutrality Help or Hurt Competition?' <http://ssrn.com/abstract=495502> (2004).
 - 15 Id.
 - 16 Peter Fishburn and Andrew Odlyzko, 'Dynamic Behavior of Differential Pricing and Quality of Service Options for the Internet', <http://citeseer.ist.psu.edu/cache/papers/cs/7649/ftp:zSzzSzdmacs.rutgers.uzSzpubzSzdimacsSzTechnicalReportsSzTechReportsSz1999zSz99-12.pdf/fishburn99dynamic.pdf>, undated.
 - 17 Broadband Working Group, 'The Broadband Incentive Problem', MIT Communications Futures Programme, at 3.
 - 18 Id.
 - 19 Id.
 - 20 Christopher Yoo, 'The Economics of Net Neutrality: Why the Physical Layer of the Internet Should Not Be Regulated', *Progress on Point*, at 18 (July 2004).
 - 21 Id.
 - 22 Marguerite Reardon, 'Verizon says Net neutrality is overhyped', http://news.com.com/Verizon+says+Net+neutrality+is+overhyped/2008-1037_3-6056210.html?tag=st.prev (31 March 2006).
 - 23 Vinton Cerf, prepared statement to US Senate Committee on Commerce, Science and Transportation (7 February 2006).
 - 24 Id.
 - 25 Vinton Cerf, letter to representatives Joe Barton and John D Dingell, 8 November 2005.
 - 26 See Tim Wu and Lawrence Lessig, 'Ex Parte Submission in CS docket No. 02-52', Letter to FCC Secretary Marlene H Dortch (22 August 2003) (arguing for a "neutral" network in which "all applications are treated alike").
 - 27 Lawrence Lessig, testimony before the Senate Committee on Commerce, Science and Transportation, at 3 (7 February 2006).
 - 28 Lawrence Lessig and Robert W McChesney, 'No Tolls on the Internet', *Washington Post*, A23, 8 June 2006.
 - 29 As Professor Lessig testified: "There's nothing wrong with network owners saying 'we'll guarantee fast video service on your broadband account.' There is something wrong with network owners saying 'we'll guarantee fast video service from NBC on your broadband account.'" Lawrence Lessig, testimony before the Senate Committee on Commerce, Science and Transportation, at 3 (7 February 2006).
 - 30 See Aline van Duyn and Paul Taylor, 'Line of Sight: Why the Battle of the Bundle is at the Doorstep', *Financial Times* (17 March 2006) (citing reduced prices for cable bundles in localities where telcos have introduced competing bundles).
 - 31 Ironically, one of the strongest advocates of net neutrality, Google, is experimenting with multiple pricing models for network access. Google is developing a broadband network for the city of San Francisco that would have two tiers of service: (i) free, but with advertisements, and (ii) paid, but without advertisements. Verne Kopytoff and Ryan Kim, 'Google offers S.F. Wi-Fi – for free', *San Francisco Chronicle*, www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2005/10/01/MNGG9F16KG1.DTL (1 October 2005). One wonders whether such innovation and investment would be permitted under the net neutrality regulatory framework that Google and others advocate should be adopted.
 - 32 Despite growing evidence of impending disaster (see Broadband Working Group, 'The Broadband Incentive Problem', MIT Communications Futures Programme, at 3), some net neutrality supporters maintain that "[b]roadband capacity is not nearly as constrained as the network owners would have us believe," (Vinton Cerf, prepared statement to US Senate Committee on Commerce, Science and Transportation, 7 February 2006).
 - 33 Id.
 - 34 Broadband Working Group, 'The Broadband Incentive Problem', MIT Communications Futures Programme, 7.
 - 35 Reply declaration of Marius Schwartz, Docket No. 06-74, http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6518367656, par 49, 19 June 2006.
 - 36 See Jean-Charles Rochet and Jean Tirole, 'Platform Competition in Two-Sided Markets', *Journal of the European Economic Association*, vol 1, No. 4, 990-1029 (June 2003).
 - 37 Vinton Cerf, prepared statement to US Senate Committee on Commerce, Science, and Transportation (7 February 2006).
 - 38 Christopher Yoo, 'Would Mandating Broadband Network Neutrality Help or Hurt Competition?', <http://ssrn.com/abstract=495502>, at 51 (2004).

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- 39 Id at 52. Although Professor Yoo's calculations of concentration in a national market for upstream broadband services predates recent mergers in that industry, the mergers have not materially affected the identified market, and thus Professor Yoo's assessment of competitive conditions in the upstream market remains accurate.
- 40 Thomas Hazlett, 'Neutering the Net', *Financial Times*, 20 March 2006, available at <http://news.ft.com/cms/s/392ad708-b837-11da-bfc5-0000779e2340.html>.
- 41 See Letter from Albert Cinelli, president, QComm, 'In the Matter of Consumer Protection In the Broadband Era', WC Docket No. 05-271 (16 March 2006).
- 42 Christopher Yoo, 'Network Neutrality and the Economics of Congestion', <http://ssrn.com/abstract=825669>, at 48.
- 43 In the Matter of Madison River Comms LLC, Consent Decree, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-05-543A2.pdf (3 March 2005).
- 44 'FCC's Martin Preaches Competition', www.lightreading.com/document.asp?doc_id=96487&site=globalcomm (6 June 2006); similarly FTC chairman Deborah Platt Majoras recently stated that the agency disfavours additional regulation at this time, and that she believes that "we should look at whether any net neutrality or similar legislation could have the effect of entrenching existing broadband platforms and market positions, as well as adversely affecting the levels and areas of future innovation and investment in this industry." Deborah Platt Majoras 'The Federal Trade Commission in the Online World: Promoting Competition and Protecting Consumers', remarks to the Progress and Freedom Foundation's Aspen Summit, 21 August 2006.