

First, Assume a Monopoly: The Failure of Vertical Foreclosure Theory on the Never-Was-Neutral Internet

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ABSTRACT

Internet service providers and their customers have understood and debated the concepts of net neutrality since the beginning of the era of dial-up bulletin board systems. Commentators have only recently joined the debate, and often overlook history. No commentator, legislator, or regulator can be certain how networks and technologies will evolve over the next decade—especially when they misunderstand how those networks evolved over the last one.

This paper refocuses the net neutrality debate by challenging the application of vertical foreclosure theory to today's non-neutral Internet access and content markets. The paper finds that the current policy fascination with non-existent net neutrality is ill founded. Disclosure and a broader focus on both network and content providers' non-neutral traffic policies would better enable the market to choose technologies and business models dynamically while still providing regulators with a potential enforcement mechanism.

Keywords: net neutrality, FCC, broadband, Internet, monopoly, economics, vertical foreclosure

INTRODUCTION

A shipwreck stranded a physicist, a geologist, and an economist on a deserted island with only a carton of canned food to eat. Each scientist applied the insights of his discipline to solving the problem of opening the cans. The physicist suggested dropping rocks off a high cliff to open the cans. The chemist suggested using polished rocks and the sun's rays to heat the cans until they split open from internal pressure leaving the food accessible and cooked. Then, the economist spoke, "Gentlemen, assume we had a can opener . . ."

Proponents of net neutrality regulation generally argue that Internet access providers threaten the innovative, largely regulatory-free Internet, and that government action is necessary to prevent the destruction of the global network's benefits. Opponents tend to argue that regulations would ruin innovation, fail in practice, or be doomed in principle. While commentators have alternately argued for or against the nebulous "net neutrality" concept, the vast majority have done so from theoretical perspectives rather than technical ones. Like the stranded economist, commentators on both sides ignore the facts on the ground, and first assume a monopoly. As a result, the debates have discussed nonexistent "end-to-end" neutral network models, [1] purely theoretical monopoly-controlled networks, [2] or value judgments about whether non-neutrality or government intervention causes the most "harm" to Internet consumers. [3]

Relatively few treatments come from technical perspectives that explain the history of non-neutrality on the Internet, or the enduring power of end users and technological innovation. This paper highlights what Internet network administrators have always known: net neutrality is not—nor was it ever—the status

quo. Acknowledging this reality refocuses the net neutrality debate on end users, rather than networks. By analyzing Internet history, testing monopolist theories against real world Internet markets, and exploring important economic arguments, this paper attempts to illuminate the value of a uniform disclosure solution that protects provider innovation yet leaves market power in the hands of consumers.

Specifically, this paper focuses on the application of vertical foreclosure theory by Dr. Barbara van Schewick. [4] Vertical foreclosure theory fails in application online, and its misapplication represents a significant danger to innovative Internet access and content markets. Dr. van Schewick makes fatal assumptions about the existence of monopolies in the access market, and overstates the likelihood of vertical foreclosure even if those monopolies were to emerge.

Legislators and administrative agencies have no way to predict future technologies or their impacts. Net neutrality legislation as envisioned by Professor Lawrence Lessig, Dr. van Schewick, and others ignores the history of consumer power to foster continued innovation and prevent access provider harms. Regulatory approaches that aim to stifle particular practices or network architectures often make little technical sense, and are unacceptably subject to political whims. Instead of adopting specific neutrality regulations—whether narrowly tailored to last mile networks or broadly viewed from the perspective of overall consumer welfare—this paper advocates a uniform disclosure regime. Categorized, detailed disclosures would enable the market to choose technologies and business models dynamically, yet still provide regulators with a potential enforcement mechanism.

1. THE HISTORY OF NET NEUTRALITY

The broad concept of net neutrality covers a range of issues over a longer period than most commentators recognize. [5] While the FCC may have only joined the debate in recent years, the Internet community, its standards bodies, and market participants have debated these issues for over two decades. Decisions made before regulators took notice impact today's debate in many ways. Standards bodies built non-neutrality into networking protocols long before the commercialization of the Internet. Discussions about acceptable use, user restrictions, tiered access plans, and pay-by-usage are at least as old as the pre-Internet bulletin board systems that flourished during the 1980s and early 1990s. By the mid-1990s, the burgeoning Internet service provider industry had largely replaced the offline BBS as the focal point of neutrality and content filtering debates. The Internet community's successful—and regulation-free—resolution of these difficult neutrality issues not only requires reframing today's discussions about network neutrality, but also provides important lessons for legislators and regulators considering new regulatory regimes.

CIX and the absence of monopoly power

The 1990s saw the first major carrier and consumer skirmishes over net neutrality issues. The battles tread familiar ground: disputes over equal access and arbitrary consumer content restrictions.

Various pundits and experts have offered doomsday warnings for years. In 1997, a group of Internet providers argued that termination of peering agreements “may be just the opening . . . skirmish in the long-predicted move [by Tier 1 providers] acting as a closed cartel to change the fundamental economics of the Internet . . . [that] will cascade down to the pocketbooks of all users and smaller . . . ISPs.” [6] In 1994, Internet journalist Gordon Cook warned that Tier 1 providers would soon dominate the market and force higher usage-based pricing and the elimination of free peering points like CIX. [7] Legislators, too, have fanned these fears. Senator Ron Wyden (D-Or.) used similar language in 2006, claiming that “[c]reating a two-tiered system could have a chilling effect on small mom and pop businesses that can’t afford the priority lane, leaving these smaller businesses no hope of competing against the Wal-Marts of the world.” [8]

Preferential access, present from the commercial foundation of the Internet, does not represent a fundamental change to business models or Internet economics. Cook and others in the mid-1990s may not have foreseen the power of individuals to shape Internet governance, given the comparatively limited scope of the commercial Internet at the time. However, both academics like Professor Lessig and Dr. van Schewick and legislators like Senator Wyden have the benefit of history. Their scenarios fail explain clearly how the “Wal-Marts of the world” could hope to buy discriminatory access on thousands of provider networks around the world to create a priority lane, or why a meshed, worldwide network would eschew opportunities to circumvent any discriminatory “lanes” that individual carriers tried to build. As the next section recounts, organizations like CIX have found that creating a discriminatory lane leads to irrelevance, not dominance. A telecommunications oligopoly has not materialized at any point in the existence of the tiered access model. Despite dire predictions, the non-neutral Internet access model has arguably fostered—or at worst failed to hinder—innovation in Internet networking.

The relatively few attempts to impose access blocks have had no measurable effect on innovation and growth of Internet networks, services, and content. Three events illustrate this absence of power: CIX’s 1994 attempt to isolate non-members, the 2006 decision by AOL to eliminate its walled garden content, and the separate panic over a technical glitch at Craigslist that same year.

CIX: The first (failed) attempt to monopolize

In 1994, CIX decided that the rapidly expanding size of routing tables—lists of instructions stored by routers and other Internet-connected devices about the available paths to different networks—would soon overwhelm the capacity of their routers to store them. Among other services, CIX primarily provided connectivity for its members. All members were required “to interconnect with all other CIX members . . . directly or indirectly through the CIX router—at no additional cost to member networks.” [9] Prior to November 1994, non-CIX members could still exchange routing tables at the CIX router and with other CIX members without paying CIX’s \$7,500 annual membership fee. [10]

Following a vote by the board of directors, CIX President Bob Collet announced on November 1st that CIX would impose filtering beginning on November 15th. [11] A key member of CIX resigned in protest on the same day, and the announcement fueled a significant debate. [12] COOK Report editor Gordon Cook warned providers that failing to pay CIX’s membership fee to avoid the filtering amounted to “a double barreled round of Russian roulette. . . . Joining the CIX is obvious [sic] the safest thing for non member ISPs to do.” [13]

The commercial Internet community in 1994 was miniscule compared to today’s global network of providers. As the primary exchange point for commercial Internet traffic, customers and backbone providers depended on CIX. However, CIX learned quickly that it had little power to impose filters, despite its market power as the primary facilitator of the commercial Internet in the United States. [14] CIX quickly faded into obscurity. Its decision served to encourage the major backbone providers to build new platforms and offer to downstream customers ways to interconnect and bypass CIX’s network altogether. As the COOK Report explained, “with the CIX router foundering and seen as a place to avoid, many providers began to get interested in MAE-East [another routing information exchange point] as an alternative.” [15] By 1997, CIX membership had stalled at approximately 150 members, and faced defections by major founding members MCI and UUNET. [16] By 2001, CIX had decommissioned its router and exchange point. [17] CIX needed content and customers to survive, a network truth as important today as it was then.

In contrast with the nascent commercial Internet of 1994, today’s consumers, access providers, and businesses can choose from a host of broadband options and dozens of providers of bandwidth and other niche services. A market once in *actual* danger of domination by a handful of founding players has evolved into an innovative marketplace replete with services and players of all types and sizes.

2. WHY CIX COULD NEVER HAPPEN TODAY

If you see smoke, assume a raging forest fire

Despite repeated failures by supposed Internet access monopolists to exert vertical pressure on Internet content providers, net neutrality proponents cling to monopolist theories. Monopoly power has yet to emerge. Recent research advocating neutrality regulation makes erroneous assumptions about the market power of broadband access providers, while evidence shows that today’s providers wield far less power than the failed CIX did in the early days of the commercial Internet.

Broadband providers would face a public relations and economic disaster similar to the one that CIX endured if they attempted to completely block or even severely restrict access to sites or services that their customers desired. Researchers Anton Wahlman and Brian Coyne of asset management firm Needham & Company, a private asset management firm, argue, “[c]onsumers will gravitate to pipe providers that do not restrict their activities. . . . Any pipe provider who tries to restrict uses of the pipe to favored services (voice, video, or data) in a ‘walled garden’ will likely be at a severe or impossible disadvantage, with consumers leaving for other pipes.” [18]

While Wahlman and Coyne make their argument in the context of the value of a “dumb pipe” in the broadband market, their argument applies equally to any pipe: smart or dumb, edge or backbone. Broadband networks exhibit strong direct and indirect network externalities [19] and bandwagon effects. [20] Under these theories, a network’s value increases proportionally

with the number of its users. [21] The increased interconnectivity of the Internet generates substantial benefits for users, broadband providers, and content providers.

Time Warner's AOL unit exemplifies the disadvantages of Wahlman and Coyne's "walled garden." AOL, after peaking at 27.7 million subscribers in 2002, slid to under 18 million in 2006. [22] The company, famous for its proprietary, subscriber-only content, abandoned its pay-for-content model as its former users increasingly migrated to other dial-up and broadband providers. By jettisoning its Internet access business and releasing its content freely, AOL has built a business model better positioned to succeed on an increasingly large and interconnected Internet. AOL's decision perfectly illustrates the substantial benefits to users, broadband providers—and even AOL itself—that increased numbers of users provide.

The fate of erstwhile Internet giants CIX and AOL provide two concrete examples, but the market has swiftly addressed even the *hint* of restriction as well. In early June 2006, writer Tom Foremski wrote on his popular SiliconValleyWatcher blog that Cox Cable—one of Professor Lessig's "duopoly" broadband providers—had blocked access to popular classified advertisement site Craigslist. [23] Other online net neutrality activists immediately jumped on the story to criticize both Cox for their alleged actions and lawmakers for failing to protect net neutrality. [24] Senator Wyden, a sponsor of net neutrality legislation, [25] went even further. He penned a Wall Street Journal editorial on net neutrality, and cited Cox as an example of why legislation was necessary. [26] He claimed, as bloggers had, that Cox was blocking access to Craigslist to boost its own classified advertising business. [27] Cox had not blocked Craigslist, though, and quickly announced the real reason for the inaccessibility: a technical glitch in the way Craigslist served data from its Web site coupled with a bug in third-party security software distributed by Cox to its customers. [28] The Cox/Craigslist incident was one of several protests over allegedly discriminatory behavior in 2006. [29] Unwanted regulatory attention aside, even the hint of inaccessibility or overly restricted access creates a firestorm of negative publicity today. As it did with CIX and threatened to do with Cox, the market would correct or bypass any discriminatory practice. Faced with an inability to deliver content to customers, major content providers would seek alternate delivery avenues.

The failure of vertical foreclosure theory online

Commentators including Daniel Rubinfeld and Hal Singer [30] and, more recently, Dr. Barbara van Schewick [31] have suggested that—despite the experiences of CIX, AOL, and Cox—broadband providers could exert vertical pressure on content providers. Under this vertical foreclosure theory, Cox would theoretically use its monopoly power to force Craigslist, Google, eBay, or other similar content aggregation providers out of the market in favor of Cox-provided services. While broadband providers have launched limited services into content aggregation markets, their efforts have met with high inherent barriers to entry. [32] In February 2007, end users conducted nearly seven billion searches on the Internet, nearly half with market-leader Google. [33] The current search engine industry leaders—Google, Yahoo!, Microsoft (MSN.com), and IAC/Interactive's Ask.com—dominate the market with 91.7% of all searches in comScore's qSearch rankings. [34]

Despite significant evidence that vertical foreclosure has failed to emerge, monopolist theories still find favor among proponents of net neutrality regulation. Dr. van Schewick [35] depends largely on the theory of "internalizing complementary

efficiencies" (ICE), [36] the research of Joseph Farrell and Michael Katz into rent extraction in systems markets [37] and Michael Whinston's economic study of monopolists' ability to exclude competitors from complementary markets through tying. [38] Her synopsis of Farrell and Weiser's theory is sound: "If the presence of independent producers of complementary products generates additional surplus, the monopolist may be able to capture some of that surplus through its pricing of the primary good. In this case, the monopolist will earn greater profits when its rivals are in the market than when they are not. In this case, the monopolist does not wish to steal sales in the secondary market, but takes its profits by charging a higher price for the primary good." [39]

However, Dr. van Schewick's application of this theory is not. While van Schewick purports to apply this and other theories to the Internet, her applications focus entirely on theories of what *could* happen in a monopolist-controlled network rather than what *does* happen on the competitive Internet. [40] Her theory makes two fatal assumptions about the Internet access market that debunk its application. Dennis Carlton's research into monopolists' exclusionary conduct [41] identified two critical elements that van Schewick assumes away. Carlton explained that monopolists could only extract profits from the secondary market if the secondary market is subject to economies of scale. [42] As applied to broadband Internet access providers, van Schewick's theory fails both of Carlton's tests. The failure of AOL's walled garden and the emergence of Google and other search engines illustrates that the secondary market in Internet content is not subject to economies of scale in the traditional sense. Economies of scale (or, more correctly, economies of *demand*) apply to individual market participants as well as the Internet market—access companies, content providers, and consumers—as a whole. The standardization of online contracts to eliminate costly bilateral negotiations, [43] courts' tendencies to give a structural pass on potential intellectual property violations to content and access providers like Google, Netcom, and Network Solutions, [44] and similar phenomena illustrate the broader economies of demand that apply to the entire Internet. The drive to lower search and transaction costs to increase network effects overshadows any particular firm's drive to exploit narrow economies of scale within individual markets.

More importantly, van Schewick's model requires that Internet access providers hold a monopoly in the primary market. Net neutrality proponents often cite the "broadband duopoly" in support of this element of Carlton's exclusionary theory. [45] However, van Schewick, Lessig, and others mistakenly conflate *market* power with *monopoly* power.

Carlton explains the difference by using the example of a monopoly resort owner. [46] Guests at the hypothetical island resort are required to purchase all meals at the resort. As long as the resort holds a monopoly, it fully exploits the secondary meal market. The resort exploits economies of scale by requiring guests to purchase all meals at the resort, rendering any non-resort restaurants unprofitable and forcing them out of the market. [47] The monopoly resort then can exploit island residents who did not demand the primary good (lodging at the resort) but are nonetheless subjected to the monopolist resort owner's control of the supply of meals. [48] However, Carlton's model requires that the firm be a monopolist in the resort market. If the resort did not hold a monopoly, it could not exclude outside restaurants from the market. Guests could simply stay at another resort that did not have the onsite meal requirement. In an island resort "duopoly," resort owners would

hold *some* pricing power but lack the *significant* (i.e. monopoly) power over meal pricing to exclude all restaurants.

The failure of vertical foreclosure to emerge extends beyond the traditional cable and telephone company broadband players and beyond even the access market. Largely blocked by regulatory hurdles from directly entering cable TV markets, Verizon and AT&T have both released IPTV services to compete with entrenched cable TV service. [49] Google has bypassed both cable and DSL technologies to invest in a broadband over power line provider. [50] HughesNet offers satellite broadband. [51] Fixed wireless technologies have gained increasing traction in many urban and rural markets, [52] often aided by government grants in rural areas with limited broadband choices. [53] Manufacturers aid in limiting the power of the traditional cable and DSL providers as well. Cellular chipset maker Qualcomm recently announced a new chipset for their market-leading EV-DO broadband wireless technology that offers 9.6 Mbps speeds, [54] rivaling the fastest of the wired broadband services. Intel, Motorola, and Samsung have backed the new WiMAX wireless standard, leading to Sprint's 2006 announcement of its impending deployment of a new nationwide network based on WiMAX. [55]

The recent decline in cable and DSL provider market share [56] strongly suggests that this purported duopoly lacks the monopolist's ability to exclude rivals. While broadband providers undoubtedly have some market power to set prices, evidence shows that the market exhibits significant innovative flexibility and pricing power falls well short of a monopoly. Even a purely price-based analysis supports the conclusion that broadband providers lack the prerequisite monopoly pricing power. The price of DSL service from Verizon has decreased from \$49.95 per month for a 768 Kbps download ADSL service in 2001 (plus the cost of a modem rental) [57] to just \$14.99 per month (with a free modem) for the same 768 Kbps connection in 2007. [58] AT&T cable broadband pricing has fallen from \$45.95 in 2001 [59] to as little as \$33 per month in 2007 with AT&T successor Comcast. [60] The price of cable modem service in 2007, priced per Mbps based on the bandwidth offered to customers, has declined to less than 25 percent of 2002 levels. [61]

While today's dominant content providers depend on broadband providers for content delivery to customers, broadband providers could not survive without content from Google, eBay, or Yahoo driving demand for broadband service. Companies like Cox and Verizon have far less market power and influence today than CIX or other early commercial providers did. Markets have adequately addressed, and will continue to address, harmful provider actions and will continue to develop innovative service offerings, provided regulators do not squelch market responses with onerous regulation.

3. WHY DOING NOTHING NOW, OR ACTING POST-HARM, COULD FAIL

A simple hypothetical illustrates the difficulty that legislators would face applying net neutrality regulations. Any regulatory regime would need to separate actual discrimination that harms the market from inevitable transient performance issues that users encounter online daily. Assume that regulators discover that Sinister Cable's customers can no longer access Internet television service from NetTube, a popular upstart content provider, due to excessive jitter. [62] Among partisan regulatory commission members, [63] two theories emerge. One side believes that Sinister Cable has configured software on

their set-top boxes to inject network delay with the goal of derailing NetTube's service in favor of its own. If true, Sinister Cable's actions would violate the net neutrality regulations and cause a concrete harm in the market.

Other regulators argue that Sinister Cable is not behind the problems for NetTube subscribers. They point to evidence that Sinister Cable's service configurations are nondiscriminatory, and that a bug in third party software licensed by Sinister Cable caused unforeseen problems with NetTube's unique IP television protocol. Sinister Cable, in fact, has worked for months with the third party and posted software patches long before any of its customers complained to regulators. The company and some of its cable provider brethren also present the agency with a wealth of peer-reviewed scientific evidence showing that, while its shared cable architecture offers higher speeds, it suffers from more variability in packet delivery as a result. With the software problem fixed, the jitter problems appear to dissipate enough for the NetTube service to function. These regulators argue that net neutrality and concrete harm regulations should not hold Sinister Cable liable for software bugs and architecture limitations beyond its control.

The debate quickly devolves into a political power struggle, a non-neutral outcome that could result in significant concrete harm of its own. Worse yet for policy makers, Sinister Cable's motives remain private. While the company might not have taken any deliberate or obvious steps to create the problem, it did not fret over NetTube's service problems. The company took several months to release a patch, and then did so without fanfare, leaving NetTube customers without service until media attention revealed the patch's existence. Sinister Cable could return to quietly managing its cable network so that jitter remains a problem.

Astute readers will recognize that this situation closely mirrors the Cox/Craigslist situation described earlier. [64] Craigslist configured their servers in a non-standard way, exploiting a third party's software bug. Cox released a full patch months after its third party provider found the bug, [65] and Cox customers have not reported similar problems. For its part, Cox denied that it had ever considered interfering with Craigslist, just as Comcast claimed that its selective edit of a Nightline broadcast was an encoding error by ABC. [66] A network provider that wants to cause network disruptions to gain an advantage over competitors can easily do so and present plausible reasons for its decisions. Laws and regulations cannot act as divining rods, locating the true intentions of an Internet service or content provider.

On the other hand, providers who choose an entirely "neutral" policy and perform no service differentiation could easily violate net neutrality regulations. For example, a company with no policy could degrade VoIP by allowing that traffic to intermingle with other data. VoIP packets are typically small (often 64 bytes) to minimize the effects of any potential data loss on a conversation. Web or e-mail servers typically optimize for efficiency and break data down into the largest packet size possible (often between 1400 and 1500 bytes). In a network that does nothing to differentiate between VoIP streams and other packets, the 64-byte packets could be queued for transmission behind larger 1500-byte packets. On slow or congested networks, the delay caused by the time to transmit larger 1500-byte packets introduces jitter. [67] The delays caused by commingling data would have a similar effect on VoIP as a purposely-induced transmission delay. To regulators, Sinister Cable and the "neutral policy" provider would look the same.

In some cases, such as the FCC's decision to sanction Madison River Communications for openly blocking VoIP, [68] regulators would easily discern anticompetitive strategies and weak technical justifications. Hard cases, such as the Cox/Craigslist issue and the hypothetical situations posed above, would result in arbitrary—and possibly incorrect—decisions. Regulators would struggle to distinguish between Cox Communications, who had no intention of discriminating but implemented a software update that nonetheless caused discrimination, and “Sinister Cable,” who might falsely claim that it follows nondiscriminatory practices, but in fact seeks out reasons to discriminate.

Improving market response to service differentiation by informing end users

Law and economics theory traditionally found a market failure in one of several general situations, including “when [market] players do not have symmetric and full information relevant to their market activities.” [69] Most famously, then-FCC Chairman Michael Powell labeled this information disclosure requirement as the fourth “Internet Freedom” to which consumers are entitled. [70] Two years earlier, state regulators had identified the same need for accurate and complete consumer information about Internet services. The National Association of Regulatory Utility Commissioners (NARUC), which represents state regulatory agencies and officials, adopted a Resolution Regarding Citizen Access to Internet Content at their November 2002 meeting. [71] The resolution recognized the possibility that “some providers of broadband service or facilities may have an incentive to restrict Internet access to favored news sources, and if they chose to do so, it could significantly harm free and open information exchange in the marketplace of ideas.” [72] Therefore, NARUC resolved, in part, that broadband users should “[r]eceive meaningful information regarding the technical limitations of their broadband service.” [73]

The same year, Internet standards makers also recognized the importance of meaningful information. RFC 3260, [74] released in April 2002, clarified several terms in the original Differentiated Services RFC. Specifically, the RFC noted the importance and function of the Traffic Conditioning Agreement (TCA). “A TCA is ‘an agreement specifying classifier rules and any corresponding traffic profiles and metering, marking, discarding and/or shaping rules which are to apply’” [75] The RFC drafters separated the TCA from other concepts, since the term “implied considerations that were of a pricing, contractual, or other business nature, as well as those that were strictly technical.” [76]

The TCA concept, if adopted by regulators, would both avoid onerous government regulation and address the concerns of net neutrality advocates that providers could act discriminatorily. [77] Throughout Internet history—squabbles with CIX, the rise of spam filters and antivirus software, complaints about discriminatory actions by providers, and even the net neutrality debate's prominence—users have held the greatest sway over the market. While innovators and entrepreneurs have shaped tastes, users have governed officially and unofficially. Providing detailed information to users about traffic policies that could affect Internet service on their connections would ensure that the balance of power remained on the side of consumers.

Regulators or legislators could model a “Traffic Control Disclosure Act” (TCDA) on the Fair Credit and Charge Card Disclosure Act. [78] That Act emphasizes a “more detailed and

uniform disclosure . . . with respect to information.” [79] A proposed TCDA would strive to provide detailed information about provider practices. Internet service providers and content providers alike would disclose, in a reasonably consistent manner, certain specifics of their service offerings and traffic control policies in a uniform table. If designed to provide relevant information, this disclosure would help consumers more easily compare different service offerings. Given the vociferous and vocal opposition to the most egregious differentiation policies, public disclosures would likely discourage all but a few standard classes of service differentiation.

With public comment and regulatory oversight, the disclosure table can evolve as advancements in technology dictate and consumer tastes change. For example, the proliferation of unsolicited commercial e-mail (spam) has led providers to block external access to the ports used by mail servers, [80] a type of filtering developers of the mail protocols likely did not see necessary years ago. A TCDA must accomplish three primary goals:

Notice: The Fair Credit Act provisions provide sensible guidelines for the TCDA framework. Any content or Internet service provider must post their disclosure conspicuously and prominently on their Web site. Any solicitations by Internet service providers for dial-up or broadband access, or by content providers for pay services, must include the data in a tabular format determined by regulators. [81] In any telephone or in-person solicitations for Internet service “the person making the solicitation shall orally disclose the information described” in the table. [82] Any provider offering a service for pay must notify customers of any changes to the policy.

Choice: The TCDA must inform consumers of the choices available to discontinue service penalty-free after a short trial period. The provider must also notify customers of their rights to reject any changes in network policy changes and cancel penalty-free, regardless of contract duration or prepayment.

Education: TCDA disclosure gives consumers the ability to obtain easily understandable and accurate information about traffic control policies, applications, and technology advancements. Companies that implement service differentiation schemes will have an opportunity to explain the benefits of the technologies to consumers. The regulatory oversight agency can act as a forum for information and education about technologies and consumer options. In addition, regulators can address any market failures to disclose and maintain policies accurately and clearly.

Unlike laissez-faire approaches that attempt to react ex post to market failures, or cumbersome regulations that try to read institutional minds or dictate network policies, a TCDA would embrace openness and transparency. A disclosure regime would compel providers to make public their service differentiation policies and practices. Individuals do not have a right to neutrality, but to the knowledge of how service differentiation policies could affect the services they purchase from Internet service or content providers.

As last mile networks change, the TCDA would encourage niches could to organize vertically. A gaming provider may offer consumers a wireless connection built for maximum performance with every major online gaming network, but otherwise offering degraded performance for other applications or content providers. A TCDA would give consumers clear, concise information about that vertical integration, and the choices they necessarily make when selecting one service over

another. Net neutrality regulations banning service differentiation would ban this type of vertical innovation.

The role of watchdog regulators

Informed end users, even empowered Internet users, still need watchdog regulators in the future. Informed users generally cannot act to benefit their future selves. Users will rarely consider the collective, long-term consequences of their individual market actions. Similarly, informed end users cannot account for externalities. For example, imagine a world in which everyone uses the Internet to access the Daily Show. A bias in favor of delivering Comedy Central's content could be a market success. Informed end users would get differentiated Internet services geared toward delivering John Stewart to the desktop. In that sense, end users would get what they want.

Once the economies of demand push the market to introduce this Daily Show bias, how does this affect users in the future after John Stewart loses his comedic edge? What happens to the venture capitalists who want to start up a new Daily Show competitor, but fear they will not get quality access to Internet consumers? The social benefit of innovation could arguably morph into a costly externality. Net neutrality proponents' worst fears could come true.

Vertical foreclosure theory is sound, its application to the Internet access and content markets is not . . . for now. The non-neutral Internet of 2007 features empowered consumers, an uninterrupted history of failures by companies to establish monopoly power or achieve vertical foreclosure, and the ever-widening deployment of broadband technologies. However, the rapid pace of innovation and change in the Internet access and content markets could create an entirely new landscape in short order. The next Internet protocol or hot "killer app," could rewrite the rules, reinvigorating the regulation discussion. A largely regulatory-free, non-neutral Internet will always need regulators and commentators to watch for warning signs of potentially harmful market power. [83]

CONCLUSION

The largely academic NSFnet did not evolve into the commercial Internet because of neutrality or nondiscrimination. Entrepreneurs, scientists, academics, and a wave of consumer demand beginning with early technology adopters drove network expansion and the proliferation of broadband technologies—while discriminating and prioritizing from the earliest days and within the most basic technologies. Both the Internet's history and solid economic evidence suggest that this innovative culture will continue unabated, if regulators resist the urge to tinker. The Internet's content and service suppliers have developed numerous new technologies and industry sectors over the past 20 years. Innovation has often been required, and customers have increasingly demanded, non-neutrality, tiered access, and other service differentiation. Net neutrality regulation, in the direct form of neutrality mandates or through indirect ex post enforcement, will discourage innovators and strip consumers of their power to shape service offerings.

From the Internet's earliest days, consumers have efficiently balanced providers' levels of service differentiation to foster continued innovation without the heavy hand of regulation. Regulators should create incentives for consumers to continue to govern. Government enforcement, therefore, should focus on disclosure of provider practices. This paper presents the framework for a simple, clear, uniform disclosure modeled on existing law that can address net neutrality proponents'

concerns without jeopardizing regulators' agnosticism for the market's direction.

Tomorrow's networks will need a combination of simplicity and complexity, openness and differentiation. As they have since the invention of TCP/IP, networks will also need end users to strike the proper balance between that openness and differentiation. By acting to eliminate imperfect information, government regulators can foster an even more robust market governed by well-informed consumers.

[+] The author wishes to thank Professors Joshua Fairfield and Kevin Collins at Indiana—Bloomington who provided invaluable input and suggestions on earlier drafts and research. Special thanks to J.C. Utter, Scott Yoder, and Jeff Broadwick at ImageStream for their support and encouragement. All errors and oversights are solely attributable to the author.

[1] See Lawrence Lessig, *The Architecture of Innovation*, 51 DUKE L.J. 1783, 1789 (2002).

[2] See Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. TELECOMM. & HIGH TECH. L. 329 (2007); see also *infra* note 40 (detailing van Schewick's use of theoretical markets, rather than Internet markets, to test monopoly theories).

[3] See Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847 (2006).

[4] van Schewick, *supra* note 2.

[5] E.g., Yoo, *supra* note 3, at 1855-56.

[6] Postings of Dennis Brumm et al. to ba.internet (May 4, 1997), available at

http://groups.google.com/group/ba.internet/browse_thread/thread/99c7a3a80b74d0de/.

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[9] CIX, About the Commercial Internet eXchange, <http://web.archive.org/web/19970413033334/cix.org/CIXInfo/about-cix.html>. Without reading this section further, readers can deduce from this citation's URL the result of CIX's routing policy decision. The only available link to this information about CIX comes from archive.org, a non-profit archive of historical Web pages and other digital collections, and not a current CIX site.

[10] COOK Network Consultants, *CIX On Again Off Again Filtering: What's at Stake?*, THE COOK REPORT, Dec. 1994, at 4, available at <http://cookreport.com/backissues/dec4newsletter.pdf>.

[11] Posting of Gene Hastings to North American Network Operators Group (NANOG) Mailing List (Nov. 2, 1994, 12:15:35 EST), available at <http://merit.edu/mail.archives/nanog/1994-11/msg00020.html>; Ellen Messmer, *IP Service Providers Face Traffic Shutdown*, NETWORK WORLD, Aug. 22, 1994, at 5.

[12] Postings of Rich Braun et al., to ne.org.neci.general (Nov. 1, 1994), available at http://groups.google.com/group/ne.org.neci.general/browse_thread/thread/f02eec7dd620501b/.

[13] COOK Network Consultants, *supra* note 7, at 7.

- [14] *See Management of NSF Network Hearing Before the H. Subcomm. on Sci. of the H. Comm. On Sci., Space, & Tech.*, 102nd Cong. (testimony of Mitchell Kapor, Pres. of Electronic Frontier Foundation and Chairman of CIX).
- [15] COOK Network Consultants, *supra* note 10, at 4.
- [16] Kenneth Cukier, *CIX Unfazed as ISPs Shun its Router*, COMMUNIC'NS WEEK INT'L (March 10, 1997).
- [17] E-mail from Farooq Hussain, CIX, to Randy S. Whitney, UUNET (Jan. 11, 2002, 09:36:02 EST), available at <http://www.farooqhussain.org/projects/Shutdown%20email.pdf>.
- [18] ANTON WAHLMAN & BRIAN COYNE, EQUITY RESEARCH NOTE: THE DUMB PIPE IS THE ONLY MONEY PIPE 5 (Needham & Co. Inc., 2003), available at http://www.vonage.com/media/pdf/res_12_15_03.pdf.
- [19] Brett Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 971-72 (2005).
- [20] JEFFREY H. ROHLFS, BANDWAGON EFFECTS IN HIGH-TECHNOLOGY INDUSTRIES 30-31 (2001).
- [21] As Professor Yoo explains, net neutrality proponents tend to overlook portions of this theory. Yoo, *supra* note 3, at 1891.
- [22] Anick Jesdanun, *AOL Shifts Strategy with Free Offerings*, ASSOCIATED PRESS, Aug. 2, 2006, available at <http://abcnews.go.com/Technology/wireStory?id=2264677>.
- [23] Posting of Tom Foremski to SiliconValleyWatcher, http://www.siliconvalleywatcher.com/mt/archives/2006/06/craigslist_is_b.php (Jun. 6, 2006). Foremski originally claimed that Cox was using a purposefully configured "blacklist" to block access to Craigslist, a statement he later retracted.
- [24] *E.g.*, Posting of Matt Stoller to MyDD, <http://www.mydd.com/story/2006/6/14/214831/479> (Jun. 14, 2006, 09:48:31 EST); Save the Internet.com, <http://www.savetheinternet.com/blog/2006/06/14/discrimination-in-disguise/> (Jun. 14, 2006, 23:07 EST).
- [25] Wyden, *supra* note 8.
- [26] Sen. Ron Wyden, Editorial, *Why We Must Protect Internet Neutrality*, WALL ST. J., Jun. 17, 2006, at A11.
- [27] *Id.*
- [28] *See* Posting of Richard Bennett to The Navel of the Internet, <http://bennett.com/blog/index.php/archives/2006/06/17/know-nothing-claims-about-site-blocking/> (Jun. 17, 2006, 22:20 EST).
- [29] *E.g.*, Mark Hachman, *BellSouth Says It's Not Blocking MySpace*, PC MAGAZINE, Jun. 2, 2006, <http://www.pcmag.com/article2/0,1895,1971082,00.asp>; Caroline McCarthy, *Did Comcast Really Sensor the 'Sleepy Repairman' Video from 'Nightline'?*, CNET NEWS, Jul. 18, 2006, http://news.com.com/2061-10802_3-6095431.html.
- [30] *See* Daniel L. Rubinfeld & Hal J. Singer, *Vertical Foreclosure in Broadband Access*, 49 J. INDUS. ECON. 299 (2001).
- [31] *See* van Schewick, *supra* note 2. Dr. van Schewick cites Rubinfeld and Singer's vertical foreclosure theory with approval throughout her article. *E.g.*, *id.* at 335 n.13.
- [32] *The Un-Google*, ECONOMIST, Jun. 17, 2006, at 65.
- [33] Press Release, comScore, comScore Releases February U.S. Search Engine Rankings, (Mar. 21, 2007), available at <http://www.comscore.com/press/release.asp?press=1255>.
- [34] *Id.*
- [35] van Schewick, *supra* note 2 at 335, 342.
- [36] Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85, 114 (2003).
- [37] Joseph Farrell & Michael L. Katz, *Innovation, Rent Extraction, and Integration in Systems Markets*, 48 J. INDUS. ECON. 413 (2000).
- [38] Michael D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837, 840, 850-52, 855 (1990).
- [39] van Schewick, *supra* note 2 at 345 (citing Farrell & Weiser, *supra* note 36).
- [40] *See, e.g.*, van Schewick, *supra* note 2, at 345 (under the heading "Application to the Internet," discussing the "the hypothetical [monopolist-controlled] network that is the focus of this analysis" rather than the Internet); *id.* at 346 (under the heading "Application to the Internet," discussing a hypothetical local telephone company and its revenue sources); *id.* at 359 (under the heading "Application to the Internet," discussing situations under which providers "may be able to force" rivals from the market and citing hypothetical examples); *id.* 360 (under the heading "Application to the Internet," suggesting "conditions underlying this theory may well be present in the Internet context" and that monopolists, if they exist, "may be able to drive [their] rivals" from the market, but citing no evidence of this actually occurring).
- [41] *See, e.g.*, Dennis W. Carlton, *A General Analysis of Exclusionary Conduct and Refusal to Deal—Why Aspen and Kodak are Misguided*, 68 ANTITRUST L.J. 659, 664-65 (2001).
- [42] Carlton, *supra* note 41 at 664-68. Carlton also adds a third element that does not affect the analysis here.
- [43] For example, users do not negotiate the terms of use for every Web site they visit online. These online contracts of adhesion are preferable to the exceedingly high transaction costs associated with individually negotiating each contract term.
- [44] The "structural pass" refers to the unwritten rule that modern courts tend to give great latitude to Internet content and access providers to ensure the continued functionality and structure of the Web and the Internet. *See, e.g.*, Gov't. Empls. Ins. Co. v. Google, Inc., 77 U.S.P.Q.2d (BNA) 1841 (E.D. Va. 2005); Religious Tech. Ctr. v. Netcom On-Line Comm'n. Servs., 907 F. Supp. 1361 (N.D. Cal. 1995); Lockheed Martin Corp. v. Network Solutions, Inc., 141 F. Supp. 2d 648 (N.D. Tex. 2001); Lockheed Martin Corp. v. Network Solutions, Inc., 194 F.3d 980 (9th Cir. 1999).
- [45] *E.g.*, H.R. 5273, 109th Cong. § 2.8 (2006).
- [46] Carlton, *Exclusionary Conduct*, *supra* note 41 at 667-68.
- [47] *Id.*
- [48] *Id.*
- [49] Marguerite Reardon, *Verizon's TV Dreams*, CNET NEWS, Oct. 13, 2005, http://news.com.com/2100-1034_3-5894645.html; Marguerite Reardon, *Laying a New Path to Your TV*, CNET NEWS, Dec. 28, 2006, http://news.com.com/2100-1034_3-6146207.html.
- [50] Dawn Kawamoto, *Google Invests in Power-Line Broadband*, CNET NEWS, Jul. 7, 2005, available at http://news.zdnet.com/2100-1035_22-5777917.html.
- [51] HughesNet Services, <http://www.hughesnet.com/> (last visited Apr. 15, 2007).
- [52] FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF JUNE 30, 2006 (2007), at tbl. 1 available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270128A1.pdf [hereinafter *FCC High-Speed Services*]. Fixed wireless providers reported a 72.97 percent increase in subscribers from June 2005 to June 2006. The FCC report notes

that many “[s]mall providers of high-speed connections . . . serve rural areas with relatively small populations.” *Id.* at 2.

[53] The USDA’s Rural Utilities Service program has funded numerous fixed wireless deployments in markets underserved or unserved by incumbent cable and DSL providers. *See, e.g.*, USDA Rural Utilities Service, <http://www.usda.gov/rus/> (announcing recent grants and loans); Press Release, Wireless Communications Association, Closing the Gap on the Digital Divide (Sept. 2003), *available at* https://secure.wcai.com/pdf/2003/rural_mtvernonnetSept.pdf (announcing USDA Rural Utilities Service grant to Mt. Vernon Net, a rural Illinois Internet provider).

[54] Press Release, Qualcomm, Qualcomm Demonstrates Significant EV-DO Milestones with High-Capacity VoIP Over Rev. A and High-Speed Data Over Rev. B, *available at* http://www.qualcomm.com/press/releases/2007/070323_demonstrates_significant_ev_print.html.

[55] Press Release, Sprint Nextel, Sprint Nextel Announces 4G Wireless Broadband Initiative with Intel, Motorola and Samsung (Aug. 8, 2006), *available at* http://www2.sprint.com/mr/news_dtl.do?id=12960.

[56] *FCC High-Speed Services*, *supra* note 52 at tbl. 1, 3. Cable modem market share fell from 63.2 percent in 2003 to just 44.13 percent of all high-speed lines in 2006. DSL providers, roughly flat as a percentage of residential subscribers, *id.* at tbl. 3, slid from 38.45 percent overall in June 2005 to 34.94 percent in June 2006. *Id.* at tbl. 1. The big winners appear to be mobile wireless providers. These providers have blossomed from a 0.89 percent share in June 2005 to 17.05 percent in June 2006. *Id.*

[57] Tom Spring, Verizon Joins Broadband Price Hike Parade, *PC WORLD*, May 2, 2001, <http://www.pcworld.com/resource/article/0,aid,48945,00.asp..>

[58] Verizon, Verizon High Speed Internet Plans, <http://www22.verizon.com/content/consumerdsl/plans/all+plans/all+plans.htm> (last visited Apr. 16, 2007).

[59] Spring, *supra* note 58.

[60] Comcast, The Comcast Triple Play, <http://www.comcast.com/tripleplay-s/> (last visited Apr. 16, 2007). Comcast offers the \$33 per month package for customers ordering a voice, video, and data package. *Id.* Comcast also offers a package at the same price for the first year for data-only subscribers who subscribe online. ComcastOffers.com, <http://www.comcastoffers.com/> (last visited Apr. 12, 2007).

[61] The standard rate for Comcast service is \$42.95 per month for 6 Mbps, or \$7.16 per Mbps. Comcast, Help – FAQ, <http://www.comcast.net/help/faq/index.jsp?faq=Connection118073> (detailing the speed/price packages available for customers). AT&T Broadband limited its customers to 1.5 Mbps for \$45.95—nearly \$31 per Mbps. Larry Dignan, *AT&T Broadband Opts for Tiered Pricing*, *CNET NEWS*, Aug. 1, 2002, <http://news.com.com/2100-1033-947559.html>.

[62] In lay terms, jitter simply refers to the gaps in delivery times between data packets. Services such as IP voice and video are sensitive to delays between packet deliveries. Repeated half-second pauses in packet delivery, for example, would render video streams unwatchable. Excessive jitter would be akin to having a conversation with someone who stopped talking for a few seconds after every third or fourth word.

[63] Unfortunately, partisan wrangling often is not hypothetical, another danger in leaving regulation of the nebulous Utopian concept of “net neutrality” to the political capriciousness of Congress or the FCC.

[64] *See supra* notes 23-28.

[65] The original fix was a beta patch. The full release came out several months later. *See* Foremski, *supra* note 23.

[66] McCarthy, *supra* note 29.

[67] In non-technical terms, an undifferentiated broadband network is a crowded highway tollbooth. Your car has an automated toll payment transceiver, so you can clear the booth without slowing down. Unfortunately, you are sandwiched among several large tractor-trailers that must stop at the booth, pay cash, and make change. Even though the interstate system is completely neutral, the nature of the traffic on the road nonetheless affects your ability to avoid travel delays (“jitter”).

[68] *In re* Madison River Comm., LLC, 20 F.C.C.R. 4295 (2005).

[69] Niva Elkin-Koren & Eli M. Salzberger, *Law and Economics in Cyberspace*, 19 *INT’L REV. OF L. & ECON.* 553, 555 (1999).

[70] Michael K. Powell, *Preserving Internet Freedom: Guiding Principles for the Industry*, 3 *J. TELECOMM. & HIGH TECH. L.* 5, 12 (2004).

[71] NAT’L ASS’N OF REG. UTIL. COMM’RS, RESOLUTION REGARDING CITIZEN ACCESS TO INTERNET CONTENT (2002), *available at* http://www.naruc.org/associations/1773/files/citizen_access.pdf.

[72] *Id.*

[73] *Id.*

[74] Dan Grossman, IETF Network Working Group, RFC 3260: New Terminology and Clarifications for Diffserv (2002) [hereinafter RFC 3260], *available at* <http://www.ietf.org/rfc/rfc3260.txt>.

[75] RFC 3260, *supra* note 74.

[76] *Id.*

[77] Although he has never developed the concept, Professor Wu has signaled his agreement with the idea of increased disclosure. *E.g.*, Posting of Tim Wu, to Public Knowledge, <http://www.publicknowledge.org/node/494> (Jun. 28, 2006, 11:38 EST).

[78] Fair Credit and Charge Card Disclosure Act, Pub. L. No. 100-583, 102 Stat. 2960 (1988) (codified at 15 U.S.C. §§ 1610, 1637, 1640 (2000)) [hereinafter Fair Credit Act]; *see also* 12 C.F.R. § 226.5a (disclosures for credit and charge card applications and solicitations).

[79] Fair Credit Act, at Preamble.

[80] *E.g.*, Declan McCullagh, *Feds to Fight the Zombies*, *CNET NEWS*, http://news.com.com/2010-1071_3-5715633.html; Cox’s War Against Spam, <http://www.cox.com/sandiego/highspeedinternet/spamfaq.asp>, (last visited Apr. 15, 2007).

[81] *See* Fair Credit Act § 2(a) (amending 15 U.S.C. 1637 § 127(c)(1)(A)).

[82] *Id.* (amending § 127(c)(2)(A)).

[83] An example of the functioning early warning system is the scrutiny of Google’s 2007 purchase of DoubleClick and the wave of consolidation in the Internet advertising market that Google’s announcement of the deal touched off. The FTC has announced an investigation, and major advertising industry associations have urged a “careful, wide-ranging, and comprehensive perspective” in evaluating the deals. Abbey Klaassen & Ira Teinowitz, *4A’s, ANA Weigh in on Google-DoubleClick, Online Ad Deals*, *ADVERTISING AGE*, May 31, 2007, http://adage.com/digital/article?article_id=116994. *See also* Abbey Klaassen, *String of Digital Deals Leaves Ad World Baffled*, *ADVERTISING AGE*, Jun. 4, 2007, http://adage.com/digital/article?article_id=117073.