Network Neutrality or Bias?--Handicapping the Odds for a Tiered and Branded Internet

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Converging technologies and markets pose major challenges to incumbent telecommunications [1] companies and national regulatory authorities ("NRAs"). Packet switched networking can provide a single, but versatile medium for the delivery of many information, communications and entertainment ("ICE") services. Most NRAs have only begun to revamp the nature and type of regulation in light of changed circumstances. Generally NRAs have streamlined telecommunications service regulation in light of actual or prospective competition. These regulators have refrained from subjecting Internet-carried, information services [2] to significant government oversight.

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[1] Telecommunications is defined as "the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received." 47 U.S.C. § 153(43). Telecommunications service means "the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used." 47 U.S.C. § 153(46). The Communications Act defines telecommunications carrier as "any provider of telecommunications services, except that such term does not include aggregators of telecommunications services (as defined in section 226). A telecommunications carrier shall be treated as a common carrier under this Act only to the extent that it is engaged in providing telecommunications services, except that the Commission shall determine whether the provision of fixed and mobile satellite service shall be treated as common carriage." 47 U.S.C. § 153(44).

[2] Information service is defined as "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service." 47 U.S.C. § 153(20). "[T]he language and legislative history of [the Communications Act of 1996] indicate that the drafters . . . regarded

Core telecommunications service revenue streams, such as that provided by basic wireline telephone services, have declined [3] as increasing numbers of subscribers migrate to new options provided by wireless carriers, [4] cable [5] television companies and Voice over the Internet Protocol ("VoIP") ventures. [6] Understandably incumbent carriers have undertaken a major

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telecommunications services and information services as mutually exclusive categories." Federal-State Joint Board on Universal Service, Report to Congress, 13 FCC Rcd. 11501, 11522 (1998); *see also* Vonage Holdings Corp., 290 F. Supp.2d at 994, 1000 (applying the FCC's dichotomy).

[3] The FCC reports that in 2004 local exchange telecommunications revenues in the United States declined to $85.92 billion from $86.474 billion in the preceding year with toll services declining from $58.983 to $50.557 billion in the same period. Federal Communications Commission, Industry Analysis and Technology Division, Wireline Competition Bureau, *Trends in Telephone Service*, Table 15.1 Telecommunications Industry Revenues, 15-3 (2005);available at: http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/trend605.pdf.

[4] The FCC reports that in 2004 local wireless revenues increased from $85.254 billion to $95.503 billion in the previous year. *Id*.

[5] Cable service is defined as: (A) the one-way transmission to subscribers of (i) video programming, or (ii) other programming service, and (B) subscriber interaction, if any, which is required for the selection or use of such video programming or other programming service. 47 U.S.C. § 522(6).

[6] Voice over the Internet Protocol ("VoIP") refers to the use of the Internet to carry and deliver on a real time, immediate basis packets of data that correspond to a voice conversation. VoIP services range in quality, reliability and price and can link both computers and ordinary telephone handsets. For technical background on how VoIP works *see* Intel, White Paper, *IP Telephony Basics*, available at http://www.intel.com/network/csp/resources/white_papers/4070web.htm; Susan Spradley and Alan Stoddard, Tutorial on Technical Challenges Associated with the Evolution to VoIP, Power Point Presentation, available at: http://www.fcc.gov/oet/tutorial/9-22-03_voip-final_slides_only.ppt. *See also*, R. Alex DuFour, *Voice Over Internet Protocol: Ending Uncertainty and Promoting Innovation Through a Regulatory Framework*, 13 COMLCON 471 (2005); Stephen E. Blythe, *The Regulation of Voice-Over-Internet-Protocol in the United States, the European Union, and the United Kingdom*, 5 J. High Tech. L. 161(2005).

In a short span of time VoIP has evolved from a low quality hobby of computer enthusiasts, who used the Internet as a medium to provide voice communications between computers, to a near equivalent to conventional dial up telephone service. VoIP provides

campaign seeking regulatory relief that would remove real or perceived disincentives for new investment in replacement lines of business [7] and to establish parity with unregulated ventures that offer competitive services. [8]

In light of the financial stakes involved in the scope of regulation applied to conventional,

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consumers with access to lower cost services, because of technological efficiency in the use of the Internet's packet switched architecture and reduced regulation imposed costs. Some VoIP service providers can avoid paying access charges to local exchange carriers and making USF contributions. *See* Petition for Declaratory Ruling that pulver.com's Free World Dialup is Neither Telecommunications Nor a Telecommunications Service, Docket No. 03-45, Memorandum Opinion and Order, 19 FCC Rcd 3307 (2004).

[7] The International Telecommunication Union reported that as of January 1, 2005 the United States ranked 16th in broadband penetration measured in terms of number of subscribers per 100 inhabitants. *See* International Telecommunications Union, ITU Strategy and Policy Unit Newsblog; available at: http://www.itu.int/osg/spu/newslog/ITUs+New+Broadband+Statistics+For+1+January+2005.aspx. *See* Rob Frieden, *Lessons From Broadband Development in Canada, Japan, Korea and the United States*, 29 TELECOM POL'Y., No. 8, 595-613 (Sept. 2005).

Regulatory uncertainty and the overlay of existing telecommunications regulation may have created disincentives for incumbent carriers to invest in broadband plant. On the other hand, regardless of a real or perceived regulatory burden, incumbent carriers probably can no longer rely on wireline services as the primary source of revenue.

[8] "The existing regulatory framework was built around the concept that different services were provided by different providers, without overlap. Thus, telephone companies providing telephone service are regulated as common carriers under Title II of the Communications Act of 1934 . . .. But, to the extent that [other] wireline networks can deliver the same services to the consumer at the same quality, it is difficult to understand why different technologies should trigger different regulatory treatment for the same services." Antonia M. Apps & Thomas M. Dailey, *Non-Regulation of Advanced Internet Services*, 8 GEO. MASON L. REV. 681, 682-683 (Summer 2000); *see also*, Rob Frieden, *The FCC's Name Game: How Shifting Regulatory Classifications Affect Competition*, 19 BERKLEY TECH. L. J., No. 4, 1275-1314 (Fall, 2004); Rob Frieden, Regulatory Arbitrage Strategies and Tactics in Telecommunications, 5 N.C. J. L.& TECH., No. 2, 227-275 (2004); available at: http://www.jolt.unc.edu/Vol5_I2/pdf/Frieden%20v5i2.pdf. Rob Frieden, *Adjusting the Horizontal and Vertical in Telecommunications Regulation: A Comparison of the Traditional and a New Layered Approach*, 55 FED. COMM. L.J., No. 2, 207-250 (March, 2003).

so-called legacy services and new information services, [9] numerous organizations [10] have pursued a public policy agenda supporting deregulation and the eradication of government oversight, including traditional regulatory over pricing, interconnection and quality of service. [11]

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[9] "Initial telecommunications regulatory reform has also been marked by regulatory arbitrage, whereby network carriers would seek to take advantage of inconsistent telecommunications regulations to sustain their businesses. Examples of early regulatory arbitrage include international callback routines designed to take advantage of excessive international accounting rates, and bypass facilities of Competitive Access Providers - competing local exchange carriers, designed to avoid local exchange access charges. Recent examples of regulatory arbitrage include IP telephony services designed to avoid universal service charges, and reciprocal compensation terminating fees for terminating calls to Internet Service Providers, designed to take advantage of the alleged local nature of Internet traffic. Such regulatory arbitraging has been tacitly approved by regulatory authorities, to encourage certain social policy agendas and to avoid political obstacles that have favored existing monopoly network infrastructures." Benjamin Lipschitz, *Opportunities and Challenges in the Digital Era*, 7-FALL MEDIA L. & POL'Y 14, 20 (Fall 1998).

[10] *See, e.g.*, The Progress & Freedom Foundation, *Net Neutrality and Net Neutering in a Post-Brand X World: Self-Regulation, Policy, Principles and Legal Mandates in the Broadband Marketplace*, Release 12.29 (Dec. 2005); available at: http://www.pff.org/issues-pubs/pops/pop12.29netneutrality.pdf; National Cable & Telecommunications Association, *Phone Companies and the Truth: A Bad Connection* (March 14, 2006)(identifying several "astro turf" consumer and academic organizations claiming independence despite serving as paid mouthpieces); available at: http://www.ncta.com/pdf_files/Bells_Misleading_America.pdf.

[11] *See, e.g.*, Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, CC Docket No. 02-33, Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd. 14,853 (2005) available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-150A1.doc (reclassifying DSL from a common carrier provided telecommunications service to a largely unregulated information service). Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Docket Nos. 01-338, 96-98, 98- 147, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978 (2003), corrected by Errata, 18 FCC Rcd 19020 (2003), *partially vacated and sub* nom., United States Telecom Ass'n v. FCC, 359 F.3d 554 (D.C. Cir. 2004) (USTA II), *cert. denied*, 125 S.Ct. 313, Order on Reconsideration, 19 FCC Rcd. 15,856 (2004), Further Reconsideration, 19 FCC Rcd. 20,293 (2004) (Triennial Review FTTC Reconsideration Order). In response to the D.C. Circuit's vacatur of certain Triennial Review Order unbundling rules, the FCC issued an Interim Order and NPRM, setting forth a six-month interim unbundling framework with respect to those network elements, and seeking comment on permanent unbundling rules that would respond to

These groups reject any view that even as telecommunications becomes less regulated, a new concept of "network neutrality" [12] should force largely unregulated Internet Service Providers ("ISPs") to forego the option of offering differentiated and tiered Internet services. Opponents of net neutrality view the concept as jeopardizing operational and pricing flexibility. Net neutrality advocates fervently argue that the Internet cannot achieve maximum contributions to national productivity, economic opportunity and innovation unless government ensures end-to-end connectivity by foreclosing a balkanized, or tiered Internet. [13]

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the USTA II decision. Unbundled Access to Network Elements; Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, WC Docket No. 04-313, CC Docket No. 01-338, Order and Notice of Proposed Rulemaking, 19 FCC Rcd. 16,783 (2004); Order on Remand, 20 FCC Rcd. 2533 (2005).

[12] *See, e.g.*, Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. TELECOM & HIGH TECH L. 141 (2005); available at: http://ssrn.com/abstract=388863; Barbara van Schewick, *Towards and Economic Framework for Economic Neutrality*, paper presented at the 33nd annual Telecommunications Policy Research Conference, Arlington, Va. (2005); available at: http://web.si.umich.edu/tprc/papers/2005/483/van%20Schewick%20Network%20Neutrality%20TPRC%202005.pdf; Mark A. Lemley and Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. Rev. 925 (2001).

[13] *See, e.g.*, United States Senate, Committee on Commerce, Science and Transportation, Prepared Statement of Vinton G. Cerf, Vice President and Chief Internet Evangelist, Google, Inc. available at: http://commerce.senate.gov/hearings/testimony.cfm?id=1705&wit_id=4958. "The Internet's open, neutral architecture has proven to be an enormous engine for market innovation, economic growth, social discourse , and the free flow of ideas. The remarkable success of the Internet can be traced to a few simple network principles—end-to-end design, layered architecture, and open standards—which together give consumers choice and control over their online activities." For background on a revised regulatory regime that applies different degrees of government oversight based on the scope of competition in each layer of service that blends telecommunications packet delivery with intelligent networking , software applications and content *see* Richard S. Whitt, *A Horizontal Leap Forward: Formulating A New Communications Public Policy Framework Based on the Network Layers Model*, 56 FED. COMM. L.J. 587 (May, 2004); Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561 (2000); Scott Marcus, *The Potential Relevance to the United States of the European Union's Newly Adopted Regulatory Framework for Telecommunications*, Federal Communications

In tandem with efforts to shape public policy and public opinion, incumbent carriers have recognized that declining revenue prospects for traditional, core service require changed business plans and strategies. Incumbent telephone companies now see upside financial opportunities in providing broadband Internet access, video services and VoIP singularly and as a bundle of services commonly referred to as the "triple- or quadruple play." [14] Incumbents' responsiveness to consumers' wants, needs and desires and the willingness to embrace change comes across as a refreshing change to the "Bellhead" [15] caricature of a corporate mindset lacking creativity, entrepreneurship and marketing acumen.

Commission, Office of Plans and Policy Working Paper Series No. 36 (July, 2002); available at: http://www.fcc.gov/osp/workingp.html; Douglas Sicker, *Further Defining a Layered Model for Telecommunications Policy* (2002); unpublished paper available at: http://intel.si.umich.edu/tprc/papers/2002/95/LayeredTelecomPolicy.pdf; Kevin Werbach, *A Layers Model for Internet Policy*, 1 J. TELECOM. & HIGH TECH. L., 37 (2002); John T. Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Regulation From the Bottom Up*, 1 J. ON TELECOM. & HIGH TECH. L., 95 (2002); Phillip J. Weiser, *Law and Information Platforms*, J. ON TELECOM. & HIGH TECH. L., 1 (2002); Craig McTaggert, *A Layered Approach to Internet Legal Analysis* (Dec. 21, 2002); available at http://www.innovationlaw.org/cm/ilg2002/reading/layered1.pdf; Robert Cannon, *The Legacy of the Federal Communications Commission's Computer Inquiries*, 55 FED. COMM. L.J. 167 (2003); Rob Frieden, *Adjusting the Horizontal and Vertical in Telecommunications Regulation: A Comparison of the Traditional and a New Layered Approach*, 55 FED. COMM. L.J. 207 (2003).

[14] *See, e.g.*, Matt Richtel, It's Not Enough to Be Just a Phone Company, THE NEW YORK TIMES, , Sec. C, p. 1 (February 19, 2004); available at: http://web.lexis-nexis.com/universe/document?_m=fc005e879bfda64a00009c618b294e7c&_docnum=17&wchp=dGLbVzz-zSkVb&_md5=88b9da3c07b1da868d15202176609ba6.

[15] Bellhead has been defined as a "person involved with telephone networks or someone who thinks about networking from a circuit-switched point of view." PC Magazine Encyclopedia, available at: http://www.pcmag.com/encyclopedia_term/0,2542,t=Bellhead&i=38536,00.asp.

For background on the Bellhead and Nethead orientation *see* Rob Frieden, *Revenge of the Bellheads: How the Netheads Lost Control of the Internet*, 26 TELECOM. POL'Y, No. 6, 125-144 (Sep./Oct. 2002).

However, the Bellhead mindset may not have perished entirely as senior incumbent carrier managers have gone public with provocative statements about net neutrality that represent longstanding management philosophies, operating assumptions and business strategies fashioned when the incumbent carriers primarily provided voice telephony. As well recent double digit billion dollar mergers of incumbent telecommunications firms evidence a keen interest in buying out competition in addition to investing in innovations and new facilities. [16] Notwithstanding substantial technological and market convergence that will force new strategies, the senior managers of AT&T, BellSouth and Verizon have expressed rather rigid traditionalist views on their companies' role in content delivery, and how these companies will price service, interconnect facilities and recover costs.

Even in an environment where data transmission and the Internet increasingly dominate incumbent carrier managers still appear to shape business strategies based on the expectation that they can continue to make major operational and business decisions based on the status quo. When operating networks primarily transmitted, switched and routed voice telephone calls, an incumbent carrier could identify who caused the carrier to incur costs, where traffic originated and terminated and what volume of traffic a subscriber generated, and had responsibility for payment. When an Internet-centric network dominates, carriers have far less ability to track cost causers, particularly because content and conduit converge and a number of different business factors contribute to the generation of traffic, including advertiser added content whose reception by consumers pays for the creation and delivery of desired content.

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[16] Major mergers and acquisitions in the United States telecommunications marketplace include AT&T's acquisition of TCI, one of the nation's largest cable television ventures, Verizon's merger with MCI, SBC's mergers with Pacific Telesis, Ameritech and AT&T and its proposed merger with BellSouth.

Consumers look to Internet access as a seamless collection of telecommunications capability, i.e., high speed bit transport, and access to content. Additionally Internet traffic flows have both bursty and asymmetric characteristics unlike voice telephony. Consumers require broadband connections capable of handling substantial data volumes on an episodic, not continuous basis. The Internet's asymmetrical nature refers to the fact that much of the broadband connectivity consumers require flows downstream from a content source to a consumer. A narrowband, upstream request for content can trigger a wideband download of the content bundled with an additional payload of commercial advertising. Heretofore, Internet traffic routing has not readily satisfied the Bellhead desire to designate particular carriers and routes to meter usage for each and every data session.

Faced with ever increasing bandwidth requirements, incumbent carriers have resurrected a decidedly Bellhead notion that they should implement technological innovations that can "sniff" and meter Internet traffic and thereby identify cost causers with greater specificity. Innovations in packet prioritization may help incumbent carriers achieve this objective, but such technologies have not yet become commonly available. More fundamentally competitive necessity and preexisting operational and pricing strategies militate against such metering. When they first introduced Internet services, the incumbent carriers recognized that a predominant

"Nethead"[17] culture coupled with technological limitations foreclosed the simple extension of voice telephony pricing, interconnection and cost recovery techniques.

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[17] A Nethead has been defined as a "person who has a passion for the Internet, [or one] involved with data networks and packet switching." PC MAGAZINE ENCYCLOPEDIA, available at: http://www.pcmag.com/encyclopedia_term/0,2542,t=Nethead&i=47793,00.asp.

Recently senior managers of incumbent carriers have signaled their intent to meter and tier Internet services. AT&T Chairman Ed Whitacre has colorfully expressed indignation that current standard procedure for Internet pricing and interconnection has left his company burdened with having to create, maintain and frequently upgrade an expensive bit transport infrastructure while content firms, such as Google, allegedly get a free ride:

> Now what they would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using. Why should they be allowed to use my pipes? The Internet can't be free in that sense, because we and the cable companies have made an investment and for a Google or Yahoo! or Vonage or anybody to expect to use these pipes [for] free is nuts! [18]

In a Bellhead-managed, voice telephony environment, a telephone company has the ability to meter a specific customer's traffic and to bill for carrying that traffic on a metered or flat-rate. With rare exception a telephone company only handles traffic for which it can expect to receive compensation from either the call originator, or the call recipient. The Bellhead model for managing traffic and recovering costs has a route-specific focus with comprehensive tracking, usage metering and cost accounting.

In a Nethead-managed Internet environment, carriers interconnect their networks seamlessly and build cooperative relationships designed to achieve global network connectivity. The Internet operates as a "network of networks" [19] and offers users access to content regardless

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[18] At SBC, It's All About "Scale and Scope," BUSINESSWEEK, ONLINE EXTRA November 7, 2005.

[19] "The idea of a computer network intended to allow general communication between users of various computers has developed through a large number of stages. The melting pot of developments brought together the network of networks that we know as the Internet."

of location. ISPs readily interconnect their networks with an eye toward acquiring access to other carriers' networks for payment, or in exchange for providing reciprocal access on a zero payment basis. Accordingly, content generated by Google and sought by an AT&T broadband service customer arrives at the final destination via AT&T lines, but quite likely have transited the facilities of other ISPs upstream from AT&T. With the revenues accruing from providing broadband access, AT&T either pays for upstream access to other ISPs' networks, a transaction known as transiting, or AT&T negotiates a reciprocal peering relation with other ISPs whereby the parties voluntarily agree to exchange traffic, often without funds transferring between the carriers. Google is no more a free rider of AT&T networks than AT&T and its subscribers would be when content originates on an AT&T network, but must travel across the networks of other ISPs, with which AT&T has a transiting or peering agreement, to reach a recipient who subscribes to an ISP unaffiliated with AT&T.

The fact that incumbent carrier executives have gained traction with the view that content providers enjoys a free ride underscores the ability to obscure how Internet traffic traverses networks and how ISPs manage and pay for such networking. As well it may foreshadow an aggressive campaign by carriers such as AT&T and Verizon to change the fundamental terms and conditions under which consumers access Internet content. Internet ventures have come up with many different business models to recoup and profit from investments, including the offer of free, subsidized or deliberately underpriced access to content. Internet ventures also may sweeten the deal, by increasing the value propositions of a service, i.e., providing more options for free, or at a subsidized price. Keen on identifying and charging cost causers, incumbent

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Wikipedia, History of the Internet; available at: http://en.wikipedia.org/wiki/History_of_the_Internet.

telecommunications companies may want to alter and reduce the value proposition enjoyed by Internet consumers, particularly ones who consume the most, e.g., video file downloaders, and who currently access the Internet on an "all you can eat" ("AYCE") unmetered monthly subscription.

This article will examine Bellhead business models incorporating metering and other traditional cost recovery strategies with an eye toward determining what constitutes reasonable price discrimination and what represents an unfair trade practice or an anticompetitive strategy. The article will consider whether and how Bellhead management strategies will jeopardize the serendipity and positive networking externalities [20] that have accrued when users can freely "surf the web" and content providers can bundle user sought content with advertising. Different pricing points based on throughput caps makes sense to Bellhead corporate officers who think they can capture rents that otherwise would accrue to content providers.

The article also will examine the clash of Bellhead and Nethead cultures with an eye toward identifying the stakes involved when Internet access pricing and interconnection primarily follows a telecommunications infrastructure cost recovery scheme in lieu of different commercial relationships favored by most Internet ventures. The article concludes that most Bellhead cost recovery models are lawful even though they will reduce for most consumers the real or perceived value proposition offered by an unmetered monthly Internet access subscription.

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[20] A positive network externality exists when the cost incurred by a user of the Internet does not fully reflect the benefit derived with the addition of new users and points of communications. See John Farrell & Garth Saloner, *Standardization, Compatibility and Innovation*, 16 RAND J. OF ECON. 70 (1985); Michael L. Katz. & Carl Shapiro, Network Externalities, *Competition and Compatibility*, 75 AM. ECON. REV. 424 (1985). See also Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479 (1998).

Traditional Interconnection and Cost Recovery Models

To appreciate the significance of recent initiatives to change Internet pricing, interconnection and quality of service conventions, one should consider the traditional models used by telecommunications carriers and ISPs in telephony and the Internet respectively. Bellhead and Nethead philosophies play a significant role in shaping interconnection terms and conditions.

Telecommunications Settlements

Telecommunications carriers have established interconnection and cost recovery models based on a network architecture designed to provide voice telephone circuit via a neutral conduit for the content generated by others. In a nutshell telecommunications carriers closely track network usage, establish direct contractual commitments with all carriers whose traffic traverses a network, and expect compensation for each unit of traffic handled. For international traffic telecommunications carriers typically "match" international half-circuits and financially "settle" accounts using a fixed per minute accounting rate [21] that attributes a negotiated financial value for each minute of traffic.

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[21] For background on the international accounting rate system, *see* Paul W. Kenefick, *A Step in the Right Direction: The FCC Provides Regulatory Relief in International Settlements and International Services Licensing*, 8 COMLCON 43 (2000); Rob Frieden, MANAGING INTERNET-DRIVEN CHANGE IN INTERNATIONAL TELECOMMUNICATIONS, ch. 9.1 (2001); Robert M. Frieden, *Falling Through the Cracks: International Accounting Rate Reform at the ITU and WTO*, 22 TELECOM POL'Y, 963, 963-75 (1998) (describing how heightened attention to international calling rates at the ITU and WTO has led some observers to conclude that carriers soon will impose cost-based termination charges). Rob Frieden, Robert M., *Last Days of the Free Ride? The Consequences of Settlement-Based Interconnection for the Internet*, 1 INFO., No. 3, 225-238 (June, 1999).

Ironically the telephony model currently operates comparatively on a less hierarchical and more democratic basis than the Internet model. For example, each and every United States long distance carrier seeking to provide directly routed telephone calling to any foreign country generally can establish an operating agreement directly with one or more foreign carriers. Until a few years ago, Federal Communications Commission ("FCC") policies required all U.S. carriers, regardless of traffic volume, capitalization and global presence, to apply the same financial terms and conditions when settling accounts with foreign carriers. [22] For domestic traffic carriers typically apply multi-element access charges for the use of facilities to originate and terminate traffic. [23] Some of the charges are usage based and others are flat rated, because the cost does not vary with usage.

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[22] 1998 Biennial Regulatory Review Reform of the International Settlements Policy and Associated Filing Requirements, IB Docket No. 98-148, Report and Order and Order on Reconsideration, 14 FCC Rcd. 7963 (1999); Policy Statement on International Accounting Rate Reform, 11 FCC Rcd. 3146, 3146 (1996) (stating intent to update accounting rate policies to encourage competition and technological innovation); International Settlement Rates, IB Docket No. 96-261, Report and Order, 12 FCC Rcd. 19806, 19891, 19894 (1997) (creating four transition periods for compliance with benchmarks and responding to the potential for expanded opportunities for one-way bypass of an accounting rate settlement created by the Basic Telecommunications Service Agreement); Regulation of International Accounting Rates, CC Docket No. 90-337, Phase II, Fourth Report and Order, 11 FCC Rcd. 20063, 20083, 20094 (1996) (permitting carriers to negotiate alternatives to the traditional settlement rate system for routes where effective competitive opportunities exist for U.S. carriers); 1998 Biennial Regulatory Reviews Reform of International Settlements Policy and Associated Filing Requirements, IB Docket No. 98-148, 13 FCC Rcd. 15320 (1998) (proposing largely to abandon accounting rate scrutiny for traffic to World Trade Organization Member nations); International Settlements Policy Reform; International Settlement Rates, IB Docket Nos. 02-324, 96-261, Notice of Proposed Rulemaking, 17 FCC Rcd 19954 (2002), First Report and Order, 19 FCC Rcd. 5709 (2004).

[23] Interstate access charges are imposed by local exchange carriers ("LECs") to recover the costs of providing access to their networks for interstate and long-distance service. The FCC seeks to promote the filing of access charges that recover costs from the class of consumers that have caused the LEC to incur such costs. In particular, non-traffic-sensitive costs-costs that do not vary with the amount of traffic carried over the facilities-should be recovered through flat-

In the Bellhead world each and every carrier secures permission to use another carrier's network for compensation on a highly calibrated and typically metered basis. A well-calibrated cost recovery mechanism applies anytime and anywhere one carrier hands off traffic to another carrier. Carrier "correspondents," of any size and traffic volume, secure direct interconnection of networks or indirect transiting via the network of a third carrier. In the traditional telecommunications model, carriers can readily track traffic routes and meter traffic streams. With such specificity carriers can easily meter traffic and determine whether a carrier should receive payment for switching, routing and transporting more traffic than the carrier handed off to another carrier.

ISP Peering and Transiting

In the Nethead world ISPs typically use less calibrated measures of traffic flow and also have a far greater number of cost recovery options available for negotiation. ISPs traditionally have established looser interconnection arrangements that may not even meter traffic flows, and which emphasize the accessibility of bandwidth, number of interconnection locations, diversity of available routes and availability of personnel. They can secure access to the entire, global Internet cloud often by securing a direct contractual arrangement with a few ISPs who in turn have acquired other interconnection arrangements with many other smaller ISPs.

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rate charges, and traffic-sensitive costs should be recovered through per-minute charges. This approach fosters competition and efficient pricing. The Part 69 rules of the FCC Rules and Regulations, 47 C.F.R. Pt. 69 (2005), governing access charges, codifies this strategy. *See* Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Transport Rate Structure and Pricing, and End User Common Line Charges, First Report and Order, 12 FCC Rcd. 15,982, paras. 344-48 (1997), *aff'd* Southwestern Bell Tel. Co. v. FCC, 153 F.3d 523 (8th Cir. 1998); Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long-Distance Users, Federal-State Joint Board on Universal Service, Sixth Report and Order, 15 FCC Rcd. 12962 (2000); Developing a Unified Intercarrier Compensation Regime, Notice of Proposed Rulemaking, 16 FCC Rcd. 9610 (2001).

ISPs initially used a similarly democratic model during the early days of the Internet. At that time, just about all ISPs agreed to peer with any other ISP on a settlement free, "Sender Keep All" [24] peering [25] arrangement with no transfer of funds, or a transit arrangement where one ISP pays to acquire access to another ISP's network and its customers as well as access to other ISPs' networks. As government incubators and anchor tenants sought to privatize the

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[24] "In a bill-and-keep or sender-keeps-all arrangement, each carrier bills its own customers for the origination of traffic and does not pay the other carrier for terminating this traffic. In a settlement arrangement, on the other hand, the carrier on which the traffic originates pays the other carrier to terminate the traffic. If traffic flow between the two networks is balanced, the net settlement that each pays is zero, and therefore a bill-and-keep arrangement may be preferred because the networks do not have to incur costs to measure and track traffic or to develop billing systems. As an example, the Telecommunications Act of 1996 allows for incumbent local exchange carriers to exchange traffic with competitors using a bill-and-keep arrangement." Michael Kende, *The Digital Handshake: Connecting Internet Backbones*, 11 COMLCON 45, n.60 (2003) (citing 47 U.S.C. §252 (d)(2)(B)(i) (2000)). "The sharing of traffic over the interconnected networks forming the Internet on a statistical and un-metered 'settlements' (or 'bill & keep') basis was a hallmark of early federal agency involvement in the development of the Internet. This system of traffic carriage free of charge became known as 'peering.'" Barbara Esbin, INTERNET OVER CABLE: DEFINING THE FUTURE IN TERMS OF THE PAST 20 (F.C.C., O.P.P. Working Paper No. 30, 1998), available at 1998 WL 567433.

[25] For background on the economics and logistics of peering, *see* Geoff Huston, *Where's the Money?—Internet Interconnection and Financial Settlements* (Jan. 2005); available at: http://www.potaroo.net/ispcol/2005-01/; Steve Gibbard, *Economics of Peering* (Oct. 2004); available at: http://www.pch.net/resources/papers/Gibbard-peering-economics.pdf; Daniel C.H. Mah, *Explaining Internet Connectivity: Voluntary Interconnection Among Commercial Internet Service Providers* (March 26, 2003); available at: http://tprc.org/papers/2003/181/Explaining_Internet_Connectivity_Mar26-03.DOC.pdf; William B. Norton, *A Business Case for ISP Peering*, Draft 1.3 (Feb. 19 2002); available at: http://www.equinix.com/pdf/whitepapers/Business_case.pdf; Jean-Jacques Laffont; Scott Marcus; Patrick Rey; Jean Tirole, *Interconnection and Access in Telecom and the Internet*, 91 AMER. ECON. REV., No. 2, 287-291 (May, 2001); Bill Woodcock, *White Paper on Transactions and Valuation Associated with Inter-Carrier Routing of Internet Protocol Traffic*, or BGP for Bankers, (Aug. 2000); available at: http://www.pch.net/resources/papers/routing-economics/pch-routing-economics.htm.

Internet, interconnection became less democratic and more hierarchical. [26] Currently only the largest, Tier-1 ISPs agree to peering, with smaller ISPs, having fewer customers, available routes, bandwidth and interconnection points, having to pay to interconnect and use the networks of the Tier-1 ISPs.

Even as smaller ISPs now have to pay for network access, the Nethead credo of promoting global connectivity continues. Theoretically a small ISP in a most remote location can provide its customers access to just about any ISP and any source, or recipient of content simply by securing a transit agreement with one ISP higher up the hierarchy. This ISP, located upstream from the smaller ISP, typically can "advertise" routes, i.e., offer transit access to other ISPs' networks, sufficient to secure global access to the smaller ISP's subscribers. The brilliance in the Internet ISP relationship lies in the positive networking externalities achieved through global connectivity.

The specificity in routing and destinations in telecommunication access arrangements largely eliminates any opportunity for free rides, or underpayment by a carrier. In Internet access arrangements even with the elimination of peering opportunities, some operators can exploit transit and other routing agreements at least in the short run. If an ISP does not bear much risk in providing qualitatively inferior service it can exploit access to other ISPs' networks sooner and more extensively. The concept of "hot potato routing" [27] refers to an ISP's decision

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[26] *See* Rob Frieden, *Does a Hierarchical Internet Necessitate Multilateral Intervention?* 26 N.C. J. INT'L & COM. REG., No. 2, 361-405 (Spring, 2001).

[27] "Rather than lease lines throughout the nation and expand capacity, the free rider ISP may attempt to hand off traffic to a larger, better equipped ISP at the closest public peering point. The free rider ISP considers traffic a 'hot potato' and has a financial incentive to pass such traffic off to any other ISP who agrees to take it." Rob Frieden, *Without Public Peer: the Potential Regulatory and Universal Service Consequences of Internet Balkanization*, 3 VA. J.L. & TECH.

to hand off traffic to another ISP closer to the service territory of the handing off ISP. Presumably the quick hand off to another operator reduces the handing off ISP's costs and makes fuller use of transit opportunities.

Despite significant efforts to streamline regulation telecommunications carriers' cost recovery strategies and tactics face still significant government oversight. In contrast ISPs typically negotiate contracts subject to non-disclosure agreements making it quite difficult to determine the actual terms and conditions the parties will use. Telecommunications settlements offer a generally transparent process among equals with money flowing from one carrier to the other based almost exclusively on traffic flows. Few ISPs now peer on a zero cost basis and the flow of funds depends on a number of factors in addition to traffic flows, including location of the ISP.

While ISPs do not ignore the cost of doing business, they pursue a cooperative routing arrangement often based on a less than scientific "rough justice" estimate of whether a carrier offers switching, routing and bit transport services equivalent to what it receives. ISPs in remote areas, including most developing countries, bear the entire financial burden to access larger ISP networks, often via expensive international satellite links. In a worse case scenario an ISP in a developing country lacks access to a local or regional facility for the exchange of traffic thereby requiring transit via distant ISP facilities even for the delivery of local traffic. Having to self-provision telecommunications line access to other ISPs and the possibility of "tromboning," via

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8, P 2 n.2 (1998); see also Michael Kende, *The Digital Handshake: Connecting Internet Backbone*s, 11 COMLCON 45, 60 (2003).

distant ISP facilities even for local traffic, juxtaposes with the greater uniformity and equality in telecommunications cost sharing. [28]

One key way to reduce Internet traffic costs lies in the installation of local or regional facilities that link many ISPs and their separate networks. Such Internet Exchange Points ("IXPs") make it possible for each participating ISP to exploit better the Internet's "network of networks" synergy, i.e., the opportunity for an ISP to hand off traffic for carriage by other ISPs instead of having to engineer a longer, possibly circuitous route. ISPs interconnect networks at IXPs, because individually and collectively they can reduce their bandwidth and line transmission costs, provide more reliable service with less time of service delays (latency) and operate more efficiently.

IXPs provide a centralized hub and spoke network typology instead of requiring each ISP, regardless of size, traffic volume and capitalization, to erect a mesh network covering the globe. Because the Internet offers access to content and users anywhere, each ISP has to secure network connections to all potential recipients of content and senders of content, or competitively suffer for the lack of global reach. Reciprocal interconnection—whether freely provisioned or provided for a fee—makes it possible for an ISP to access the entire global Internet cloud for its

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[28] "Without an IXP, ISPs have to pay international bandwidth prices for traffic that is actually destined locally within a particular country. In most cases the traffic travel overseas through two satellite hops before it reaches its destination a few kilometers across a city. With an IXP present within a country, each ISP pays HALF the cost to reach each of the other ISPs, since they all meet at a neutral point in the middle." African Internet Service Providers Association, *"The Halfway Proposition" Background Paper on reverse subsidy of G8 countries by African ISPs*, p. 4, presented at the Conference of African Ministers of Finance, Planning and Economic Development, Johannesburg, South Africa Oct. 19, 2002; available at: http://afrispa.skybuilders.com/.

subscribers and thereby to accrue increasing value from the Internet, because its utility and value increase with the number of accessible points of communications.

ISPs operating without the benefit of a local or even regional IXP bear the financial burden of having to secure links with the largest and most desirable Tier-1 ISP networks at a location at their own expense possibly thousands of miles distant, on terms primarily established by the larger ISP. Remotely located ISPs and ones with comparatively fewer subscribers, networking options and content options must procure expensive telecommunications links, including one or more satellite hops, or a long submarine cable link to route traffic to and from an ISP leasing transit access to networks and content throughout the world. Because ISPs do not split operating costs in half, like the telecommunications half-circuit settlements process, smaller and remotely located ISPs must unilaterally pay for the complete telecommunications links to ISPs willing to provide interconnection services. [29]

Practically speaking, even the largest ISPs need to rely on the network reach and customer accessibility provided by other ISPs. But unlike the large Tier-1 ISPs who agree to handle the traffic of other similarly situated ISPs on a zero cost basis, small and remotely located ISPs become clients and resellers of the network services provided by large ISPs. This may appear unfair in light of "democratic" telecommunications line cost sharing arrangements, but the Internet operates largely free of rate regulation and other forms of government oversight. Tier-1 ISPs typically can require smaller carriers to pay for network access, but on the other hand

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[29] For an assessment of self provisioning financial impact on Australian ISPs *see* John Hibbard, John de Ridder, Dr. George R. Barker and Professor Rob Frieden, *International Internet Connectivity and its Impact on Australia*, Final Report on an Investigation for the Department of Communication Information Technology and the Arts, Canberra, Australia (2004); portions available at: http://www.dcita.gov.au/__data/assets/word_doc/16616/IIC_report_-_web_version.doc

the smaller ISPs do have a number of Tier-1 ISP network options. With payment for access smaller ISPs not only have access to a Tier-1 ISP's subscribers, but also the content available from these subscribers and also the network access the Tier-1 ISP itself has secured from other ISPs typically located throughout the world.

Some would argue that market-based Internet access achieves an efficient outcome while creating incentives for ISPs to continue building out and expanding networks. But on the other hand a disproportionate financial burden foisted on the poorest ISPs and their subscribers has the potential to exacerbate the "digital divide" which separates people with easy and robust ICE access opportunities and those without. [30]

Current Marketplace Conditions Affecting Peering/Transit Decision-making

The process by which an ISP qualifies for peering as opposed to having to pay for peering or transit services, remains largely private. ISPs negotiate terms and conditions and few offer public disclosure of the criteria used to qualify for peering. Likewise the final negotiated agreement falls under comprehensive nondisclosure agreements making a forensic examination quite difficult.

However, several Tier-2 ISPs have posted on their World Wide Web sites general qualifications for its agreement to peer. [31] Having now merged with AT&T, SBC's peering

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[30] *See, e.g.*, Organization for Economic Co-Operation and Development, *Regulatory Reform as a Tool for Bridging the Digital Divide* (2004); available at: http://www.oecd.org/dataoecd/40/11/34487084.pdf.

[31] For current peering requirements, *see, e.g.*, MCI, MAE Peering, How to Connect to the MAE Network; available at: http://www.mae.net/peer/howToConnect.htm; SBC Corp., SBC Internet Services Peering Information; available at: http://www.sbcbackbone.net/peering/; Club Internet, T-Online France, Public Peering Information and Private Network Interconnection Guidelines; available at: http://www.club-internet.fr/Peering/. New Zealand Internet Exchanges, Terms and Conditions for ExchangeNET

requirements offer the best available snapshot of the typical prerequisites for securing domestic U.S. peering agreements. AT&T requires the following of peering candidates:

1. For domestic ISPs coast-to-coast nationwide OC-12 or larger public IP backbone network.

2. Presence at three or more public peering points listed above (at least one on the East Coast, one on the West Coast, and one in the Mid West) for domestic ISPs.

3. Presence at two or more public peering points listed above for International ISPs.

4. A total minimum busy hour traffic exchange of 25 Mbps with SBC Internet's Autonomous System Numbers will be required.

5. Must not have been an IP transit customer of SBC Internet in the past six (6) months.

6. Willingness to enter into a Bilateral Interconnection Agreement and Non-Disclosure Agreement with SBC Internet.

7. Operation of a 24x7x365 Network Operations Center (NOC) that proactively monitors all peering connections and provides an escalation path to quickly identify and resolve network problems.

8. No requirement for a balanced traffic exchange ratio due primarily to the asymmetric nature of current broadband metallic transmission systems such as ADSL and cable modems and of current Internet Data Centers.

9. Joint capacity planning reviews for interconnection augmentation to accommodate traffic growth and minimize the possibility of latency or packet loss between both networks.

10. Consistent routes announcements at all public peering points.

Customers; available at: http://nzix.net/terms.html; Vienna University Computer Center, Internet Peering Agreement; available at: http://www.vix.at/vix-aconet-pa.doc; U-Net Peering Policy; available at: http://www.u-net.net/about/peering.htm; IP Exchange, Internet Peering Agreement; available at: http://peering.ip-exchange.de/peering_agreement_ipx_english.pdf; Equinex, How to Peer with Equinix; available at: https://ecc.equinix.com/peering/how.htm.

The AT&T peering criteria provide insight on current market conditions in a number a ways. First, the appearance of a publicly available set of criteria evidence some move toward transparency in the process. Second, the criteria, while onerous, probably represents a more liberal set of requirements than what an incumbent Tier-1 ISP would require. Third, the relative openness of AT&T's peering availability implies that more peering opportunities have arisen for ISPs willing to enter into agreements with the second tier at public peering points, even as many Tier-1 ISPs, ostensibly on quality of service grounds, have opted to avoid public peering.

Traditional End User Payment Models

Telephone companies traditionally have charged customers for long distance services on a usage sensitive basis, i.e., a minutes of use, but have offered most wireline local service options on an umetered basis. Before regulatory policies favored averaging and "integrating" [32] the costs of long distance particularly to blunt the higher cost of serving, Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, and rural locales telephone companies priced long distance service on the basis of mileage, or bands of distances. [33] Most telephone subscribers continue to pay for long

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[32] *See* Integration of Rates and Services for the Provision of Communications by Authorized Common Carriers between the Contiguous States and Alaska, Hawaii, Puerto Rico and the Virgin Islands, Final Recommended Decision, 9 FCC Rcd. 2197, 2198 n.2 (1993) ("'Rate integration' is the Commission policy that was adopted to describe service between the contiguous states and Alaska, Hawaii, Puerto Rico and the Virgin Islands (noncontiguous points) at rates that are equivalent to those prevailing for comparable distances in the contiguous 48 states.").

[33] Section 254(g) of the Telecommunications Act of 1996, 47 U.S.C. § 254(g)(2005) codified prior FCC rate averaging policy: "Within 6 months after February 8, 1996, the Commission shall adopt rules to require that the rates charged by providers of interexchange telecommunications services to subscribers in rural and high cost areas shall be no higher than the rates charged by each such provider to its subscribers in urban areas. Such rules shall also require that a provider of interstate interexchange telecommunications services shall provide such services to its subscribers in each State at rates no higher than the rates charged to its subscribers in any other State."

distance telephone service on a per minute basis, but carriers now have "postalized" rates so that customer typically pay a fixed rate, regardless of distance, much like fixed postal rates for letters whether sent across town or across the nation. [34]

Recently telephone companies have offered unmetered AYCE long distance calling subscriptions primarily in response to such options available from VoIP ventures and the fact that many mobile telephone carriers offer customers the option of using available minutes for "free" long distance calling. In addition to competitive necessity, significant reductions in interconnection charges make it possible for carriers to offer unlimited local and long distance calling options.

ISPs historically have offered customers AYCE service. ISPs first provided Internet access using local business lines that themselves may not have been metered by local exchange carriers. Additionally it appears that customers expected Internet access to match the available unmetered local calling options, notwithstanding the fact that the local call usually interconnected with a long haul routing to reach distant sources of Internet content.

Most ISPs initially offered a "one size fits all" dialup access. As broadband access options became available, via Digital Subscriber Links [35] and cable modems, ISPs differentiated

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[34] Implicit subsidies in telecommunications "result, in large part from rate averaging between rural and suburban/urban areas and the recovery of certain non-traffic sensitive costs through traffic sensitive per minute rates, which over-recovers costs from higher volume users, often business customers." Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, CC Docket No. 01-338, 2003 WL 22175730, at *17078 n.509 (F.C.C. Aug. 21, 2003); see generally Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long Distance Users, Federal-State Joint Board On Universal Service, 15 F.C.C.R. 12,962, 12,971-72 (2002) (CALLS Order) (describing how high-volume users bear a greater share of the non-traffic sensitive costs than low-volume users), *aff'd in part, rev'd in part, and remanded in part sub nom*. Tex. Office of Pub. Util. Counsel v. Fed. Communications Comm'n, 265 F.3d 313 (5th Cir. 2001).

service based on the throughput customers generally could expect to receive. ISPs now offer services analogous to an airline's first class, business class and economy seating based on the bit rate speed for downloading and uploading content. Few observers would consider providing different bit rates and service price points unreasonable discrimination as opposed to reasonable product differentiation.

Reshaping the Internet Using the Bellhead Model

Incumbent telecommunications carriers, such as AT&T, Verizon, BellSouth and Qwest, in the United States, own and operate many of the major, Tier-1 ISPs that have a significant market share. [36] In the European Union and other nations former monopoly local and long distance telephone companies, such as NTT Corporation, British Telecom, Deutsche Telekom, and Singtel, also have a dominant market share. The merger activities of telecommunications carriers includes the acquisition of major Internet infrastructure operators, including networks previously operated independently by MCI, AT&T, GTE, BBN, Worldcom, MFS Communications, UUNet, and Verio.

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[35] Bell Atlantic, now known as Verizon, described its digital subscriber line service as "an interstate data special access service that provides a high speed access connection between an end user subscriber and an Internet Service Provider (ISP) by utilizing a combination of the subscriber's existing local exchange physical plant (i.e. copper facility), a specialized DSL-equipped wire center, and transport to the Asynchronous Transfer Mode Cell Relay Service where the ISP will connect to Bell Atlantic's network." Bell Atlantic Telephone Companies, CC Docket No. 98-168, Tariff No. 1, Transmittal No. 1081, Order, DA 98-1988, 13 FCC Rcd. 18911 (1998).

[36] One credible list of the Tier-1 ISPs includes: AOL-Time Warner, AT&T, Global Crossing, Level 3, Verizon Business, Nippon Telegraph and Telephone, Qwest, Savvis and Sprint Nextel Corporation. Wikipedia, List of Tier 1 ISPs, available at: http://en.wikipedia.org/wiki/Tier_1_carrier.

The senior managers of incumbent telecommunications carriers have the ability and apparently now the interest to manage the Internet. The ability lies in the carriers' market share and ownership of major Tier-1 ISPs. The interest largely stems from the need to establish new profit centers as traditional telephony becomes less profitable and incumbent carrier market shares decline. Incumbent carriers have made sizeable investments in network upgrades to provide broadband services and having targeted customers with a "triple-" or "quadruple-play" bundles of wireline and wireless telephony, video programming and Internet access. Having seen the massive rise in capitalization accrued by some Internet content and service providers, such as Google, incumbent carriers also want upward trajectory in their stock price and revenue streams.

Some of the major broadband network operators believe the best way to achieve this goal involves partitioning network bandwidth and prioritizing bitstreams by offering different quality of service guarantees. To some observers this strategy constitutes a form of service discrimination that violates a longstanding tradition of network neutrality in the switching, routing and transmission of Internet traffic. Since its inception the Internet has operated as a seamlessly interconnected collection of networks whose operators typically agree to handle the traffic of other operators on a "best efforts" basis. [37] Opponents of compulsory neutrality claim that they have no legal obligation to operate as common carriers [38] and that their interconnection

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[37] "The Internet is a vast network of individual computers and computer networks that communicate with each other using the same communications language, Transmission Control Protocol/Internet Protocol (TCP/IP). The Internet consists of approximately more than 100 million computers around the world using TCP/IP protocols. Along with the development of TCP/IP, the open network architecture of the Internet has the following characteristics or parameters:1. Each distinct network stands on its own with its own specific environment and user requirements, notwithstanding the use of TCP/IP to connect to other parts of the Internet. Communications are not directed in a unilateral fashion. Rather, communications are routed

arrangements result from commercial necessity and heretofore have achieved ample connectivity with plenty of routing options available to all operators. The option of offering a "better than best efforts" level of service provides a means for consumers and carriers to secure and pay for premium service, if so desired.

Replacing best efforts with variable quality of service ("QOS") offers and AYCE Internet access with metered service imposes traditional telephony interconnection, cost recovery and consumer marketing strategies. The value proposition currently enjoyed by consumers will change and may decline should incumbent carriers succeed in migrating users to pricing arrangements and service plans that incorporate these strategies. Advocates for pricing, interconnection and QOS flexibility characterize the initiative as lawful price discrimination that can offer consumers greater flexibility and possibly lower bills for low volume users. Net

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throughout the Internet on a best efforts basis in which some packets of information may go through one series of computer networks and other packets of information go through a different permutation or combination of computer networks, with all of these information packets eventually arriving at their intended destination. 2. Black boxes, for lack of a better term, connect the various networks; these boxes are called 'gateways' and 'routers.' The gateways and routers do not retain information but merely provide access and flow for the packets being transmitted.3. There is no global control of the Internet." Konrad L. Trope, *Voice Over Internet Protocol: The Revolution in America's Telecommunications Infrastructure*, 22 COMP. & INTERNET L. 1. No. 12, 1,4 (Dec. 2005).

[38] Title II of the Communications Act of 1934, as amended, 47 U.S.C. §201 et seq. requires common carriers to offer rate regulated, cost-based service to the public on a nondiscriminatory basis. "Common carrier legislation and regulation were initially intended to cover wired telecommunications services. Telephone and telegraph communications were perceived as a 'natural monopoly' early in the twentieth century. Because of the prohibitive cost of building a wired telephone or telegraph network combined with the desire to provide 'universal service' to consumers, the government's original legislative and regulatory approach was to foster and protect AT&T's monopoly in telephone wires, switches, and services." Jessica Finley, *Anticipating Regulation of New Telecommunications Technologies: An Argument for the European Model*, 26 NW. J. INT'L. L. & BUS 447, 450 (Winter, 2006).

neutrality advocates see the initiative as an attempt to legitimize network bias, bit discrimination and fragmentation of the Internet into different service levels and brands.

Regardless of the private and commercial nature of the currently constituted Internet, advocates for network neutrality emphasize the positive networking effects of a collective and unbalkanized system. If major ISPs can freely block and degrade specific traffic streams, net neutrality advocates warn of societal losses as the Internet becomes a more expensive and less serendipitous experience. Net bias advocates scoff at such global pronouncements and offer their view that combining plain vanilla routing with superior service offers options no different than the multiple classes of service provided by most airlines, or the qualitative difference between free and toll highways.

What Is Network Neutrality?

Advocates for network neutrality in the United States and elsewhere have called upon NRAs and legislatures to ensure that ISPs cannot discriminate against, or favor specific bitstreams. They believe this network neutrality principle should apply both upstream to other ISPs, or downstream to other ISPs and in turn the treatment of end users. Net neutrality advocates believe that the Internet has contributed to national productivity, economic opportunity and innovation in light of its nondiscriminatory, end-to-end connectivity.

Many net neutrality advocates speak and write in apocalyptic terms that allowing price and service discrimination will eviscerate the Internet and enable carriers to delay or shut out competitors and ventures unwilling or unable to pay surcharges. The head of a consumer group claims that incumbent telephone and cable companies' can reshape the nation's digital destiny by

branding the Internet and foreclosing much of its societal and cultural benefits. [39] Net bias advocates, emphasize that ISPs should have unfettered pricing freedom which has promoted innovation, risk tasking and diverse services and features. [40]

Few advocates for net neutrality have articulated what, if any, pricing, interconnection and QOS discrimination they believe can occur without defeating the goal of neutrality. Two academic analysts, generally in favor of network neutrality, or at least no major impediments to end-to-end connectivity, have offered two concessions to carrier operational flexibility. Professor Lawrence Lessig differentiates between ISP pricing strategies that auction off lanes of broadband service by tiering access between content sources and users and ISPs who offer end users different throughput speeds or permissible volume of traffic. [41] Access-tiering violates Professor Lessig's sense of network neutrality, because it would weaken competition for Internet services and the potential for continuing growth by erecting additional financial barriers to entry by innovators unable to pay the surcharges demanded by major network operators. Professor Lessig considers consumer-tiering a permissible strategy by network operators to recoup infrastructure investments and to create necessary incentives for more investment even though it

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[39] *See* Jeff Chester, *The End of the Internet?*, THE NATION (posted Feb. 1, 2006); available at: www.thenation.com/doc/20060213/chester.

[40] *See, e.g.*, Thomas W. Hazlett, *Neutering the net*, FINANCIAL TIMES, FT.com Online, posted March 20, 2006; available at: http://news.ft.com/cms/s/392ad708-b837-11da-bfc5-0000779e2340.html; Testimony of J. Gregory Sidak, United States Senate, Committee on Commerce, Science and Transportation (Feb. 7, 20060); available at http://commerce.senate.gov/pdf/sidak-020706.pdf.

[41] Lawrence Lessig, Prepared Testimony before the Senate Committee on Commerce, Science and Transportation, Hearing on "Network Neutrality" (Feb 7, 2006); available at: http://commerce.senate.gov/pdf/lessig-020706.pdf.

probably would result in changing the consumer value proposition by helping network operators extract higher revenues particularly from large volume, "power" users.

Professor Ed Felten distills network discrimination in terms of whether an ISP drops packets of a content provider based on operational necessity or deliberate degradation of service. [42] Minimal dropping of packets normally occurs in peering and transiting when an ISP's best efforts cannot accommodate the current volume of traffic. Absent a strategy to prioritize packets, the Internet Protocol and the contracts executed between ISPs calls for first come, first served processing. Non-minimal dropping of packets would occur when an ISP prioritizes packets in such as ways as to trigger delays and lost packets even in the absence of congestion.

In Professor Felten's dichotomy of packet dropping, network bias occurs when an ISP partitions its networks in such a way as to all but guarantee that non-priority bitstreams experience lost packets and degradation of service quality even when it is possible for the ISP to avoid dropping any packets. When dropping packets occurs even during uncongested conditions an ISP engages in anticompetitive discrimination, because the ISP deliberately degrades service, not to accommodate a priority customer, but to punish a low paying one. Permissible net bias occurs when an ISP carves out a portion of the its network to create a virtual, stand alone network. This off network design provides something akin to an intranet, i.e., a partioned network available to single corporate client or group of customers. However, the intranet may be virtual in nature and designed primarily to guarantee two dichotomous routing experiences based on price: near certain real time delivery of packets without loss and near certain packet dropping.

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[42] Professor Edward Felten, Freedom to Tinker Blog, Nuts and Bolts of Net Discrimination, March 2, 2006; available at: http://www.freedom-to-tinker.com/?p=983
Nuts and Bolts of Net Discrimination, Part 2 (March 7, 2006); available at: http://www.freedom-to-tinker.com/?p=986.

The FCC's Four Network Freedoms

Over several years the FCC has aggressively sought to free carriers providing Internet access of any significant regulatory responsibilities that apply to telecommunications service providers. The Internet has flourished in part due to a "hands off" approach by governments and the willingness of network operators to make increasing investments in the infrastructure needed to transport the bits that correspond to commercially successful content and services. As the Internet becomes a conduit for most converged services, the ventures operating bit transmission networks must make additional, substantial investments to handle growing Internet traffic along with new traffic streams that include full motion video.

At the vigorous urging of incumbent carriers, the FCC has perceived the need to create more incentives for carriers to make broadband investments. The Commission has largely dismantled compulsory access requirements and the use of mandatory pricing model that forces incumbent carriers to offer network elements [43] at rates well below what the carriers consider

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[43] "Local loop unbundling (LLU) is a potentially important option that could allow competitors to use unbundled elements or unbundled services of . . . [the incumbent's] access network to provide alternative telephone or broadband access services to end-users. Most OECD countries require unbundling, including the US, Canada, UK and Australia. Unbundling can create incentives for new investment in broadband access and drive faster deployment of broadband services because it allows less costly access to consumers for alternative broadband service providers. Vigorous competition can be expected to drive prices down towards cost." New Zealand Ministry of Economic Development, (May 5, 2004), Report on commerce commission's local loop and fixed PDN unbundling investigation, File BTP/1/TCOMP/11; available at: http://www.med.govt.nz/pbt/telecom/llu-investigation/ministry-report/ministry-report.pdf; *See also*, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, First Report and Order, 11 FCC Rcd. 15499, ¶ 10 (1996), *aff'd in part and rev'd in part*, AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366 (1999); *on remand*, Iowa Utils. Bd., v. FCC. 219 F.3d 744 (8th Cir. 2000); *affirmed in part and rev'd in part*, Verizon Comms., Inc. v. FCC, 535 U.S. 467 (2002); see also, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Docket No. 96-98, Third Report and Order and Fourth Further Notice of Proposed Rulemaking, 15 FCC Rcd. 3696, 16 FCC Rcd. 1724 (1999); reversed and remanded, United States Telecom. Ass'n v. FCC, 290 F.3d 415 (D.C.

cost-based, or what they would demand in arm's length negotiations. [44] Additionally the FCC has eliminated traditional common carrier regulatory burdens for carriers providing Internet access and services, even ones such as DSL that use "legacy" technologies, such as the copper wire, local loop that provided the conduit for regulated services. [45] Collectively these deregulatory

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Cir. 2002); see also, Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Docket Nos. 01-338, 96-98, 98-147, Notice of Proposed Rulemaking, 16 FCC Rcd 22781 (2001); Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Docket Nos. 01-338, 96-98, 98- 147, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978 (2003), *corrected by Errata*, 18 FCC Rcd 19020 (2003), *vacated and remanded in part, affirmed in part*, United States Telecom Ass'n v. FCC, 359 F.3d 554 (D.C. Cir. 2004), on remand, Unbundled Access to Network Elements, Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, WC Docket No. 04-313, CC Docket No. 01-338, Order on Remand, 20 FCC Rcd. 2533 (2005).

[44] The FCC has required incumbent local exchange carriers to offer competitor access to network facilities and services on the basis of a Total Element Long Run Incremental cost analysis. "TELRIC obliges both incumbents and state regulators to set prices based on the long-run costs that would be incurred to produce the services in question using the most-efficient telecommunications technology now available, and the most efficient network configuration. Incumbents that have aging and inefficient equipment thus must sell for less than their historical cost; the old system that calculated rates based on actual cost of equipment plus a reasonable rate of return on capital is out the window." AT&T Communications of Illinois, v. Illinois Bell Telephone Co. 349 F.3d 402, 405 (7th. Cir. 2002). The FCC expects to eliminate or reduce the application of TELRIC pricing. *See* Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers, WC Docket No. 03-173, Notice of Proposed Rulemaking, 18 FCC Rcd 18945 (2003).

[45] Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, CC Docket No. 02-33, Report and Order and Notice of Proposed Rulemaking, FCC 05-150, 2005 WL 2347773 (rel. Sep. 23, 2005); available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-150A1.doc; *see al*so, National Cable & Telecommunications Ass'n v. Brand X Internet Services, 125 S. Ct. 2688 (2005) *affirming* Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, Internet Over Cable Declaratory Ruling, Appropriate Regulatory Treatment for Broadband Access to the

initiatives have freed incumbent carriers of having to share and interconnect facilities providing information services, or to provide these facilities on a nondiscriminatory and rate regulated basis.

In light of such deregulatory fervor it comes as somewhat of a surprise to see the FCC weigh in on the network neutrality debate at all. In a non-binding, non-compulsory Policy Statement the FCC has articulated four "principles":

> (1) consumers are entitled to access the lawful Internet content of their choice;
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> (2) consumers are entitled to run applications and services of their choice, subject to the needs of law enforcement;
>
> (3) consumers are entitled to connect their choice of legal devices that do not harm the network; and
>
> (4) consumers are entitled to competition among network providers, application and service providers, and content providers. [46]

The FCC's four Network Freedoms appear noncontroversial, but they have no impact on the pricing, interconnection and QOS differentiation under their current status as policy objectives. However, the Commission has intervened where a wireline telephone company deliberately blocked—as opposed to degraded—VoIP traffic terminations. In Madison River Communications, LLC [47] the Commission fined a telephone company and ordered it not to block VoIP traffic terminations. Arguably the consumer entitlement to competition among

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Internet Over Cable Facilities, GN Docket No. 00-185 & CS Docket No. 02-52, Declaratory Ruling and Notice of Proposed Rulemaking, 17 FCC Rcd 4798 (2002).

[46] United States Federal Communications Commission, Public Notice, FCC Adopts Policy Statement (Aug. 5, 2005); available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260435A1.doc.

[47] Madison River Communications, LLC, Order, DA 05-543, 20 FCC Rcd 4295 (2005), available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-05-543A1.pdf.

software application providers, such as VoIP ventures, means that the Commission considers network neutrality a viable concept at least where compulsory common carriage responsibilities continue to apply as in the case with local wireline telephone companies.

Whether and When Network Neutrality Principles and Possibly Regulations Are Necessary

Advocates for network neutrality appropriately note the synergy and serendipity achieved when the Internet operates as a network of networks and offers consumers seamless, global connectivity based on best efforts routing and reciprocal carriage agreements among ISPs. Consumers enjoy an incredible value proposition when they can access the Internet on an unmetered, AYCE basis and acquire attractive content subsidized by advertisers who can exploit the AYCE subscription option by adding to the downloaded packet payload. The high value proposition offered to consumers jibes with the Nethead philosophy about making the Internet ubiquitous with more emphasis on connectivity and with less regard for cost recovery and analysis of cost causation.

Netheads helped create the Internet and the initial reciprocal, zero payment peering models. At the Internet's inception, Netheads could emphasize connectivity over cost, because governments sponsored incubation efforts as both underwriters and anchor tenants. As governments have largely eliminated their financial sponsorship and as Bellhead-dominated telecommunications carriers seek to recoup their Internet investment, cost causation and cost recovery have become substantially more important.

The net neutrality versus net bias debate focuses on what strategies and tactics in accounting for costs and recovering them are reasonable and fair versus anticompetitive and unjustified. Unreasonable net bias occurs when an ISP pursues a discrimination strategy against a specific type of bitstream or generator of a bitstream without a reasonable and fair minded

financial or operational justification. ISPs can and should drop packets based on congestion and the inability to route bits. Net bias occurs when an ISP drops packets or denies access—even when contractually obligated to provide it—based on artificially induced conditions that simulate congestion, despite the fact that ample capacity exists to switch and route the traffic.

Net bias does not occur simply when ISPs elect to offer end users different throughput speeds and even a daily or monthly quota of permissible throughput. Likewise net bias does not occur when an ISP negotiates different interconnection and access arrangements with upstream peers and clients. Net bias does not even occur when an ISP deliberately partitions bandwidth so that a "private" or premium routing option exists. However, net bias does occur when an ISP engages in tactics designed to render "public" peering and transit routes congested unreliable, or blocked despite the fact that ample, unpartitioned capacity to switch and route the traffic remains available.

Permissible Network Bias

Advocates for network flexibility correctly state that external, non-market driven constraints on their ability to price discriminate can adversely impact their incentive to invest in broadband infrastructure and their ability to recoup that investment. ISPs have avoided common carrier responsibilities and the Internet largely functions as a product of countless interconnection arrangements flexibly negotiated and executed free of government oversight. ISPs correctly note that only in rare instances has an interconnection dispute triggered allegations

of anticompetitive practices and rarely if ever has a consumer lost access to a content source or addressee as a result of network inaccessibility or balkanization. [48]

Variable Bandwidth and Throughput

Network flexibility in pricing, service provisioning and QOS makes economic sense and does not violate a reasonable expectation of network neutrality. ISPs should have the option of offering end users, peers and transit clients options as to the amount of available throughput. Just as airlines offer first, business, and economy seating and car drivers have free and toll highway options, Internet consumers should have access to different Internet experiences. Variable throughput options already exist upstream from end users to peers and transit clients who reciprocate with connectivity at a specified bandwidth, or pay for a specific amount of connectivity.

Bandwidth Partitioning

Absent contractual commitments with peers and transit clients to provide a specific level of service and throughput, an ISP also should have the option of partitioning its available bandwidth. Partitioning enables a facilities-based ISP to meet different levels of peering requirements as well as to offer transit clients different amounts of throughput. If an ISP can engineer a complete route, whether via its own facilities, or network capacity allocated to it by another carrier, the ISP can offer end-to-end, QOS performance guarantees at a premium price.

Partitioning constitutes legitimate price and quality discrimination, even if the remaining public, non-premium throughout declines. Net bias occurs if and only if the ISP deliberately

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[48] Threats of "depeering" occasionally occurs as do temporary denials of service. *See, e.g.*, *Level 3 depeers Cogent*, THE REGISTER, Oct. 6, 2005; available at: http://www.theregister.co.uk/2005/10/06/level3_cogent/.

degrades service on public peering and transit links, despite ample “public network” capacity to offer uncongested switching, routing and packet transmission.

Metered Service

ISPs do not violate a reasonable sense of net neutrality by migrating consumers to metered Internet access. While metering would reduce the value proposition to consumers Internet AYCE access should not be a government mandated right. Metering satisfies the Bellhead quest for cost attribution and recovery and surely would force consumers to rethink their usage patterns and tolerance for unsolicited content, the core financial model for subsidizing consumer access to desired content.

Metering and caps on throughput might create new and possibly lower price points for occasional users. However, the Bellhead experience with local wireline, plain old telephone service and many types of wireless packages confirm that few consumers like having to think about the number of calls they make and their minutes of use.

Better Than Best Efforts Routing

Despite a Nethead heritage of a one size fits all Internet, ISPs already have diversified the terms and conditions under which they switch, route and transport the packets generated by a third party content provider, or another ISP. Better than best efforts routing is not a contradiction, or unreasonable discrimination against content generators, consumers or ISPs that elect not to pay for superior treatment. However an ISP may not unilaterally change the terms of interconnection that would violate an otherwise enforceable contract or Service Level Agreement.

Impermissible Net Bias

Deliberate Packet Loss

Probably the most troubling scenarios of unfettered network bias lies in the potential for seemingly legitimate QOS, interconnection and pricing discrimination to obscure, unfair trade- and anticompetitive practices. The Internet Protocol has a built in system for managing congestion, but ISPs appear to have the ability to create or simulate congestion and the necessity for dropping packets when no real congestion takes place. False congestion [49] to punish, discipline or competitively outmaneuver competitors, or customers refusing to pay newly imposed surcharges, appears the same as the manufacture of congestion by energy traders employed by Enron keen on artificially raising prices. [50]

Existing peering and transit agreements may lack a specific prohibition of deliberate packet loss, based on the presumption that best efforts routing implies nondiscrimination. Because ISPs in the future may have the option of offering biased and discriminatory network routing, regulatory or judicial remedies may be needed to foreclose and punish deliberate

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[49] ISPs surely should have the option of offering a premium peak service that would offer higher likelihood of undropped packets and timely delivery even under truly congested conditions. *See*, Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, VANDERBILT UNIVERSITY LAW SCHOOL LAW AND ECONOMICS WORKING PAPER 05-28 (2005); available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=825669.

[50] "So Enron was also responsible for some of California's power crisis! What was then a profoundly corrupt enterprise manipulated the Golden State's power market to help create artificial shortages that would jack up prices. A particularly repellent example of this enterprise was Enron's so-called Death Star strategy, which, as a company memo put it, let Enron be paid 'for moving energy to relieve congestion without actually moving any energy or relieving any congestion.' In one case, Enron bought power in California at a capped price of $250 a megawatt hour and resold it in Oregon for $2,500. The company also "laundered" electricity to avoid federal price caps." Providence Journal-Bulletin (May 22, 2002) (retrived from Lexis-Nexis Academic Universe).

degradation of service, particularly when packet loss and other strategies are directed at specific content providers.

Targeting Large Volume Content Generators for Punishment or Extortion

Several senior managers of incumbent telecommunications carriers have derided high volume content generators, such as Google, as free riders of the carriers' broadband networks. [51] Even as these managers threaten retaliation, one representative has labeled as "chicken littles" [52] articulated concerns about the adverse impact of a tiered Internet, these very same leaders have all but threatened to abuse the bits generated by large content generators. [53]

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[51] Marguerite Reardon, Cnet, News of Change,Qwest CEO Supports Tiered Internet (March 15, 2006); available at: http://news.com.com/Qwest+CEO+supports+tiered+Internet/2100-1034_3-6050109.html?tag=nl [hereinafter cited as Qwest comments]; "William L. Smith, chief technology officer for Atlanta-based BellSouth Corp., told reporters and analysts that an Internet service provider such as his firm should be able, for example, to charge Yahoo Inc. for the opportunity to have its search site load faster than that of Google Inc." Jonathan Krim, Executive Wants to Charge for Web Speed Some Say Small Firms Could Be Shut Out of Market Championed by BellSouth Officer, WASHINGTON POST, December 1, 2005; Page D05; available at: http://www.washingtonpost.com/wp-dyn/content/article/2005/11/30/AR2005113002109.html;
cf. BellSouth Media Room, Net Neutrality Overview; available at http://bellsouth.mediaroom.com/index.php?s=press_kit&item=74**;** Arshad Mohammed, Verizon Executive Calls for End to Google's "Free Lunch," WASHINGTON POST, February 7, 2006; Page D01; available at: http://www.washingtonpost.com/wp-dyn/content/article/2006/02/06/AR2006020601624.html.

[52] "'We believe in finding a commercial solution to this issue. The marketplace has tools to sort this out,' said Whitacre in response to those calling for legislated Net neutrality. Comparing those who call for legislation to Chicken Little, Whitacre argued that service providers do not need Congress to tell them how best to run their businesses." Pete Comas, Whitacre Calls for Less Regulation, VOIP MAGAZINE, March 21, 2006; available at: http://www.voip-magazine.com/content/view/2512/.

[53] One knowledgeable industry analyst deems this strategy extortion: "I think it's probably true that companies are coming to Qwest willing to pay for better treatment on their network," he said. "But I think they're doing it out of fear. It's legalized extortion." Qwest Comments (quoting Jeff Pulver, CEO of Pulver.com.

Incumbent carriers have presented quite a mixed message. On hand they have achieved incredible deregulatory success by representing the robustly competitive nature of the broadband Internet access marketplace. This environment does not yet exist in light of the current 99.4% market share the FCC itself has calculated for cable modem and DSL access. [54] Nevertheless the presumption of robust competition emboldens the incumbent carriers to portray themselves as victims of thievery by the likes of Google, E-bay and Yahoo.

On the other hand these very carriers have threatened to engage in practices that comes across as traditional monopolist responses to incipient competition. True to its Bell System heritage incumbent telecommunications firms imply the ability and willingness to employ anticompetitive interconnection, QOS and access pricing strategies. Threats of surcharges or degraded service imply that incumbent carrier managers may still operate with a Bellhead orientation that they can continue to manage a bottleneck, engage in margin squeezes, [55] readily

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[54] The FCC reported that as of December 31, 2005, cable television companies provided 62.4% of broadband high speed services in the United States with telephone companies providing 37%. Federal Communications Commission, *High Speed Services for Internet Access: Status as of December 31, 2005* (rel. July 26, 2006); available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-266596A1.pdf
With rare exception one cable television company and one telephone company offer broadband services in any locality meaning that 99.4% of the primary next generation networks are provided by two largely unregulated operators in any single locality.

[55] A margin price squeeze "refers to situations in which a vertically-integrated dominant firm uses its control over an input supplied to downstream rivals to prevent them from making a profit on a downstream market in which the dominant firm is also active. The dominant firm could in theory do this in a number of different ways. It could raise the input price to levels at which rivals could no longer sustain a profit downstream. Alternatively, it could engage in below-cost selling in the downstream market, while maintaining a profit overall through the sale of the upstream input. Finally, the dominant firm could raise the price of the upstream input and lower the price of the downstream retail create a margin between them at which a rival would not be profitable." Damien Geradin and Robert O'Donoghue, *The Concurrent Application of Competition Law and Regulation: The Case of Margin Squeeze Abuses in the Telecommunications Sector*, 1 J. COMP. L. & ECON. 355,357-58 (June, 2005).

meter network use and discriminate between similarly situated traffic streams. Innovations in bit and packet sniffing do provide the opportunity to discriminate by type of service, e.g., video versus email, type of network user, e.g., transit for the customer of another ISP, or delivery for a customer, type of packet, e.g., content generated by one unwilling to pay a surcharge, or content generated by one willing to pay a surcharge. Only time will tell whether incumbent carriers pursue lawful price and service discrimination, or unlawful practices.

Rather than threaten lawful or unlawful retaliation through delayed, degraded and dropped packets, incumbent carriers should market a superior Internet experience for high volume content generators and their customers. Because incumbent carriers and their ISP affiliates may not have a direct peering or transit agreement, these ventures may lack privity of contract with companies such as Google. Rather than alienate them with threats, incumbent operators should come up with marketing strategies to entice these attractive prospects customers to become customers. In any event both end user serving ISPs and upstream operators should face an explicit prohibition on content provider specific QOS and packet degradation and discrimination.

Port Blocking

Even the FCC appears to agree that an ISP cannot single out a specific lawful user of the ISP's network and deny service to that user. When an ISP agrees to peer with another ISP, or to provide transit service over a number of "advertised routes" the ISP has contractually committed to carry any and all packets from the other ISP regardless of the identity and marketplace success of the other ISP's customers. The peering or transit providing ISP may demand more

compensation, or the reciprocal expansion of throughput from other ISPs. However, the ISP should have no lawful opportunity to deny onward packet transmission to specific customers of other ISPs, or specific types of traffic generated by the customers of other ISPs.

Port blocking involves the conscious decision by one ISP to deny onward transmission of traffic, or delivery of traffic to an intended recipient. An ISP engaged in port blocking might determine that most VoIP traffic destined for a final recipient traverses one specific routing. An ISP keen on blocking VoIP, perhaps to shelter an access charge payment revenue stream accruing to an affiliated telephone company, might block the known routing configuration for unaffiliated VoIP operators. The Madison River company pursued this strategy and the FCC fined the company. Additionally several cable television companies allegedly have blocked ports, filtered IP addresses and have pursued other means to thwart or slow transit via their networks. [56]

The FCC could fine Madison River, because the company blocking packet delivery operated as a conventional, common carrier telephone company subject to Title II of the Communications Act of 1934, as amended. The Commission probably would have had no enforcement mechanism should the port blocking occur in the network of a company classified as providing information services, [57] including VoIP and other functional equivalents to

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[56] *See* Cybertelecom, Vonage Complaint to the FCC, News; available at: http://www.cybertelecom.org/voip/blocking.htm.

[57] Information service is defined as "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service." 47 U.S.C. § 153(20). The FCC does not apply common carrier regulation to information service providers under Title II of the Communications Act, 47 U.S.C. §201 et seq. The Commission uses its ancillary regulatory power under Title I,

conventional circuit switched telephony like that provided by Madison River. Accordingly, port blocking strategies should be deemed impermissible by telecommunications service providers and information service providers alike. [58] Where concerns about public health and safety exist, e.g., emergency 911 access via VoIP telephones, the FCC has refrained from relying on a marketplace generated remedy. [59]

Unfair Trade Practices and Affiliate Favoritism

A telephone company and even information service providers, such as ISPs, may look to port blocking as a way to enhance the marketplace attractiveness of corporate affiliates, particularly if the carrier can obscure its tactics. When taking advantage of technological and market convergence as well as deregulation ventures can vertically and horizontally integrate services. Triple- and quadruple-play offers that blend wireline and wireless telephony, Internet services and access to video programming demonstrate that such integration can accrue economies of scale and scope, but they also create incentives for operators to tilt the competitive

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which, for example, has been invoked to require VoIP service providers to cooperate with law enforcement authorities regarding wiretaps and to coordinate with wireline carriers in the provision of emergency 911 access. *See* Philip J. Weiser, *Toward a Next Generation Regulatory Strategy*, 35 LOY. U. CHI. L.J. 41 (2003); James B. Speta, *FCC Authority to Regulate the Internet: Creating It and Limiting It*, LOY. U. CHI. L.J. 15 (2003).

[58] "Canadian customers of Rogers, Canada's largest cable ISP, have speculated for months that the company has begun to block access to BitTorrent as well as the downloading of podcasts from services such as iTunes. While Rogers initially denied the charges, it now acknowledges that it uses "traffic shaping" to prioritise certain online activity. As a result, applications that Rogers deems to be a lower priority may cease to function effectively." Michael Geist, *Towards a two-tier internet*, BBC NEWS, Technology (Dec. 22, 2005); available at: http://news.bbc.co.uk/1/hi/technology/4552138.stm.

[59] *See, e.g.*, IP-Enabled Services and E911 Requirements for IP-Enabled Service Providers, First Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd. 10,245 (2005).

playing field to the advantage of corporate affiliates. In the absence of structural separation [60] between wireline, wireless and VoIP telephone affiliates and between information and

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[60] Initially the FCC enthusiastically embraced structural separation as an effective way to ensure non-discriminatory treatment between an incumbent local exchange carrier ("ILEC") on one hand and ILEC affiliates and competitors operating in markets that offer enhancements to basic telecommunications transmission capacity. In the *Second Computer Inquiry*, the FCC required AT&T to provide enhanced services, which have close similarity to information services, only through separate subsidiaries. Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), CC Docket No. 20828, Final Decision, 77 FCC 2d 384 (1980), *on reconsideration*, Memorandum Opinion and Order, 84 F.C.C. 2d 50 (1980) and Memorandum Opinion and Order on Further Reconsideration, 88 F.C.C. 2d 512 (1981), *aff'd sub nom*. Computer and Commun. Indus. Ass'n v FCC, 693 F.2d 198 (D.C. Cir. 1982), *cert. denied*, 461 U.S. 938 (1983). *see also* Robert M. Frieden, *The Computer Inquiries: Mapping the Communications/Information Processing Terrain*, 33 FED. COMM. L. J., No. 1. pp. 55-115 (1981); Robert M. Frieden, *The Third Computer Inquiry: A Deregulatory Dilemma*, 38 FED. COMM. L. J., No. 3. pp. 383-410 (1987).

Without any actual measurement of whether structural separation caused ILECs to operate inefficiently or to lose operational synergies the Commission subsequently eliminated structural safeguards. Amendment of Sections 64.702 of the Comm'n's Rules and Regs. (Third Computer Inquiry), Report and Order, 104 FCC 2d 958 (1986), on Recons., 2 FCC Rcd. 3035 (1987), Amendment to Third Computer Inquiry, Report and Order, 2 FCC Rcd. 3072 (1987), Amendment Computer III, Memorandum Opinion and Order on Further Recons., 3 FCC Rcd. 1135 (1988), Amendment Computer III, Memorandum Opinion and Order, 3 FCC Rcd. 1150 (1988), Amendment Computer III, Memorandum Opinion and Second Recons., 4 FCC Rcd. 5927 (1989), rev'd California v. FCC, 905 F.2d 1217 (9th Cir. 1990), Computer III Remand Proceedings, Report and Order, 5 FCC Rcd. 7719 (1990), Computer III Remand Proceedings, BOC Safeguards, Report and Order, 6 FCC Rcd. 7571 (1991), California v. FCC, 4 F.3d 1505 (9th Cir. 1993), BOC Safeguards Order vacated in part and remanded, California v. FCC, 39 F.3d 919 (9th Cir. 1994), Implementation of Telecommunications Act of 1996, Notice of Proposed Rulemaking, 11 FCC Rcd. 12,513 (1996), Computer III Further Remand Proceedings, Further Notice of Proposed Rulemaking, 13 FCC Rcd. 6040, Computer III Further Remand Proceedings, Report and Order, 14 FCC Rcd. 4289 (1999), Computer III Further Remand Proceedings, 1998 Biennial Regulatory Review, 14 FCC Rcd. 21,628 (1999) [hereinafter Computer III].

See also, Michael H. Ryan, *Structural Separation: A Prerequisite for Effective Telecoms Competition*, E.C.L.R. 2003, 24(6), 241-250; David Gabel, *Why is There So Little Competition in the Provision of Local Telecommunications Services?: An Examination of Alternative Approaches to End-User Access*, 2002 L. REV. MICH. ST. U. DET. C.L. 651 (Fall 2002); T. Randolph Beard, George S. Ford and Lawrence J. Spiwak, *Why ADCO? Why Now? An Economic Exploration Into the Future of Industry Structure for the "Last Mile" in Local Telecommunications Markets*, 54 FED. COMM. L.J. 421 (May 2002).

telecommunications service providers, a vertically and horizontally integrated venture may be tempted to use packet discrimination in ways that constitute an unfair and deceptive trade practice.

Premium Services or Fees to Override Firewalls and Filters

In the rush to "monetize" Internet investments all kinds of ventures may come up with services that appear clever and promising before their debut. One of the major ISPs, unaffiliated with an incumbent carrier, came up with such a idea: imposing a per email message surcharge in exchange for which the ISP would use best efforts to deliver the message regardless of whether the ISP's customer sought to block and filter out such content. [61] Better than best efforts delivery of spam constitutes a kind of paid for bit favoritism that enriches the ISP much to the dismay and chagrin of the ISP's customer if it results in the delivery of spam and other unwanted content that otherwise would be filtered out of view. Such premium delivery option should occur only when an ISP has secured the consent of addresses to receive such content and the content provider agrees to pay the surcharge.

In this instance AOL came to the quick realization that whatever revenues it would generate with an email stamp or surcharge would pale in comparison to the ill will of its customers and the potential that they would vote with their feet and find an ISP more willing to respect consumer firewall and filtering preferences. The incumbent carriers readily tout consumer sovereignty as sufficiently forceful to prevent anticompetitive and unfair trade practices. But unlike AOL, which faces significant competition in the marketplace for providing

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[61] Saul Hansell, *Postage Is Due for Companies Sending E-Mail*, (Feb. 5, 2006); available at: http://www.nytimes.com/2006/02/05/technology/05AOL.html?ex=1296795600&en=6efa03d0cbface9e&ei=5088&partner=rssnyt&emc=rss. AOL's false start probably will not prevent ISPs from seeking surcharge payments from delivery of customer approved content.

consumers access to Internet content, facilities-based competition for first and last mile broadband network access lacks such competition. Until such time as most consumers have viable and low cost alternatives to a cable/telephone company duopoly consumers cannot readily shift carriers when experiencing packet discrimination or favoritism that they do not like.

Unilaterally Imposing Upstream and Downstream Rules That Violate Existing Service Level Agreements

When AT&T Chairman Ed Whitacre singled out Google as a free rider, he suggested that his company and others should have the option to extend rules and pricing discipline over the customers of other carriers. No privity of contract exists between AT&T and Google unless both carrier and customer have executed a service agreement. Yet Mr. Whitacre's comment appears to state the case for his company to impose rules and charge fees for customers whose traffic traverses AT&T as part of the complete end-to-end routing arrangement even though the AT&T role occurs as a result of peering and transiting contracts with other ISPs, not Google. In other words, existing peering and transit agreements made by AT&T entitle Google to have its traffic delivered to an AT&T subscriber, or to have one or more links provided by AT&T without any direct payment from Google to AT&T.

If this comes across as unfair, consider the following justifications. First AT&T readily agreed to this arrangement, because for every peering agreement where AT&T has to provide packet transport and delivery using its network, it receives reciprocal access to the networks of a peer. Second AT&T heretofore has offered subscribers unmetered, AYCE service without regard to the type of bits the customer seeks and who generated the bits in the first place. If AT&T were to single out Google for inferior treatment, it would violate its contractual commitment to its peers and transit customers who have paid for best efforts access to AT&T's networks. Additionally AT&T might violate its Service Level Agreement with customers should

Google bits experience extraordinarily great loses, delays and access difficulties. Lastly AT&T has agreed to support global access and seamless network connectivity presumably because it accrues equal or greater utility, value and benefit for itself and its customers versus that accrued by other ISPs and their customers.

AT&T can impose special rules on Google if and only if all intermediary carriers similarly agree to enforce these rules and to offer any superior network performance offered by AT&T. Practically speaking AT&T may not be able to impose rules unilaterally across networks operated by others. However, if it were to attempt to do so regulation may be necessary to limit such rule setting to instances where AT&T can engineer a complete end-to-end routing using its own facilities, or the facilities of other carriers that readily agree to sniff Google packets and offer superior service for a premium rate. AT&T and all other ISPs should not have the option of seeking to engineer a deliberately inferior end-to-end routing experience for Google as a way to punish, or competitively disadvantage a single network user.

Conclusions and Recommendations

The debate about net neutrality has triggered emotional responses from both sides in light of the enormous stakes involved. In response to relaxed regulation and the lost revenues from core wireline telephony incumbent carriers have embraced the Internet as the primary focal point for services and profits going forward. These carriers have offered Internet access to end users at quite attractive, possibly subsidized rates. Having made the infrastructure investment and having acquired substantial market share for the first and last mile of Internet access, incumbent carriers predictably want to generate more revenues by offering subscribers additional Internet-mediated services. In light of a maturing Internet access marketplace, these carriers also want to eliminate any early market development, promotional pricing.

In seeking to migrate customers to traditional metered arrangements incumbent carriers seek to calibrate more closely wholesale and retail charges with cost causation. But in doing so incumbent carriers may reduce consumers' perceptions of the value in an Internet access subscription particularly if no AYCE option remains. Incumbent carriers continue to offer AYCE for basic telephony, because consumers expect this option and because unmetered service makes economic sense when the incremental cost of an additional call triggers insignificant additional costs outside of peak periods of congestion. Few telephone subscribers, even low volume and poor subscribers, willingly substitute a metered option for AYCE, despite the potential for a lower monthly bill.

Incumbent carriers also have failed to make a credible argument that large content providers have become free riders. Content providers, such as Google, pay for direct access to the Internet via geographically dispersed web hosting and traffic interchange points. It appears that incumbent carriers have picked the wrong fight with the wrong type of Internet user. If the Internet offers ample routing diversity and carrier options, vilified content providers, such as Google, can vote with their dollars and secure paid peering and transit agreements with competitors of incumbent carriers.

One would think incumbent carriers would want to load their facilities and recoup sizeable investment with Google's traffic. This view extends to last mile terminations of Google traffic, because some significant part of a consumer's decision to pay for incumbent carrier provided broadband access is based on the expectation of having high speed access to content supplied by major Internet players such as Google, ebay, and Yahoo as well as for peer-to-peer networking opportunities and access to large file downloads.

On the other hand, net neutrality advocates may have overstated the potential for the demise of the Internet as we know it. Absent port blocking and other deliberate attempts to drop packets or degrade traffic, much of the prospective net bias constitutes reasonable, but probably ill-advised price discrimination. End-to-end connectivity does not appear at risk if incumbent carriers limit their net bias initiatives to changing the financial terms and conditions of service to end users and upstream ISPs. Incumbent operators may have erected higher market entry costs for content suppliers and for new innovators and entrepreneurs, but the potential for serendipity available to "web surfers" should remain largely unabated. However, should a meter replace AYCE many cost conscious consumers may balk at allowing their computers and network connection to support peer-to-peer networking, and collaborative computing ventures such as the search for extraterrestrial life and climate prediction projects. [62]

The possibility exists for disruption of the current quid-pro-quo where consumers acquire access to valuable content, free of charge, in exchange for receiving additional unsolicited advertising. In a metered environment, or one where consumers face bandwidth or aggregate throughput caps or quotas, the additional advertising payload may carve out a substantial portion of a subscriber's monthly throughput allotment. Consumers may have far less tolerance for unsolicited, spam emails, banner advertisements and other throughput users if the consumer directly bears the cost for the delivery of such traffic. Net bias initiatives may accrue revenue

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[62] SETI@home is a scientific experiment that uses Internet-connected computers in the Search for Extraterrestrial Intelligence ("SETI"). Individual computer owners can participate by running a free program that downloads and analyzes radio telescope data thereby distributing the massive data analysis load among an extensive grid of participants. *See* SETI@home web site, http://setiathome.ssl.berkeley.edu/.

and efficiency gains for incumbent carriers at the risk of triggering a significant reduction in the synergy, welfare enhancement, or surplus accrued from an Internet access subscription.

Perhaps consumer resistance to unsolicited content may cause incumbent carriers to come up with innovative, untraditional payment plans similar to what Netheads offer. One option, used by both Netheads and quasi-Bellhead cellular radiotelephone carriers shift costs from content recipients to content generators. A "pay to play," Calling Party Pays [63] arrangement would require advertisers to pay for content delivery in addition to content hosting just as calling parties pay for termination of calls on wireless mobile telephone networks in many countries with the exception of the United States. Because paying parties may consider any surcharge as a double payment, from both the end user and the advertiser, incumbent carriers must offer both parties some service enhancements: for end users an increase in the throughput quota or bit rate, and for advertisers and content creators superior carriage from end-to-end, i.e., from content generator, through all affiliated and unaffiliated ISP networks and onward to the last mile operated by the incumbent carrier.

If the privatization signaled the conclusion of the Internet's first, developmental phase, then the net neutrality/net bias debate signals the conclusion of the Internet's second, adolescent and experimental phase. As the Bellheads have consolidated both ownership and management of

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[63] "Today in the United States, the presubscribed customer of a CMRS [commercial mobile radio services] provider – 'the called party' - generally pays all charges associated with incoming calls. Under CPP, a CMRS provider makes available to its subscribers an offering whereby the party placing the call to a CMRS subscriber pays at least some of the charges associated with terminating the call, including most prominently charges for the CMRS airtime." Calling Party Pays Service Offering in the Commercial Mobile Radio Services, Declaratory Ruling and Notice of Proposed Rulemaking, WT Docket No. 97-207, 14 FCC Rcd. 10,861 (1999)(proposing to remove regulatory obstacles to the offering to consumers of Calling Party Pays).

the major Tier-1 ISPs, it logically follows that their management style and operating assumptions similarly will predominate.