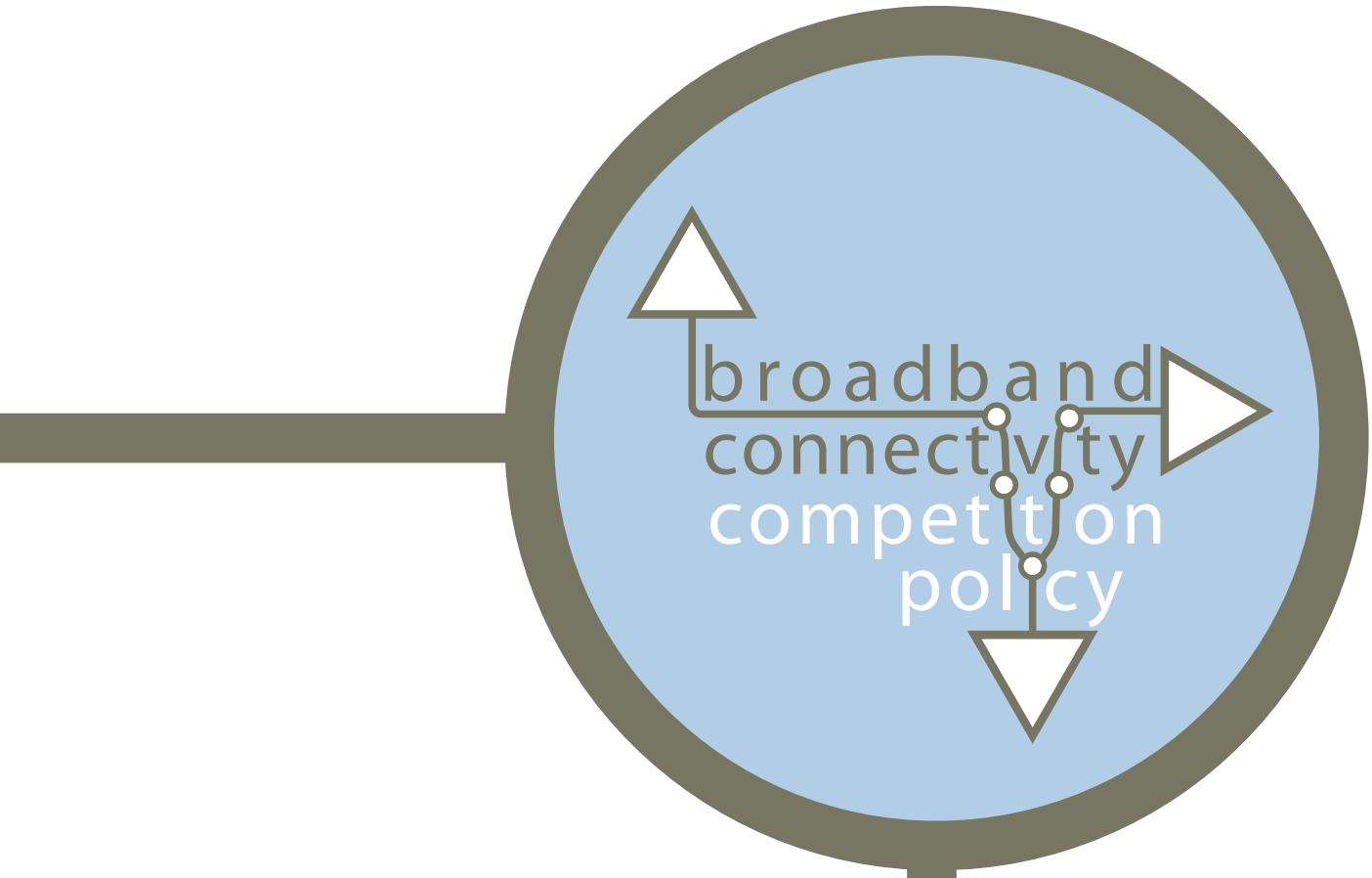

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Federal Trade Commission

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This Report represents the views of the FTC staff and does not necessarily represent the views of the Commission or any individual Commissioner. The Commission, however, has voted to authorize the staff to issue this Report.

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INTRODUCTION AND EXECUTIVE SUMMARY

Background

The Internet[1] has profoundly impacted numerous aspects of daily life for many people in the United States and is increasingly vital to the American economy. In response to recent debate relating to Internet access issues, Federal Trade Commission ("FTC" or "Commission") Chairman Deborah Platt Majoras announced the formation of the Internet Access Task Force ("Task Force") in August 2006 and invited interested parties to meet with the Task Force to discuss issues relating to Internet access generally and net neutrality[2] in particular.[3] The Task Force held a two-day public workshop on broadband connectivity competition policy in February 2007 ("Workshop") to bring together consumer advocates and experts from business, government, academia, and the technology sector to explore competition and consumer protection issues relating to broadband Internet access.[4] The purpose of this Report is to summarize the Task Force's learning on broadband Internet connectivity in general and network neutrality in particular, as developed from the Workshop, meetings between the Task Force and various interested parties, and the FTC staff's independent research.

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[1] As discussed in more detail in Chapter I of this Report, the term "Internet" is commonly used to refer to the decentralized, interconnected network of computer networks that allows computers to communicate with each other. Individual networks are owned and administered by a variety of organizations, such as private companies, universities, research labs, government agencies, and municipalities.

[2] The terms "net neutrality" and "network neutrality" have been used to identify various policy concerns and prescriptions raised by diverse parties to the larger social discussion of broadband Internet connectivity. Typically, such terms are identified with positions that recommend, at least, some legal or regulatory restrictions on broadband Internet access services that include non-discrimination requirements above and beyond any that may be implied by existing antitrust law or Federal Communications Commission ("FCC") regulations. Particular concerns and positions are explored in some detail throughout the Report, but the terms "net neutrality" and "network neutrality" are used here, interchangeably, to refer to this larger family of views. Unless otherwise clarified, our terminological choice is not meant to endorse any particular policy position.

[3] *See* Deborah Platt Majoras, Chairman, FTC, Luncheon Address, The Progress & Freedom Foundation's Aspen Summit, The Federal Trade Commission in the Online World: Promoting Competition and Protecting Consumers (Aug. 21, 2006), *available at* http://ftc.gov/speeches/majoras/060821pffaspenfinal.pdf.

[4] The agenda, transcript, public comments, and other information relating to the Workshop are available on the FTC's Web site at http://www.ftc.gov/opp/workshops/broadband/index.shtm. In addition, Appendix 1 to this Report provides the identity and affiliation of the Workshop participants.

Throughout this Report, citations to "Public Comments" refer to comments submitted to the FTC in response to its request for public comments on the topics addressed at the Workshop. In addition, citations to "Tr." refer to the Workshop transcript, which is comprised of two volumes. Volume I corresponds to the proceedings on February 13, 2007; Volume II corresponds to the proceedings on February 14, 2007. Speakers are identified by last name. Finally, citations to "Participant Presentations" refer to presentations, including slide presentations and commentary, provided by Workshop participants.

Originally, the Internet developed out of efforts by researchers at American universities and the U.S. Department of Defense Research Projects Agency ("DARPA")[5] in the 1960s and 1970s to create and test interconnected computer networks that would communicate via data packet switching rather than traditional circuits. Today, the Internet – which enables applications such as e-mail and browsers that search the World Wide Web (the "Web") – connects many millions of end users (and more than one hundred million Web sites worldwide) to content, applications, and each other. End users include the initial government and academic centers, corporate entities across all sectors of the economy, and individuals and associations.

Individual end users (and networks of end users) arrange for Internet access via a "last mile" connection to an Internet service provider ("ISP"),[6] which provides, in turn, routing and connections from the ISP's own network to the Internet. Content and applications providers offer their products and services to end users via network operators, which enable connectivity and transport into the middle, or "core," of the Internet. Before the turn of the century, most computer users connected to the Internet using "narrowband," dial-up telephone connections and modems to transmit data over the telephone system's traditional copper wirelines. Much faster "broadband" connections recently have been deployed using various technologies, including coaxial cable wirelines, upgraded copper digital subscriber lines ("DSL"), and to a lesser extent fiber-optic wirelines, wireless, satellite, and broadband over powerlines ("BPL").

Traditionally, data traffic has traversed the Internet on a "first-in-first-out" and "best-efforts" basis. This protocol for data transmission was established principally as a result of DARPA's original priority, which was to develop an effective technique for communications among existing interconnected networks, and which placed network survivability – or the potential for robust network operation in the face of disruption or infrastructure destruction – as the top goal in designing the overall architecture of this network of networks. Since the Internet's earliest days, however, computer scientists have recognized that network resources are scarce and that traffic congestion can lead to reduced performance. Although different data transmission protocols and the viability of usage-based pricing mechanisms were explored throughout the 1980s and 1990s, the debate over broadband connectivity policy did not reach critical mass until recently. Technical, business, legal, and regulatory developments all appear to have contributed to the acceleration of the discussion.

Regulatory jurisdiction over broadband services generally is subject to the shared jurisdiction of the FCC, the FTC, and the Department of Justice ("DOJ").[7] FCC jurisdiction comes chiefly from the Communications Act of 1934, as amended ("Communications Act").[8] FTC jurisdiction over broadband arises chiefly under its

[5] Appendix 2 to this Report provides a glossary of acronyms that are frequently used herein.

[6] In this Report, we also refer to broadband ISPs as "broadband providers" and "access providers."

[7] See *infra* Chapters II and IX.A for discussion of various jurisdictional issues.

[8] 47 U.S.C. §§ 151 *et seq.*

statutory mandate to prevent "unfair methods of competition" and "unfair or deceptive acts or practices in or affecting commerce" under the FTC Act.[9] The FTC's authority to enforce the federal antitrust laws generally is shared with DOJ's Antitrust Division. The FCC, FTC, and DOJ have exercised their existing authority in various ways. All three agencies have scrutinized proposed mergers in Internet-related markets and have negotiated significant conditions on certain mergers allowed to go forward.[10] In addition, the FTC has enforced the consumer protection laws, bringing a variety of cases against Internet service providers that have engaged in allegedly deceptive marketing and billing practices.[11]

Certain judicial and regulatory decisions in recent years have clarified the scope of broadband regulation in two fundamental regards. First, since about 2000, the FCC has undertaken a substantial and systematic deregulation of broadband services and facilities, concluding that cable, wireline, powerline, and wireless broadband Internet access services are "information services" that are not subject to common carrier requirements.[12] The first of these decisions was sustained by the Supreme Court in *National Cable & Telecommunications Association v. Brand X Internet Services*.[13]

Second, these decisions have served to reinforce and expand FTC jurisdiction over broadband Internet access services. That jurisdiction had once been regarded as limited to the extent that the FTC's general enforcement authority under the FTC Act did not extend to entities that were "common carriers" under the Communications Act. The regulatory and judicial decisions at issue, however, confirmed that the larger categories of broadband Internet access services, as information services, are not exempt from FTC enforcement of the FTC Act.

In recent years, changes in both user demand and technology have prompted some broadband providers openly to consider prioritizing certain data traffic to improve network management and provide premium services. The demand for bandwidth has increased dramatically, as a growing number of users seek access to increasingly data-rich Internet content, such as streaming video, which often requires considerable bandwidth or has particular quality-of-service requirements. That demand has prompted

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[9] 15 U.S.C. §§ 41 *et seq.*

[10] *See, e.g.*, Am. Online, Inc. & Time Warner, Inc., FTC Dkt. No. C-3989 (Dec. 17, 2000) (complaint), *available at* http://www.ftc.gov/os/2000/12/aolcomplaint.pdf. See *infra* Chapters II and IX for discussion of FCC, FTC, and DOJ scrutiny of mergers in the area of broadband Internet access.

[11] *See, e.g.*, Am. Online, Inc. & CompuServe Interactive Servs., Inc., FTC Dkt. No. C-4105 (Jan. 28, 2004) (decision and order), *available at* http://www.ftc.gov/os/caselist/0023000/040203aolcsdo.pdf; Juno Online Servs., Inc., FTC Dkt. No. C-4016 (June 29, 2001) (decision and order), *available at* http://www.ftc.gov/os/2001/06/junodo.pdf.

[12] Particular rulemaking and other administrative decisions along these lines are discussed in more detail in Chapters II and IX, *infra*.

[13] 545 U.S. 967 (2005).

concern about present and future congestion and about the need for further infrastructure investment and development. At the same time, technological developments have made feasible differentiation in delivery of data of various types, or from various sources, based on payment to or affiliation with a network operator.

In response, various interested parties, including some content and applications providers and commentators, have expressed concern about network operators' use of these technologies in an environment that is not subject to common carrier regulations. Some of these providers and commentators, therefore, have proposed that the transmission of data on the Internet be subject to some type of "net neutrality" regulation that forbids or places restraints on some types of data or price discrimination by network operators. Opponents of net neutrality regulation assert that it is not just unnecessary, but potentially harmful, and that allowing network operators to innovate freely across technical and business contexts, and to differentiate their networks, will lead to enhanced service offerings for both end users and content and applications providers.

Before turning to the policy discussion that follows, it is worth clarifying that this Report reflects the views of the staff of an agency that enforces the federal antitrust and consumer protection laws. The statutory mission of the FTC is to protect both competition and consumers by safeguarding and encouraging the proper operation of the free market. In carrying out that mission, the FTC primarily is focused on maximizing consumer welfare, as that term is defined in an economic sense in modern antitrust and consumer protection jurisprudence. We recognize that preserving the diversity of views expressed on the Internet is one of the animating principles of many of the most ardent proponents of network neutrality. In this Report, however, we do not attempt to balance consumer welfare (as we use it, in the economic sense) and free expression.[14] Instead, the Report focuses on the consumer welfare implications of enacting some form of net neutrality regulation.

Further, although the goal of increasing competition in broadband Internet access is fundamental to the FTC staff's interest and may be widely shared, how best to achieve that goal is a point of sharp disagreement. What the FTC can offer in this debate is an explanation of which behavior the antitrust and consumer protection laws already proscribe and a framework for analyzing which conduct may foster or impede competition in particular circumstances.

The Report is organized as follows. Chapter I provides technical information on the functioning of the Internet, and Chapter II provides background information on the

[14] *See, e.g.*, Mercatus Center, Public Comment 27, at 10 ("If the desired outcome is that anyone willing to pay the monthly price for Internet access can communicate with others at some minimum speed, then a policy that promotes 'neutral' treatment of everyone on the network may be appropriate. But if the desired outcome is to have as many people as possible connected to the Internet so they can speak if they so choose, then a different policy, aimed at reducing the consumer's total cost of Internet access as well as usage, may be most effective, even if it does not mandate 'neutrality.'"); Feld, Tr. II at 75 ("It is a question about balancing. . . . I can say that something does introduce a certain amount of economic inefficiency and it is still extraordinarily valuable for the contribution that it gives to us as a society, as a democracy . . . . I would argue that is something we should be willing to consider.").

legal and regulatory developments that have fueled the debate over net neutrality regulation. The purpose of these Chapters is to inform the subsequent policy discussion. Chapter III identifies and briefly describes the various arguments for and against net neutrality regulation that have been put forth to date. Chapter IV analyzes potential conduct by ISPs and other network operators, including vertical integration into content and applications and discrimination against non-affiliated providers of content and applications. Chapter V analyzes the potential use of data prioritization technologies by network operators. Chapter VI considers the current and future state of competition in the area of broadband Internet access. Chapter VII explores the application of the antitrust laws to certain potential conduct and business arrangements involving ISPs and other network operators. Chapter VIII addresses consumer protection issues relating to broadband Internet access. Chapter IX identifies regulatory, legislative, and other proposals for broadband Internet access that have been put forth to date. Finally, Chapter X identifies guiding principles for policy makers to consider prior to enacting any new laws or regulations in this area.

The Contours of the Debate

Proponents of network neutrality regulation include, among others, some content and applications providers, non-facilities-based ISPs, and various commentators. They generally argue that "non-neutral" practices will cause significant and wide-ranging harms and that the existing jurisdiction of the FCC, FTC, and DOJ, coupled with Congressional oversight, are insufficient to prevent or remedy those harms. Proponents suggest that, with deregulation of broadband services, providers of certain broadband Internet services have the legal ability, as well as economic incentives, to act as gatekeepers of content and applications on their networks.

Principally, these advocates express concern about the following issues: (1) blockage, degradation, and prioritization of content and applications; (2) vertical integration by ISPs and other network operators into content and applications; (3) effects on innovation at the "edges" of the network (that is, by content and applications providers); (4) lack of competition in "last-mile" broadband Internet access markets; (5) remaining legal and regulatory uncertainty in the area of Internet access; and (6) the diminution of political and other expression on the Internet. Not all proponents of net neutrality regulation oppose all forms of prioritization, however. For example, some believe that prioritization should be permitted if access to the priority service is open to all content and applications providers on equal terms; that is, without regard to the identity of the content or application provider.

Opponents of network neutrality regulation include, among others, some facilities-based wireline and wireless network operators and other commentators. They maintain that net neutrality regulation will impede investment in the facilities necessary to upgrade Internet access and may hamper technical innovation. They also argue that the sorts of blocking conduct described by net neutrality proponents are mainly hypothetical thus far and are unlikely to be widespread and thus are insufficient to justify a new, *ex ante* regulatory regime.

Principally, opponents of net neutrality regulation argue that: (1) neutrality regulations would set in stone the status quo, precluding further technical and business-model innovation; (2) effective network management practices require some data prioritization and may require certain content, applications, or attached devices to be blocked altogether; (3) new content and applications are likely to require prioritization and other forms of network intelligence; (4) allowing network operators to innovate freely and differentiate their networks permits competition that is likely to promote enhanced service offerings; (5) prohibiting price differentiation would reduce incentives for network investment generally and may prevent pricing and service models more advantageous to marginal consumers; (6) vertical integration by network operators into content and applications and certain bundling practices may benefit consumers; and (7) there is insufficient evidence of either the likelihood or severity of potential harms to justify an entirely new regulatory regime, especially given that competition is robust and intensifying and the market generally is characterized by rapid technological change.

Competing Concerns about Integration and Differentiation

Proponents of net neutrality regulation have raised various concerns about the effects of data or price differentiation in broadband markets.[15] Certain of these concerns are tied to vertical integration (broadly construed), as broadband Internet access providers have begun to offer online content and applications in addition to their primary access services. Other concerns are independent of such integration.

In particular, proponents are concerned that vertical integration by Internet access providers into content and applications markets could prompt them to block, degrade, or charge higher prices to competing content or applications. New information technologies, such as deep packet inspection, may allow network operators to identify the source and content of much of the data traffic they handle. Hence, a broadband provider with significant market power in a given access market, which has an interest in content or applications generally, could have an incentive to block or degrade competing content or applications.

Independent of market power considerations, some net neutrality proponents have raised concerns about the so-called "terminating access monopoly problem," which could result from broadband Internet access providers charging content or applications providers terminating fees for delivery to end users over the last mile. Some proponents also have expressed concern that if broadband providers are allowed to sign exclusive deals with content or applications providers, end users may be unable to access much of the content they desire, thus "balkanizing" the Internet.

On the other hand, because vertical integration may offer efficiencies that are procompetitive and pro-consumer, not all vertical integration is problematic. More particularly, opponents of net neutrality regulation maintain that some degree of vertical

[15] See *infra* Chapters IV and V for more detailed discussion of data differentiation and price differentiation, respectively.

integration by Internet access providers into content and applications may facilitate investment in infrastructure, investment in content or applications, optimization of fit between content and delivery systems, and pricing benefits for consumers. They assert that such vertical integration also may facilitate entry and thereby increase competition in broadband Internet access markets. Further, the incentives of broadband providers may cut both ways: for example, despite potentially having an incentive to favor affiliated content and applications, access providers have argued that they have an interest in providing access to a wide range of content and applications, which are essential complements to the services they sell.

As is the case with data discrimination, it is impossible to determine in the abstract whether allowing content and applications providers (or even end users) to pay broadband providers for prioritized data transmission will be beneficial or harmful to consumer welfare.[16] Such prioritization may provide benefits, such as increased investment and innovation in networks and improved quality of certain content and applications that require higher-quality data transmission, as net neutrality opponents claim. Network neutrality proponents have raised concerns, however, regarding potential adverse effects of data prioritization, including, among others: (1) a diminution in innovation by content and applications providers – particularly those unable to pay for prioritization; (2) the intentional or passive degradation of non-prioritized data delivery; and (3) increased transaction costs resulting from negotiations between broadband providers and content and applications providers over prioritization.

The balance between competing incentives on the part of broadband providers to engage in, and the potential benefits and harms from, discrimination and differentiation in the broadband area raise complex empirical questions and may call for substantial additional study of the market generally, of local markets, or of particular transactions. Again, further evidence of particular conduct would be useful for assessing both the likelihood and severity of any potential harm from such conduct.

Present and Future Broadband Competition[17]

Proponents and opponents of net neutrality regulation have fundamentally different views on the present (and likely future) state of competition in the broadband industry. Proponents argue either that a national market for broadband Internet access is, in effect, a cable-telephone duopoly or that there are significant failures of competition in many local markets. Opponents characterize the market as highly competitive. Broadband Internet access generally is a relatively new industry characterized by high levels of demand growth from consumers, high market shares held by incumbent cable and telephone providers, and many new entrants trying to capture some share of the market.

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[16] *See infra* Chapter V.

[17] Broadband competition issues are discussed throughout this Report, particularly in Chapters VI and VII.

FTC staff did not conduct independent empirical research regarding competition in local broadband Internet access markets for the purposes of this Report. We note that opponents of net neutrality regulation have pointed to evidence on a national scale that (1) access speeds are increasing, (2) prices (particularly speed-adjusted or quality-adjusted prices) are falling, and (3) new entrants, including wireless and other competitors, are poised to challenge the incumbent cable and telephone companies. We note, too, that statistical research conducted by the FCC has tended to confirm these general trends.[18] For example, broadband deployment and penetration have increased dramatically since 2000. The FCC estimated that by 2006, broadband DSL service was available to 79 percent of the households that were served by a telephone company, and cable modem service was available to 93 percent of the households to which cable companies could provide cable television service.[19]

Jurisdiction and the Application of Antitrust Law

The competitive issues raised in the debate over network neutrality regulation are not new to antitrust law, which is well-equipped to analyze potential conduct and business arrangements involving broadband Internet access. The antitrust laws are grounded in the principle that competition serves to protect consumer welfare. In conducting an antitrust analysis, then, the ultimate issue would be whether broadband providers engage in unilateral or joint conduct that is likely to harm competition and consumers in a relevant market.

Many proponents of net neutrality regulation are concerned that broadband Internet access suppliers have market power in the last-mile access market and that they will leverage that power into adjacent content and applications markets in a way that will harm competition in those markets and, ultimately, consumers. Such leveraging may take the form of exclusive dealing arrangements, refusals to deal, vertical integration, or certain unilateral conduct. All of these types of conduct can be anticompetitive and harmful to consumers under certain conditions. They also, however, can be procompetitive, capable of improving efficiency and consumer welfare, which involves, among other things, the prices that consumers pay, the quality of goods and services offered, and the choices that are available in the marketplace. Accordingly, such conduct would be analyzed under the antitrust laws to determine the net effect of such conduct on consumer welfare.

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[18] *See, e.g.*, FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF JUNE 30, 2006 (2007) [hereinafter FCC, HIGH-SPEED SERVICES], *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270128A1.doc. Although some have questioned whether the methodology used in compiling this data allows the FCC to provide a reliable analysis of competition in particular markets, the FCC data does provide an overall picture of the significant growth in broadband penetration over the past few years.

[19] *See, e.g.*, *id.* at 2-4, 5 tbl.1, 6 tbl.2, 7 tbl.3, 19 tbl.14.

There nonetheless remains significant disagreement with respect to the adequacy of existing agency oversight. Some proponents of net neutrality regulation have argued that existing laws, regulations, and agency oversight are inadequate to safeguard competition in broadband Internet access markets. Those opposed to net neutrality regulation, however, have argued that current competition law is adequate, that careful rule-of-reason application of the law is critical to the preservation of competition, and that additional regulations likely would be over-intrusive and, on balance, a burden to vibrant competition in broadband markets.

Consumer Protection Issues

Effective consumer protection in the broadband marketplace is essential to robust competition in that market – regardless of the outcome of the current broadband connectivity debate. The FTC has been active in enforcing relevant consumer protection law, bringing a variety of cases against ISPs that have engaged in allegedly deceptive marketing and billing practices. The Workshop highlighted various consumer protection concerns. Several Workshop participants argued that such concerns were best addressed under FTC jurisdiction, given the FTC's statutory mandate, its interest and experience in consumer protection issues generally, and its interest and experience in consumer protection aspects of various Internet services in particular.

Internet access implicates two broad areas of consumer protection: (1) clear and conspicuous disclosure of material terms of Internet access services; and (2) security and privacy issues created by broadband Internet access services. Current federal consumer protection law can address both sets of concerns, although consumer protection issues in the broadband marketplace may present unique technical and jurisdictional challenges, both to consumers and law enforcement agencies. Commentators within and without the Workshop have suggested that federal law enforcement fruitfully could be augmented by industry self-regulation and expanded federal guidance on pertinent issues.

Suggested Guiding Principles

The FTC's Internet Access Task Force has conducted a broad examination of the technical, legal, and economic issues underpinning the debate surrounding broadband connectivity competition policy. Based on this examination, as well as our experience with the operation of myriad markets throughout the economy, we identify guiding principles that policy makers should consider in evaluating options in the area of broadband Internet access.[20] We have provided an explanation of the conduct that the antitrust and consumer protection laws already proscribe and a framework for analyzing which conduct may foster or impede competition in particular circumstances. In evaluating whether new proscriptions are necessary, we advise proceeding with caution before enacting broad, *ex ante* restrictions in an unsettled, dynamic environment.

[20] *See infra* Chapter X.

There is evidence that the broadband Internet access industry is moving in the direction of more, not less, competition, including fast growth, declining prices for higher-quality service, and the current market-leading technology (*i.e.*, cable modem) losing share to the more recently deregulated major alternative (*i.e.*, DSL). We nonetheless recognize that not every local broadband market in the United States may enjoy vigorous competition.[21] This Report does not reflect a case-by-case analysis of the state of competition in each of the localities that may represent relevant antitrust markets.

There also appears to be substantial agreement on the part of both proponents and opponents of net neutrality regulation that greater competition in the area of broadband Internet access would benefit consumers. Thus, to the extent that policy makers are not content to wait for the market to increase competition, they should consider pursuing various ways of increasing competition in the provision of broadband Internet access.

Based on what we have learned through our examination of broadband connectivity issues and our experience with antitrust and consumer protection issues more generally, we recommend that policy makers proceed with caution in evaluating proposals to enact regulation in the area of broadband Internet access. The primary reason for caution is simply that we do not know what the net effects of potential conduct by broadband providers will be on all consumers, including, among other things, the prices that consumers may pay for Internet access, the quality of Internet access and other services that will be offered, and the choices of content and applications that may be available to consumers in the marketplace.

With respect to data discrimination, broadband providers have conflicting incentives relating to blockage of and discrimination against data from non-affiliated providers of content and applications.[22] In the abstract, it is impossible to know which of these incentives would prove stronger for each broadband provider. Further, even assuming such discrimination were to take place, it is unknown whether the net effect on consumer welfare would be adverse. Likewise, it is not possible to know in the abstract whether allowing content and applications providers to pay broadband providers for prioritized data transmission will be beneficial or harmful to consumers.[23]

Several open questions that likely will be answered by either the operation of the current marketplace or technological developments provide additional reasons for caution. These questions include, among others: (1) How much demand will there be from content and applications providers for data prioritization?; (2) Will effective data prioritization, throughout the many networks comprising the Internet, be feasible?; (3) Would allowing broadband providers to practice data prioritization necessarily result in the degradation of non-prioritized data delivery?; (4) When will the capacity limitations of the networks comprising the Internet result in unmanageable or unacceptable levels of

[21] *See infra* Chapter VI.B.

[22] *See infra* Chapter IV.

[23] *See infra* Chapter V.

congestion?; and (5) If that point is reached, what will be the most efficient response thereto: data prioritization, capacity increases, a combination of these, or some as yet unknown technological innovation? The eventual answers to these questions may give policy makers key information about the net effects on consumer welfare arising from the conduct and business arrangements that network neutrality regulation would prohibit or limit.

Policy makers also should carefully consider the potentially adverse and unintended effects of regulation in the area of broadband Internet access before enacting any such regulation. Industry-wide regulatory schemes – particularly those imposing general, one-size-fits-all restraints on business conduct – may well have adverse effects on consumer welfare, despite the good intentions of their proponents. Even if regulation does not have adverse effects on consumer welfare in the short term, it may nonetheless be welfare-reducing in the long term, particularly in terms of product and service innovation. Further, such regulatory schemes inevitably will have unintended consequences, some of which may not be known until far into the future. Once a regulatory regime is in place, moreover, it may be difficult or impossible to undo its effects.

Two aspects of the broadband Internet access industry heighten the concerns raised by regulation generally. First, the broadband industry is relatively young and dynamic, and, as noted above, there are indications that it is moving in the direction of more competition. Second, to date we are unaware of any significant market failure or demonstrated consumer harm from conduct by broadband providers. Policy makers should be wary of enacting regulation solely to prevent prospective harm to consumer welfare, particularly given the indeterminate effects that potential conduct by broadband providers may have on such welfare.

The federal antitrust agencies, the FTC and the DOJ, and the FCC share jurisdiction over broadband Internet access, with each playing an important role in protecting competition and consumers in this area. Further, as a byproduct of the ongoing debate over network neutrality regulation, the agencies have a heightened awareness of the potential consumer harms from certain conduct by, and business arrangements involving, broadband providers. Perhaps equally important, many consumers are now aware of such issues. Consumers – particularly online consumers – have a powerful collective voice. In the area of broadband Internet access, they have revealed a strong preference for the current open access to Internet content and applications.

The FTC has been involved in the Internet access area for over a decade and will continue to be involved in the evolving area of broadband access. The FTC Act is sufficiently flexible to allow the FTC to enforce the antitrust and consumer protection laws in most industries, including those involving new and ever-changing technologies. The fundamental principles of antitrust and consumer protection law and economics that we have applied for years are as relevant to the broadband industry as they are to other industries in our economy.

The FTC will continue to devote substantial resources to maintaining competition and protecting consumers in the area of broadband Internet access, using a variety of tools. The FTC will continue to enforce the antitrust and consumer protection laws in evaluating conduct and business arrangements involving broadband access. Further, the FTC's Broadband Connectivity Competition Policy Workshop and this Report exemplify some of the diverse resources the agency may bring to bear on Internet access issues, in addition to specific law enforcement actions. The Workshop and Report reflect the agency's interest in and commitment to developing competition and consumer protection policy. Finally, the agency will continue to expend considerable efforts at consumer education, industry guidance, and competition advocacy in the important area of Internet access.

I. THE INTERNET: HISTORICAL AND TECHNICAL BACKGROUND

The Internet is a decentralized network of computer networks that enables millions of private and public computers around the world to communicate with each other. This interconnection of multiple computer networks, which otherwise would function only as a series of independent and isolated islands, gives rise to the term "Internet" as we know it today.[24] This Chapter is organized as follows. Section A summarizes the historical development of the Internet and describes how data is routed over it; Section B discusses the relationship between "last-mile" Internet service providers, Internet "backbone" networks, and content and applications providers; and Section C explores the technical aspects of network management, data prioritization, and other forms of data "discrimination."

A. Historical Development

The Internet developed out of research efforts funded by the U.S. Department of Defense Advanced Research Projects Agency in the 1960s and 1970s to create and test interconnected computer networks.[25] The fundamental aim of computer scientists working on this "ARPANET" was to develop an overall Internet architecture that could connect and make use of existing computer networks that might, themselves, be different

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[24] The Federal Networking Council, a group of U.S. federal agency representatives involved in the early development of federal networking, for example, adopted this definition of the term "Internet" in 1995:

> "Internet" refers to the global information system that–
>
> (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons;
>
> (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and
>
> (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein.

U.S. Federal Networking Council, *Resolution dated October 24, 1995*, *in* Robert E. Kahn & Vinton G. Cerf, *What Is the Internet (and What Makes It Work)* n.xv (1999), *available at* http://www.cnri.reston.va.us/what_is_internet.html.

The convention of writing "internet" in lower case letters typically refers to interconnected networks generally, while writing "Internet" with an uppercase "I" is generally used to refer to the original or current version of the Internet. DOUGLAS E. COMER, THE INTERNET BOOK 60 (4th ed. 2007). Sometimes, though, individual networks are also referred to as being alternative "Internets." *E.g.*, INTERNET2, ABOUT US (2007), *available at* http://www.internet2.edu/about.

[25] *See generally* David D. Clark, *The Design Philosophy of the DARPA Internet Protocols*, COMPUTER COMM. REV., Aug. 1988, at 106, *available at* http://nms.csail.mit.edu/6829-papers/darpa-internet.pdf; BARRY M. LEINER ET AL., A BRIEF HISTORY OF THE INTERNET, http://www.isoc.org/internet/history/brief.shtml (last visited June 18, 2007); COMER, *supra* note 24, at 62.

both architecturally and technologically.[26] The secondary aims of the ARPANET project were, in order of priority: (1) Internet communication must continue despite the loss of networks or gateways between them; (2) the Internet architecture must support multiple types of communications services; (3) the architecture must accommodate a variety of networks; (4) it must permit distributed, decentralized management of its resources; (5) the architecture must be cost-effective; (6) the architecture must permit attachment by computer devices with a low level of effort; and (7) the resources used in the Internet architecture must be accountable.[27] That is to say, ARPANET's first priority was network survivability in a potentially hostile environment, and its last priority was providing a system for allocating charges for passing data packets from network to network.[28]

By the late 1960s, computer scientists were experimenting with non-linear "packet-switched" techniques to enable computers to communicate with each other.[29] Using this method, computers disassemble information into variable-size pieces of data called "packets" and forward them through a connecting medium to a recipient computer that then reassembles them into their original form. Each packet is a stand-alone entity, like an individual piece of postal mail, and contains source, destination, and reassembly information. Unlike traditional circuit-switched telephone networks, packet-switched networks do not require a dedicated line of communication to be allocated exclusively for the duration of each communication. Instead, individual data packets comprising a larger piece of information, such as an e-mail message, may be dispersed and sent across

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[26] Clark, *supra* note 25, at 106 ("The top level goal for the DARPA Internet Architecture was to develop an effective technique for multiplexed utilization of existing interconnected networks.").

[27] *Id*. at 107.

[28] *Id*. Besides survivability, "[t]here were also other concerns, such as implementation efficiency, internetwork performance, but these were secondary considerations at first." LEINER ET AL., *supra* note 25. David D. Clark, who served as chief Protocol Architect for TCP/IP from 1981-89, has noted that the ARPANET's original goals differ from what an architecture designed for commercial purposes might have looked like:

> This set of goals might seem to be nothing more than a checklist of all the desirable network features. It is important to understand that these goals are in order of importance, and an entirely different network architecture would result if the order were changed. For example, since this network was designed to operate in a military context, which implied the possibility of a hostile environment, survivability was put as a first goal, and accountability as a last goal. During wartime, one is less concerned with detailed accounting of resources used than with mustering whatever resources are available and rapidly deploying them in an operational manner. While the architects of the Internet were mindful of [resource] accountability, the problem received very little attention during the early stages of the design, and is only now being considered. An architecture primarily for commercial deployment would clearly place these goals at the opposite end of the list.

Clark, *supra* note 25, at 107.

[29] *See generally* LEINER ET AL., *supra* note 25.

multiple paths before reaching their destination and then being reassembled.[30] This process is analogous to the way that the individual, numbered pages of a book might be separated from each other, addressed to the same location, forwarded through different post offices, and yet all still reach the same specified destination, where they could be reassembled into their original form.[31]

By the mid-1970s, computer scientists had developed several software communications standards, or protocols, for connecting computers within the same network. At about the same time, ARPANET scientists developed a protocol for connecting different networks to each other, called the Transmission Control Protocol/Internet Protocol ("TCP/IP") software suite.[32] The TCP component of the suite controls the disassembly and reassembly of data packets sent from a computer server, where the data resides.[33] The IP component specifies the formatting and addressing scheme for transmitting data between sender and recipient computers.[34]

This approach requires that individual networks be connected together by gateway interface devices, called switches or routers.[35] Thus, interconnected networks are, in

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[30] *See generally* JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICY IN THE INTERNET AGE 39-45 (paperback ed., 2007) (comparing circuit-switched and packet-switched networks).

[31] *See id.* at 42.

[32] Vinton G. Cerf & Robert E. Kahn, *A Protocol for Packet Network Intercommunication*, 22 IEEE TRANSACTIONS ON COMM. 637 (1974), *available at* http://www.cs.princeton.edu/courses/archive/fall06/cos561/papers/cerf74.pdf.

[33] In the original paper describing the TCP/IP protocol, Cerf and Kahn explain:

> Processes that want to communicate present messages to the TCP for transmission, and TCP's deliver incoming messages to the appropriate destination processes. We allow the TCP to break up messages into segments because the destination may restrict the amount of data that may arrive, because the local network may limit the maximum transmission size, or because the TCP may need to share its resources among many processes concurrently. . . .
>
> From this sequence of arriving packets (generally from different HOSTS [computers]), the TCP must be able to reconstruct and deliver messages to the proper destination processes.

Id. at 640.

[34] "Since the GATEWAY [(router)] must understand the address of the source and destination HOSTS, this information must be available in a standard format in every packet which arrives at the GATEWAY. This information is contained in an *internetwork header* prefixed to the packet by the source HOST." *Id*. at 638. "If the TCP is to determine for which process an arriving packet is intended, every packet must contain a *process header* (distinct from the internetwork header) that completely identifies the destination process." *Id*. at 640.

[35] *See id*. at 638.

effect, a series of routers connected by transmission links. Packets of data are passed from one router to another, via the transmission links. Typically, each router has several incoming transmission links through which packets arrive and several outgoing links through which the router can send packets. When a packet arrives at an incoming link, the router will use a software algorithm to determine the outgoing link through which the packet should be routed. If that outgoing link is free, the packet is sent out immediately. If the relevant outgoing link is busy transmitting other packets, however, the newly arrived packet must wait. Usually, the packet will be temporarily held, or "buffered," in the router's memory, waiting its turn until the relevant outgoing link is free. Thus, buffering is a method of dealing with temporary surges in Internet traffic, which can be variable or "bursty." If too many packets are buffered during a period of congestion, however, the router may have no choice but to reroute or drop altogether some of those packets.[36] Because no transmission mechanism can be completely reliable, computer scientists also developed methods of retransmitting data to deal with dropped or otherwise incorrectly transmitted packets.[37]

Two of the resulting features of this TCP/IP protocol are that it transmits data between networks on a "first-in-first-out" and "best-efforts" basis.[38] Therefore, although the resulting interconnected networks are generally able to transmit data successfully

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[36] *See generally* Edward W. Felten, *Nuts and Bolts of Network Neutrality* 1-2 (AEI-Brookings Joint Center, Working Paper No. RP-06-23, 2006), *available at* http://www.aei-brookings.org/publications/abstract.php?pid=1106. *See also* Jon M. Peha, *The Benefits and Risks of Mandating Network Neutrality and the Quest for a Balanced Policy*, 34th Research Conference on Communication, Information, & Internet Policy 5-6 (2006), *available at* http://web.si.umich.edu/tprc/papers/2006/574/Peha_balanced_net_neutrality_policy.pdf (describing the use of algorithms to manage traffic flows across a network).

[37] As Cerf and Kahn explained:

> No transmission can be 100 percent reliable. We propose a timeout and positive acknowledgement mechanism which will allow TCP's to recover from packet losses from one HOST to another. . . . [T]he inclusion of a HOST retransmission capability makes it possible to recover from occasional network problems and allows a wide range of HOST protocol strategies to be incorporated. We envision it will occasionally be invoked to allow HOST accommodation to infrequent overdemands for limited buffer resources, and otherwise not used much.

Cerf & Kahn, *supra* note 32, at 643.

[38] *See generally* DAVID CLARK ET AL., NEW ARCH: FUTURE GENERATION INTERNET ARCHITECTURE: FINAL TECHNICAL REPORT (2003), *available at* http://www.isi.edu/newarch/iDOCS/final.finalreport.pdf (sponsored by DARPA Information Technology Office). "The original Internet provided a very simple and minimally specified packet transfer service, sometimes called 'best effort'. Crudely, what 'best effort' means is that the network makes no specific commitments about transfer characteristics, such as speed, delays, jitter, or loss." *Id*. at 7.

between senders and receivers using TCP/IP, congestion or other technical issues can affect transmission and, as a result, no particular quality-of-service level is guaranteed.[39]

Also, during the Internet's early years, network architectures generally were based on what has been called the "end-to-end argument."[40] This argument states that computer application functions typically cannot, and should not, be built into the routers and links that make up a network's middle or "core." Instead, according to this argument, these functions generally should be placed at the "edges" of the network at a sending or receiving computer.[41] This argument also recognizes, however, that there might be certain functions that can be placed only in the core of a network. Sometimes, this argument is described as placing "intelligence" at or near the edges of the network, while leaving the core's routers and links mainly "dumb" to minimize the potential for transmission and interoperability problems that might arise from placing additional complexity into the middle of the network.[42]

Throughout the 1970s and 1980s, the interconnection of computer networks using TCP/IP continued to grow, spurred by uses such as e-mail.[43] In the mid-1980s, the National Science Foundation ("NSF") recognized that computer networks were having an important impact on scientific research by facilitating communications between researchers working in different locations. NSF and DARPA had been jointly funding a network to connect computer science researchers ("CSNET") since the late 1970s. In 1985, NSF announced a plan to connect one hundred universities to the Internet, in addition to five already-existing supercomputer centers located around the country.[44]

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[39] In the original paper describing the TCP/IP protocol, Cerf and Kahn recognized that because individual networks have differing characteristics, "[t]he transmit time for this data is usually dependent upon internal network parameters such as communications media data rates, buffering and signaling strategies, routing, propagation delays, etc." Cerf & Kahn, *supra* note 32, at 637. "The success or failure of a transmission and its performance in each network is governed by different time delays in accepting, delivering, and transporting the data." *Id*. "TCP may need to share its resources among many processes concurrently." *Id*. at 640. Likewise, resources needed to buffer high volumes of incoming packets may also be "limited." *Id*. at 643. Thus, "[c]ongestion at the TCP level is flexibly handled owing to the robust retransmission and duplicate detection strategy." *Id.* at 645.

[40] *See, e.g.*, J.H. Saltzer et al., *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS ON COMPUTER SYS. 277 (1984).

[41] *Id.* at 277 ("The argument appeals to application requirements, and provides a rationale for moving function upward in a layered system, closer to the application that uses that function.").

[42] *See, e.g.*, Adam Thierer, *Are "Dumb Pipe" Mandates Smart Public Policy? Vertical Integration, Net Neutrality, and the Network Layers Model*, *in* NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED? 73, 79 (Thomas M. Lenard & Randolph J. May, eds., 2006).

[43] LEINER ET AL., *supra* note 25 ("Thus, by 1985, Internet was already well established as a technology supporting a broad community of researchers and developers, and was beginning to be used by other communities for daily computer communications. Electronic mail was being used broadly across several communities . . . .").

[44] COMER, *supra* note 24, at 72-76.

Recognizing the increasing importance of this interconnected network to U.S. competitiveness in the sciences, however, NSF embarked on a new program with the goal of extending Internet access to every science and engineering researcher in the country. In 1988, NSF, in conjunction with a consortium of private-sector organizations, completed a new long-distance, wide-area network, dubbed the "NSFNET" backbone.

Although private entities were now involved in extending the Internet, its design still reflected ARPANET's original goals. Although the original ARPANET was decommissioned in 1990, its influence continued because TCP/IP had supplanted or marginalized most other wide-area computer network protocols in existence at that time,[45] and because its design, which provided for generality and flexibility, proved to be durable in a number of contexts.[46] At the same time, its successful growth made clear that these design priorities no longer matched the needs of users in certain situations, particularly regarding accounting and resource management.[47]

By 1992, the volume of traffic on NSFNET was approaching capacity, and NSF realized it did not have the resources to keep pace with the increasing usage. Consequently, the members of the consortium formed a private, non-profit organization called Advanced Networks and Services ("ANS") to build a new backbone with transmission lines having thirty times more capacity.[48] For the first time, a private organization – not the government – principally owned the transmission lines and computers of a backbone.

At the same time that privately owned networks started appearing, general commercial activity on the NSFNET was still prohibited by an Acceptable Use Policy.[49] Thus, the expanding number of privately owned networks were effectively precluded from exchanging commercial data traffic with each other using the NSFNET backbone. Several commercial backbone operators circumvented this limitation in 1991, when they established the Commercial Internet Exchange ("CIX") to interconnect their own backbones and exchange traffic directly. Recognizing that the Internet was outpacing its ability to manage it, NSF decided in 1993 to leave the management of the backbone to the competing commercial backbone operators. By 1995, this expanding network of

[45] LEINER ET AL., *supra* note 25.

[46] "In the context of its priorities, the Internet architecture has been very successful. The protocols are widely used in the commercial and military environment, and have spawned a number of similar architectures." Clark, *supra* note 25, at 113.

[47] *Id.*

[48] COMER, *supra* note 24, at 75-76.

[49] "On the NSFNET Backbone – the national-scale segment of the NSFNET – NSF enforced an 'Acceptable Use Policy' (AUP) which prohibited Backbone usage for purposes 'not in support of Research and Education.'" LEINER ET AL., *supra* note 25.

commercial backbones had permanently replaced NSFNET, effectively privatizing the Internet.[50]

The growth of the Internet has been fueled in large part by the popularity of the World Wide Web, created in 1989.[51] The number of Web sites on the Internet has grown from one in 1989, to 18,000 in 1995, to fifty million in 2004, and to more than one hundred million in 2006.[52] This incredible growth has been due to several factors, including the realization by businesses that they could use the Internet for commercial purposes, the decreasing cost and increasing power of personal computers, the diminishing complexity of creating Web sites, and the expanding use of the Web for personal and social purposes.

From its creation to its early commercialization, most computer users connected to the Internet using a "narrowband" dial-up telephone connection and a special modem to transmit data over the telephone system's traditional copper wirelines, typically at a rate of up to 56 kilobits per second ("Kbps").[53] Much faster "broadband" connections have subsequently been deployed using a variety of technologies.[54] These faster technologies include coaxial cable wirelines, upgraded copper digital subscriber lines, fiber-optic wirelines, and wireless, satellite, and broadband-over-powerline technologies.[55]

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[50] Michael Kende, *The Digital Handshake: Connecting Internet Backbones* 5 (FCC Office of Plans and Policy, Working Paper No. 32, 2000), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp32.pdf.

[51] *See generally* WORLD WIDE WEB CONSORTIUM, ABOUT THE WORLD WIDE WEB CONSORTIUM (W3C), http://www.w3.org/Consortium (last visited June 22, 2007). Other popular uses of the Internet include: the transfer of data files from one computer to another through a File Transfer Protocol ("FTP"); electronic mail using Simple Mail Transfer Protocol ("SMTP"); and the use of TELetype NETwork ("TELNET") to use one computer to access a different computer at another location. *See generally* NUECHTERLEIN & WEISER, *supra* note 30, at 130. The Internet is often described as being comprised of multiple "layers," including: a physical layer consisting of the hardware infrastructure used to link computers to each other; a logical layer of protocols, such as TCP/IP, that control the routing of data packets; an applications layer consisting of the various programs and functions run by end users, such as a Web browser that enables Web-based e-mail; and a content layer, such as a Web page or streaming video transmission. *See id.* at 118-21.

[52] Marsha Walton, *Web Reaches New Milestone: 100 Million Sites*, CNN, Nov. 1, 2006, http://www.cnn.com/2006/TECH/internet/11/01/100millionwebsites/index.html (last visited June 15, 2007).

[53] *See* NUECHTERLEIN & WEISER, *supra* note 30, at 134-35.

[54] *See id.* at 134-47. Broadband has been defined by the FCC as services that provide transmission speeds of 200 Kbps or higher in at least one direction. *E.g.*, FCC, HIGH-SPEED SERVICES, *supra* note 18, at 5 tbl.1. Some critics, however, believe this definition is outdated. *See, e.g.*, G. Sohn, Tr. I at 97 ("[I]t defines broadband at a ridiculously slow speed, 200 kilobits per second.").

[55] See *infra* Chapter VI for a discussion of various broadband technologies.

The thousands of individual networks that make up the global Internet are owned and administered by a variety of organizations, such as private companies, universities, research labs, government agencies, and municipalities. Data packets may potentially travel from their originating computer server across dozens of networks and through dozens of routers before they reach a "last-mile" Internet service provider[56] and arrive at a destination computer. This process of disassembly, transmission, and reassembly of data packets may take as little as a fraction of a second for a simple piece of information like a text e-mail traveling along a high-speed network, or it may take several hours for a larger piece of information like a high-resolution video traveling a long distance along a low-speed network.[57]

This network of networks connects millions of individuals and organizations in a way that allows almost instantaneous communications using computers, computerized mobile devices, and other network attachments. End users interact with each other through an ever-expanding universe of content and applications, such as: e-mail, instant messaging, chat rooms, commercial Web sites for purchasing goods and services, social networking sites, Web logs ("blogs"), music and video downloads, political forums, voice over IP ("VoIP") telephony services, streaming video applications, and multi-player network video games. Internet users include individuals of virtually all ages and walks of life, established businesses, fledgling entrepreneurs, non-profit groups, academic and government institutions, and political organizations.

The TCP/IP protocol suite has been updated periodically since its introduction.[58] In recent years, however, some computer experts and other interested parties have questioned the TCP/IP suite's thirty-year-old first-in-first-out and best-efforts characteristics.[59] Likewise, in light of the increasing deployment of applications that may

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[56] See *infra* Chapter I.B.1 for a discussion of last-mile ISPs.

[57] *See, e.g.*, NUECHTERLEIN & WEISER, *supra* note 30, at 136.

[58] Kahn & Cerf, *supra* note 24 ("Refinement and extension of these protocols and many others associated with them continues to this day by way of the Internet Engineering Task Force."). *See also* INTERNET ENGINEERING TASK FORCE, OVERVIEW OF THE IETF, http://www.ietf.org/overview.html (last visited May 16, 2007) ("The Internet Engineering Task Force (IETF) is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet."). IETF activities take place under the umbrella of the Internet Society. *See generally* INTERNET SOCIETY, ABOUT THE INTERNET SOCIETY, http://www.isoc.org/isoc (last visited May 16, 2007) (The Internet Society "is the organization home for the groups responsible for Internet infrastructure standards, including the Internet Engineering Task Force (IETF) and the Internet Architecture Board (IAB).").

[59] *E.g.*, David Farber & Michael Katz, Op-Ed., *Hold Off On Net Neutrality*, WASH. POST, Jan. 19, 2007, at A19 ("The current Internet supports many popular and valuable services. But experts agree that an updated Internet could offer a wide range of new and improved services, including better security against viruses, worms, denial-of-service attacks and zombie computers; services that require high levels of reliability, such as medical monitoring; and those that cannot tolerate network delays, such as voice and streaming video. To provide these services, both the architecture of the Internet and the business models through which services are delivered will probably have to change."); Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847, 1863 & n.74 (2006) (noting the opinion of computer scientist David Farber that the current Internet architecture is "getting old").

operate better in a non-end-to-end environment, some have reexamined the end-to-end design argument.[60] Some also have explored what a next generation Internet architecture might look like, with the goal of managing the emerging tension between the Internet's open characteristics and more technologically demanding new applications.[61] In addition, some observers have suggested that the Internet's continued exponential growth and the proliferation of resource-intensive content and applications like video file sharing and the prospect of Internet Protocol television ("IPTV") may outstrip the Internet's current capacity and cause it to become significantly congested or crash altogether.[62]

The problem of network congestion, in particular, was recognized in the original paper describing the TCP/IP suite and, although it received less attention than ARPANET's other original design priorities, computer scientists continued to be mindful of the issue. Some, therefore, continued to explore different transmission protocols and the viability of market-based pricing mechanisms through the 1980s and 1990s.[63] Further, as data-routing technologies have advanced in recent years, some network operators have begun openly to consider using prioritization and other active management practices to improve network management and provide certain premium

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[60] *See, e.g.*, Marjory S. Blumenthal & David D. Clark, *Rethinking the Design of the Internet: The End-to-End Arguments vs. the Brave New World*, 1 ACM TRANSACTIONS INTERNET TECH. 70 (2001) (concluding that the open, general nature of the Internet historically associated with the end-to-end argument should be preserved); ROBERT E. KAHN, CORPORATION FOR NATIONAL RESEARCH INITIATIVES, INTERNET EVOLUTION, GOVERNANCE AND THE DIGITAL OBJECT ARCHITECTURE: WORKSHOP ON SCORM SEQUENCING AND NAVIGATION 8 (Feb. 23, 2005), *available at* http://www.handle.net/presentations_plugfest9/PlugFest9_Plenary_kahn.ppt (discussing whether the Federal Network Council's 1995 Internet definition, *see supra* note 24, should be updated to also include services "integrated with" communications and related infrastructures); Press Release, Stanford Center for Internet and Society, The Policy Implications of End-to-End (Dec. 1, 2000), *available at* http://cyberlaw.stanford.edu/e2e (workshop chaired by Professor Lawrence Lessig) ("In an increasing range of contexts . . . e2e [(end-to-end)] is being questioned. Technologies that undermine e2e are increasingly being deployed; other essential services, such as quality of service, are being developed in ways that are inconsistent with e2e design.").

[61] *E.g.*, CLARK ET AL., *supra* note 38, at 4 ("The goal of this project was to consider the following question: if we could now design the Internet from scratch, knowing what we know today, how would we make the basic design decisions?").

[62] *E.g.*, DELOITTE TOUCHE TOHMATSU, TELECOMMUNICATIONS PREDICTIONS: TMT TRENDS 2007 (2007), *available at* http://www.deloitte.com/dtt/cda/doc/content/us_tmt_%202007_Telecom_Predictions_011606.pdf. According to this report, "[o]ne of the key possibilities for 2007 is that the Internet could be approaching its capacity. The twin trends causing this are an explosion in demand, largely fueled by the growth in video traffic and the lack of investment in new, functioning capacity." *Id*. at 4.

[63] *E.g.*, Jeffrey K. MacKie-Mason & Hal R. Varian, *Pricing the Internet*, *in* PUBLIC ACCESS TO THE INTERNET 269 (Brian Kahin & James Keller eds., 1995). According to MacKie-Mason and Varian: "Congestion is likely to be a serious problem in the future Internet, and past proposals to control it are unsatisfactory. We think an economic approach to allocating scarce Internet resources is warranted." *Id*. at 284. "Our objective is not to raise profits above a normal rate of return by pricing backbone usage. Rather, our goal is to find a pricing mechanism that will lead to the most efficient use of existing resources, and will guide investment decisions appropriately." *Id*.

services for a fee.[64] As a result, computer scientists, network operators, content and applications providers, and other interested parties have increasingly debated the significance of the Internet's historical and current architecture and its implications for the Internet's future development.[65]

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[64] *See, e.g., At SBC, It's All About "Scale and Scope,"* BUS. WK., Nov. 7, 2005, http://www.businessweek.com/@@n34h*IUQu7KtOwgA/magazine/content/05_45/b3958092.htm (interview with SBC Telecommunications' CEO Edward Whitacre). According to Whitacre:

> [T]here'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!

Id. *See also* Marguerite Reardon, *Qwest CEO Supports Tiered Internet*, ZDNET NEWS, Mar. 15, 2006, http://articles.techrepublic.com.com/2100-1035_11-6050109.html. Qwest CEO Richard Notebaert has stated his company would like to offer prioritized data transmission in the same way that express parcel service may be purchased from Federal Express or UPS. In his view, "[i]t's possible that (these companies) would like to have differentiated service. . . . And if you have enough money, we can make a lot of things happen." *Id*. "Would this give some content providers an advantage over others? . . . Well, yeah. We're all trying to provide a bit of differentiation for a competitive edge. That's what business is about." *Id*.

[65] For example, some of the Internet's early designers have offered the following account:

> One should not conclude that the Internet has now finished changing. The Internet, although a network in name and geography, is a creature of the computer, not the traditional network of the telephone or television industry. It will, indeed it must, continue to change and evolve at the speed of the computer industry if it is to remain relevant. It is now changing to provide such new services as real time transport, in order to support, for example, audio and video streams. The availability of pervasive networking (i.e., the Internet) along with powerful affordable computing and communications in portable form (i.e., laptop computers, two-way pagers, PDAs, cellular phones), is making possible a new paradigm of nomadic computing and communications.
>
> This evolution will bring us new applications – Internet telephone and, slightly further out, Internet television. It is evolving to permit more sophisticated forms of pricing and cost recovery, a perhaps painful requirement in this commercial world. It is changing to accommodate yet another generation of underlying network technologies with different characteristics and requirements, from broadband residential access to satellites. New modes of access and new forms of service will spawn new applications, which in turn will drive further evolution of the net itself.
>
> The most pressing question for the future of the Internet is not how the technology will change, but how the process of change and evolution itself will be managed. As this paper describes, the architecture of the Internet has always been driven by a core group of designers, but the form of that group has changed as the number of interested parties has grown. With the success of the Internet has come a proliferation of stakeholders – stakeholders now with an economic as well as an intellectual investment in the network. We now see, in the debates over control of the domain name space and the form of the next generation IP addresses, a struggle to find the next social structure that will guide the Internet in the future. The form of that structure will be harder to find, given the large number of concerned stake-holders. At the same time, the industry

B. Major Internet Components

1. "Last-Mile" Internet Service Providers

"Last-mile"[66] Internet service providers offer the network connections that link end users to the wider Internet.[67] By connecting its end-user customers to the many networks comprising the Internet backbone, an ISP provides its customers access to the end-user computers of any other ISP in the world connected to that backbone. Computer users in the United States have had nearly ubiquitous last-mile access to dial-up Internet connections of 56 to 280 Kbps since the late 1990s through telephone modems.[68] In recent years, faster broadband connections have supplanted dial-up service for a rapidly growing number of computer users who demand faster access to the increasingly sophisticated and data-rich content and applications available on the Internet.[69] Principally, end users receive last-mile broadband Internet service through coaxial cable wireline or upgraded copper digital subscriber wireline connections; other platforms, such as fiber-optic wirelines, wireless, satellite, and broadband over powerlines, are also increasingly available to connect end users to the Internet.[70]

Basic residential service packages are typically available on a flat-rate basis to home computer users.[71] ISPs may require that end users with more demanding needs, like a medium or large business, purchase a business-class or other type of premium

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> struggles to find the economic rationale for the large investment needed for future growth, for example to upgrade residential access to more suitable technology. If the Internet stumbles, it will not be because we lack for technology, visions, or motivation. It will be because we cannot set a direction and march collectively into the future.

LEINER ET AL., *supra* note 25.

[66] Networks that connect end users to the broader Internet are generally referred to as "last-mile" ISPs. Networks that transmit data from a content or applications provider's computer server(s) to the broader Internet are sometimes referred to as "first-mile" ISPs.

[67] Today, major last-mile wireline broadband ISPs include: AT&T, Comcast, Covad, Cox Communications, and Verizon. Major wireless broadband ISPs include: AT&T, Sprint Nextel, T-Mobile, and Verizon Wireless.

[68] *See* NUECHTERLEIN & WEISER, *supra* note 30, at 134-35.

[69] *See id.* at 134-47.

[70] According to the most recent data available from the FCC, most broadband consumers access the Internet today by cable modem or DSL. Of the 64.6 million high-speed lines in the United States as of June 30, 2006, 44.1% were cable modem, 36.4% DSL or other high-speed telephone line, 17.0% mobile wireless, 1.1% fiber-to-the-premise, 0.8% satellite, 0.5% fixed wireless, and 0.01% broadband over powerlines (and other lines). FCC, HIGH-SPEED SERVICES, *supra* note 18, at 5 tbl.1.

[71] *See generally* Lehr, Tr. I at 37 (discussing "the market's current attraction to . . . flat-rate pricing"); Brenner, Tr. II at 96. *See also, e.g.*, VERIZON, VERIZON HIGH SPEED INTERNET, http://www22.verizon.com/content/consumerdsl/plans/all+plans/all+plans.htm (last visited May 17, 2007).

service package.[72] In addition, end users can purchase for a premium fee access to a specialized virtual private network ("VPN") offering a defined quality-of-service level over a reserved portion of an ISP's network.[73]

Last-mile broadband wireline architecture can take various forms. A last-mile ISP can extend a fiber-optic wireline from a backbone connection to either a neighborhood node, to the curb of a premise, or all the way to the end user's premise. If the fiber runs only to the node or curb, the ISP can then use a cable or DSL connection for the remaining distance to the end user's premise.[74] DSL wirelines provide a dedicated amount of bandwidth to each end user, but can transmit data up to only about three miles without the use of a repeater. Accordingly, transmission speeds can vary depending on an end user's distance from a repeater.[75] Cable wirelines offer shared bandwidth among many customers. Thus, the transmission speed for an individual cable modem customer can vary with the number of customers who are using the network simultaneously.[76]

Last-mile wireless networks using wireless fidelity ("Wi-Fi") or worldwide interoperability for microwave access ("Wi MAX") technologies can be set up by deploying multiple antennas on street lights, traffic signals, and buildings, so that multiple wireless hotspots overlap each other to form a continuous "mesh" network of wireless signals. An initial connection to a backbone network also must be made in order to provide access to the wider Internet.[77] Several major telecommunications companies also offer mobile wireless Internet services over their wireless phone networks.[78] Three satellite providers offer broadband Internet service via satellite.[79] An end user must have a computer or other device that is configured for wireless Internet use to access these

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[72] *E.g.*, COMCAST, COMCAST WORKPLACE, http://www.comcast.com/wa-business/internet.html (last visited May 14, 2007). Last-mile access for large enterprise customers, particularly those with multiple locations, typically involves the use of dedicated, high-capacity facilities often referred to as special access or dedicated access services. *See In re* Special Access Rates for Price Cap Local Exch. Carriers, 20 FCC Rcd 1994, 1995-96 (2005) (order and notice of proposed rulemaking) [hereinafter *Special Access NPRM*].

[73] *See, e.g.*, CHARLES B. GOLDFARB, ACCESS TO BROADBAND NETWORKS: CONGRESSIONAL RESEARCH SERVICE REPORT TO CONGRESS 10-11 (2006), *available at* http://www.ipmall.info/hosted_resources/crs/RL33496_060629.pdf.

[74] *Id*. at 9-11.

[75] *See generally* FCC, FCC CONSUMER FACTS: BROADBAND ACCESS FOR CONSUMERS, http://www.fcc.gov/cgb/consumerfacts/dsl2.html (last visited June 22, 2007).

[76] *See generally id*.

[77] Wireless broadband providers that do not have their own facilities connecting their transmitters (*e.g.*, cell towers) to their switches typically purchase special access services from an incumbent local exchange carrier or other provider of such services. *See Special Access NPRM*, 20 FCC Rcd at 1995-96.

[78] GOLDFARB, *supra* note 73, at 10.

[79] *Id*. at 10-11.

networks. In addition, there are now over forty deployments of broadband–over-powerline technologies in the U.S., most of which are in trial stages.[80]

Today's last-mile networks generally are partitioned asymmetrically to provide more bandwidth for data traveling from an ISP's facilities to the end user's computer ("downstream") than in the other direction ("upstream"). Typically, this is done because end users request much more data from other server computers than they, themselves, send out.[81] As a result, asymmetric architecture may constrain content and applications that require the end user simultaneously to send and receive content at the same speeds and volumes, such as two-way video transmissions.[82] Also, ISPs have the technical capability to reserve portions of last-mile bandwidth for specific applications.[83]

2. Internet Backbone Operators

Since 1995, when the expanding number of commercial backbone networks permanently replaced NSFNET, commercial backbones have generally interconnected with each other through voluntary, market-negotiated agreements.[84] To this day, there are no general, industry-specific regulations that govern backbone interconnection in the U.S.[85] Instead, commercial backbone operators independently make decisions about interconnection by weighing the benefits and costs on a case-by-case basis.[86] Typically,

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[80] *Id*. at 11-12.

[81] *Id.* at 4, 9.

[82] *Id.* at 9.

[83] For example, Verizon reserves one fiber of its downstream fiber-to-the-home service specifically for the company's video service, while a separate fiber carries all other incoming traffic. *Id.* at 10. AT&T reserves 19 of 25 megabits of downstream end-user bandwidth specifically for the company's video service. *Id*. at 11. AT&T customers can purchase between 1.5 and 6 Mbps of the remaining downstream bandwidth for Internet access and voice services. *Id*.

[84] Observers have noted that:

> Particularly in the Internet's early days, many backbone providers exchanged traffic at government-sponsored Network Access Points (NAPs)–the Internet's equivalent to public airports, where the routes of many different carriers converge. (When the government privatized the Internet, it transferred control of these points to commercial providers.) Internet backbone providers now increasingly rely on privately arranged points of interconnection, largely because of congestion at the NAPs.

NUECHTERLEIN & WEISER, *supra* note 30, at 132.

[85] *See generally id.* at 133 ("These peering and transit agreements are completely unregulated. Neither the FCC nor any other governmental authority regulates the prices that a larger backbone network may charge a smaller one for transit services or mandates that backbone providers interconnect at all.").

[86] As one commentator notes:

> Currently, there are no domestic or international industry-specific regulations that govern how Internet backbone providers interconnect to exchange traffic, unlike other network

backbones connect to each other under one of two types of arrangements. In a "peering" arrangement, backbones of similar size engage in a barter arrangement in which backbone A carries traffic for backbone B in exchange for backbone B carrying a similar amount of traffic for backbone A. In this arrangement, exchanged traffic generally is destined only for the other backbone's end users. In a "transit" arrangement, a smaller backbone pays a larger backbone to carry its customers' traffic to all end users on the Internet.[87] To date, market forces have encouraged interconnection among backbones and between backbones and last-mile ISPs.[88]

Today, these backbones make up the core or "middle" of the Internet. Generally, individual backbone networks are made up of a multiplicity of redundant, high-speed, high-capacity, long-haul, fiber-optic transmission lines that join at hubs or points of interconnection across the globe.[89] Transmission over the backbone is generally reliable even when one component fails because there are multiple different routes of transmission from one computer to another.[90] A backbone's customers include ISPs providing last-mile connectivity to end users, providers of content and applications that wish to connect their computer servers directly to a backbone, and specialized companies that lease space on shared or dedicated computer servers to smaller content and applications providers.

3. Providers of Content and Applications

Millions of organizations and individuals connected to the Internet's edges provide an ever-expanding universe of content and applications to end users. Commercial entities and other organizations provide a large portion of such content and applications, but individuals are increasingly contributing content and applications to the Internet for personal, social, and creative purposes.[91]

> services, such as long distance voice services, for which interconnection is regulated. Rather, Internet backbone providers adopt and pursue their own interconnection policies, governed only by ordinary laws of contract and property, overseen by antitrust rules.

Kende, *supra* note 50, at 2.

[87] *See generally* NUECHTERLEIN & WEISER, *supra* note 30, at 132-33.

[88] *Cf.* Ryan, Tr. I at 237.

[89] NUECHTERLEIN & WEISER, *supra* note 30, at 131-38. *See also* Li Yuan & Gregory Zuckerman, *Level 3 Regains Luster Amid Web-Video Boom*, WALL ST. J., Dec. 21, 2006, at C1 (providing a map of Level 3's fiber-optic backbone). Today, major U.S. backbone operators include: Verizon, AT&T, Global Crossing, Level 3, Qwest, SAVVIS, and Sprint-Nextel.

[90] COMER, *supra* note 24, at 137-42.

[91] Popular examples include: Blogger.com (Web logs); flickr.com (photo sharing); YouTube.com (audio and video files); and MySpace.com (social networking pages, Web logs, photo sharing, audio and video files). *See also* Lev Grossman, *Time's Person of the Year: You*, TIME, Dec. 25, 2006, at 38, *available at* http://www.time.com/time/magazine/article/0,9171,1569514,00.html.

Content and applications providers use various methods to distribute their offerings over the Internet. Smaller organizations and individuals typically lease space on a shared or dedicated computer server from a specialized company that provides a connection to the wider Internet, typically through a negotiated agreement with a backbone operator.[92] Large companies may build their own server farms with direct access to an Internet backbone.[93] Some companies also provide Web sites where users can post self-generated content, such as photos, blogs, social networking pages, and audio and video files, while the companies themselves manage the site's underlying technical aspects.[94] Increasingly, content and applications providers are also copying their content and applications to multiple computer servers distributed around the world, a technique called local caching.[95] This practice allows data to be transmitted to end users more quickly, over a shorter physical distance, and using fewer routers. This strategy, in turn, generally decreases the potential for transmission problems such as the delay or dropping of data packets.[96]

Today, many applications can be delivered from a provider's computer server via the Internet to a customer's computer and installed automatically. This ability to transmit applications cheaply and directly to end users allows applications providers to update their programs frequently and to deliver new versions to customers quickly. Likewise, the Internet allows content providers to transmit cheaply an expanding array of content, such as music and video downloads.

Originally, most Web content consisted of static text and graphics files that could be viewed graphically using a basic Web browser and a narrowband connection. Some of the newest content and applications, however, are time-sensitive, bandwidth-intensive, or both. VoIP, for example, is sensitive to both "latency" – the amount of time it takes a packet of data to travel from source to destination – and "jitter" – on-again, off-again

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[92] *See, e.g.*, TheHostingChart, http://www.thehostingchart.com (last visited June 22, 2007).

[93] *See, e.g.*, Pepper, Tr. I at 93. Pepper notes that "a lot of these large providers made enormous investments in big server farms to bring content closer to consumers with their caching servers. Bringing content closer to consumers reduces the need to go across multiple hops [between networks]." *Id*. *See also* Yoo, *supra* note 59, at 1881-83; John Markoff & Saul Hansell, *Hiding in Plain Sight, Google Seeks More Power*, N.Y. TIMES, June 14, 2006, at A1, *available at* http://www.nytimes.com/2006/06/14/technology/14search.html?ei=5090&en=d96a72b3c5f91c47&ex=1307937600.

[94] *See supra* note 91.

[95] Content and applications providers may construct multiple server farms in various locations. *See supra* note 93. Alternatively, they can contract with a third party to manage this function. *See, e.g.*, Misener, Tr. II at 191 ("Essentially, you have a company that has set up edge serving facilities. That is to say server farms outside major metropolitan areas."). *See also* Yoo, *supra* note 59, at 1881-83; William C. Symonds, *Traffic Cops of the Net*, BUS. WK., Sept. 25, 2006, at 88, *available at* http://www.businessweek.com/magazine/content/06_39/b4002094.htm (profiling third-party content distribution company Akamai Technologies).

[96] *See* Pepper, Tr. I at 93; Yoo, *supra* note 59, at 1882.

delay associated with bursts of data traffic.[97] High-resolution video files and streaming video applications are examples of bandwidth-intensive content and applications that some observers suggest are already challenging the Internet's capacity.[98]

C. Network Management, Data Prioritization, and Other Forms of Data "Discrimination"

The differential treatment of certain data packets by network operators, such as prioritizing some packets over others, is often referred to as data "discrimination."[99] This Section addresses Internet congestion (one of the primary reasons cited for engaging in such data discrimination), the various types and uses of data discrimination, and the feasibility of end users detecting and avoiding certain types of data discrimination.

1. Internet Congestion

As explained above, the problem of network congestion has been recognized since the Internet's earliest days. Network resources such as computer processing power, transmission media, and router buffer memory are finite, like other resources. Congestion, therefore, can occur at any point on the Internet. Of course, end users can purchase more powerful computers and network operators can expand the capacity of their networks, but the computers, physical transmission media, and routers that comprise the Internet can still transport and process only a certain amount of data at any given time. Although it happens rarely, if too many computers send bursts of packets at the same time, a network may become temporarily overloaded.

The TCP/IP protocol generally has enabled the Internet to function at a workable level, even as Internet use has undergone tremendous growth during the last decade.[100] Nonetheless, Internet transmissions are still subject to variable performance and periods of congestion. Some observers suggest that the use of bandwidth-intensive applications like certain peer-to-peer file-sharing protocols by even a small minority of users is already consuming so many network resources as to be worrisome. This situation is of particular concern to some experts, who believe that the use of such applications by even a small portion of Internet users may effectively degrade service for the remaining

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[97] *See, e.g.*, Blumenthal & Clark, *supra* note 60, at 72-73; GOLDFARB, *supra* note 73, at 2-3 & n.4.

[98] *See, e.g.*, GOLDFARB, *supra* note 73, at 3-4.

[99] "Unfortunately, engineers, economists, and lawyers have different definitions for discrimination." Peha, *supra* note 36, at 3. Some technology experts distinguish between so-called "minimal" or "needs-based" discrimination, where packets are discarded or otherwise treated differently only when absolutely necessary (as in the case of congestion), and "non-minimal" or "active" discrimination, where packets are treated differently for some other, discretionary reason. *See, e.g.*, Felten, *supra* note 36, at 4. The introduction to Chapter IV below includes a discussion of how we use the term "discrimination" in analyzing the potential effects on consumer welfare of various conduct by ISPs and other network operators.

[100] COMER, *supra* note 24, at 165-69.

majority of end users.[101] Some observers suggest that such applications are already testing the Internet's existing capacity and may even potentially crash the Internet, or parts of it.[102]

2. Alleviating Internet Congestion

Several techniques have been used to alleviate short-term Internet congestion. Non-linear packet switching enables data to be dispersed and, in turn, allows networks to reroute individual data packets around points of congestion and avert delays. The TCP component of the TCP/IP suite also monitors delays and slows the packet-transmission rates accordingly.[103] Some applications, however, such as certain peer-to-peer file-sharing protocols, operate in a different manner. When congestion occurs, these applications do not slow their rates of data transmission. Rather, they aggressively take advantage of TCP's built-in reduction mechanism and, instead, send data as fast as they can.[104] Therefore, some networks have actively restricted or blocked altogether these kinds of applications, on the grounds that the networks need to preserve an equitable level of service for the majority of their end users.

Networks may also use "hot potato" routing policies that hand off to other networks at the earliest possible point data that is not destined for termination on their own networks, thus reducing the use of network resources.[105] Local caching of data by content and applications providers further helps to alleviate congestion by reducing the

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[101] According to Peha, "[t]raffic from a very small number of users can dominate the network and starve everybody else out. Peer-to-peer, in particular, is a problem today, and other applications might come along." Peha, Tr. I at 22. *See also* SANDVINE, INC., NETWORK NEUTRALITY: A BROADBAND WILD WEST? 4 (2005), *available at* http://www.sandvine.com/general/getfile.asp?FILEID=37 (reporting that it is common for less than 20% of users/applications/content to consume 80% of a network's resources); ANDREW PARKER, CACHELOGIC, P2P IN 2005 (2005), *available at* http://www.cachelogic.com/home/pages/studies/2005_01.php (reporting that in 2004 peer-to-peer traffic constituted 60% of overall Internet data traffic and 80% of upstream data traffic); Press Release, Sandvine, Inc., EDonkey – Still King of P2P in France and Germany (Sept. 13, 2005), *available at* http://www.sandvine.com/news/pr_detail.asp?ID=88 (reporting that P2P file-sharing traffic in the UK and North America represents up to 48% of all downstream bandwidth and 76% of all upstream traffic).

[102] *See, e.g.*, Brenner, Tr. II at 99 (recounting that "[w]e all know the famous story of downloading the Victoria's Secret streaming video when so much demand was placed on it, nobody could get a download"). Beyond this oft-cited example, however, staff has not been presented with any specific evidence of an instance where a significant portion of the Internet has substantially crashed, apart from general examples of temporary network congestion. *See also* DELOITTE TOUCHE TOHMATSU, *supra* note 62, at 4.

[103] TCP sends and receives acknowledgements each time a packet is sent to and received from a computer. Also, TCP automatically starts a timer whenever a computer sends a packet. The timed period depends on the distance to the recipient computer and delays on the Internet. If the timer runs out before the sending computer receives an acknowledgement, TCP retransmits the packet and lengthens the timed period to accommodate the network delay, effectively slowing the transmission rate. Once enough computers in the network slow down, the congestion clears. *See* COMER, *supra* note 24, at 140-41.

[104] Peha, *supra* note 36, at 7.

[105] NUECHTERLEIN & WEISER, *supra* note 30, at 132.

distance over which data must travel and the number of routers that might potentially delay or drop packets. In addition, as discussed below, some networks have proposed prioritizing data and providing other new types of quality-of-service assurances to alleviate the effects of congestion.

3. Packet-inspection and Flow-control Technologies

To treat some data packets differently than others, as opposed to simply using a first-in-first-out and best-efforts approach, a network operator must be able to identify certain relevant characteristics of those packets.[106] One source of identifying information is the packet's header, which contains the IP address of its source and destination. The packet header also contains several types of information that suggest the type of application required to open the data file, such as the source and destination port numbers, the transport protocol, the differentiated service code point or traffic class, and the packet's length.[107] Additionally, the header contains the Media Access Control ("MAC") address of the packet's source and destination, which provides information about the manufacturer of the device attached to the network.[108]

In recent years, router manufacturers have refined packet-inspection technologies to provide network operators with a wide range of information about the data traffic on their networks, including information not provided in packet headers.[109] These technologies were developed in part to help local area networks direct traffic more efficiently and to thwart security risks.[110] Deep packet inspection may also be implemented on the Internet to examine the content of packet streams – even search for keywords in text – and to take action based on content- or application-specific policies.[111] Such actions could involve tracking, filtering, or blocking certain types of packet streams. Further, deep packet inspection can map the information it accumulates to databases containing, for instance, demographic or billing information.[112]

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[106] Peha, *supra* note 36, at 3 (discussing the criteria that networks can consider when deciding how to prioritize packets).

[107] *Id.* at 4. Some computer scientists believe that port numbers have become an unreliable tool for determining a packet's associated application. According to Peha, "[o]nce upon a time, you could learn who the application was, through something called a port number, but that hasn't been reliable or meaningful for a number of years." Peha, Tr. I at 18.

[108] Peha, *supra* note 36, at 4.

[109] *See, e.g.*, Pepper, Tr. I at 83-87.

[110] *E.g.*, Tim Greene, *The Evolution of Application Layer Firewalls*, NETWORK WORLD, Feb. 2, 2004, *available at* http://www.networkworld.com/news/2004/0202specialfocus.html ("Now the latest Internet defense technology – deep packet inspection firewalls – is being touted as the best line of defense against worms that can sneak past earlier technology to wreck havoc in corporate networks.").

[111] Peha, *supra* note 36, at 4-5.

[112] *Id.*

Another relatively new technology that may be implemented to reveal information about packet streams is flow classification. This technology monitors the size of packets in a data stream, the time elapsed between consecutive packets, and the time elapsed since the stream began, with the goal of making reasonable determinations about the nature of the packets in the stream. Thus, flow classification may reveal information about a packet stream even if the individual packets themselves are encrypted against packet inspection.[113] With the development of these two technologies, it is now cost-effective for a network operator to gain extensive knowledge about the nature of the data traveling across its network.[114]

4. Data Prioritization and Other Forms of Data Discrimination

Recently, some network operators have suggested that they would like to use these new technologies to prioritize certain data traffic or to provide other types of quality-of-service assurances to content and applications providers and/or end users in exchange for a premium fee.[115] In contrast to the practice of transmitting data on a first-in-first-out and best-efforts basis, network operators could use a router algorithm to favor the transmission of certain packets based on characteristics such as their source, destination, application type, or related network attachment. One or more of these strategies could be employed to manage network traffic generally. Or, they might be used by a network operator to actively degrade certain non-favored traffic.

Packets going to or from certain favored addresses could be given priority transmission. Likewise, network operators could give priority to packets for latency-sensitive applications such as VoIP or network video games. In the alternative, routers could be programmed to reroute, delay, or drop certain packets.[116] For example, a network operator could block packets considered to be a security threat.[117] It could drop or otherwise delay packets associated with unaffiliated or otherwise disfavored users, content, or applications.[118] A network could apply such treatment only in certain

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[113] *Id*. at 4. For example, if a network operator detects a steady stream of packets flowing at 30 Kbps across its network for a period of time, it might conclude those packets are part of a VoIP telephony transmission. *Id*.

[114] *Id.* at 5.

[115] *See supra* note 64. Quality of service "typically involves the amount of time it takes a packet to traverse the network, the rate at which packets can be sent, and the fraction of packets lost along the way." Peha, *supra* note 36, at 5.

[116] *E.g.*, Peha, *supra* note 36, at 4-6.

[117] *E.g.*, Craig McTaggart, *Was the Internet Ever Neutral?*, 34th Research Conference on Communication, Information, & Internet Policy 9 (2006), *available at* http://web.si.umich.edu/tprc/papers/2006/593/mctaggart-tprc06rev.pdf (discussing blocking as a tool to control network abuse).

[118] *E.g.*, Peha, *supra* note 36, at 12–13 (describing scenarios in which network operators might block rival services, specific content, or software).

circumstances, such as during periods of congestion, after a quota of packets has been met, or, until certain usage fees are paid.[119] Some observers, however, question whether implementing wide-scale prioritization or similar schemes across multiple networks having differing technical characteristics is, in fact, even technically possible.[120]

Network operators also could provide separate physical or logical channels for different classes of traffic.[121] Another method for favoring certain Internet traffic is to reserve capacity on last-mile bandwidth for certain packet streams to provide a minimum level of quality.[122] Similarly, a network operator could limit the amount of bandwidth available to an end user, thereby degrading or effectively blocking altogether the use of

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[119] *See, e.g.*, *id*. at 5-6.

[120] *See, e.g.*, Alcatel-Lucent, Public Comment 1. According to Alcatel-Lucent, an opponent of network neutrality regulation:

> [I]ndustry standards would have to be adopted that put in place common policies for the labeling and prioritization of data packets. . . . The vast majority of Internet traffic must traverse the networks of numerous broadband service providers. This means that in order to favor the traffic of Service A over Service B during its entire trip through the Internet, each service provider and backbone network would have to prioritize and label packets in exactly the same way – a scenario that does not exist today. The idea that a service provider could maintain priority routing for its "preferred data packets" between a user in Washington, DC and Los Angeles, CA is not possible absent a comprehensive agreement between all network service providers to treat and identify data packets based on a common standard not currently in existence. Absent such developments, the data would almost certainly change hands at least once, likely stripping it of any prioritization it might have enjoyed inside the network of a sole provider.

Id. at 5. Likewise, a representative of Google, a network neutrality proponent, states that:

> [L]ast mile providers who want to give some sort of priority service, you know, only have control over their own network. It's not obvious to us how you can offer this kind of end-to-end service. It's not obvious to us how you identify the traffic in order to segregate it, that you're going to give priority to. And how do you do this segregation without degrading other traffic?

Davidson, Tr. I at 230-31.

[121] For example, a network operator could physically send favored data traffic over a lightly used connection, while sending other data traffic over a more heavily used connection. Or, the network could use logical separation to send traffic on the same physical connection, but use different service flows, as in the case of a virtual local network ("VLN"). Peha, *supra* note 36, at 6.

[122] For example, AT&T's Project Lightspeed and Verizon's FiOS services reserve portions of last-mile bandwidth for their proprietary video services. GOLDFARB, *supra* note 73, at 10-11, 17-18. These network operators also could sell reserved capacity to content or applications providers in return for a quality-of-service guarantee. Verizon, for example, has such plans for its FiOS service. *Id*. at 10.

bandwidth-intensive content or applications.[123] A network operator also could treat data packets differently by providing preferential access to services, such as local caching.[124]

Data also can be treated differently through the use of pricing structures, such as service tiers, to provide a certain quality-of-service level in exchange for payment.[125] In a fee-for-priority system, content and applications providers and/or end users paying higher fees would receive quicker, more reliable data transmissions. Sometimes, such an arrangement is referred to as a "fast lane." Other data might simply be provided on a best-efforts basis. Similarly, a network operator might assess fees to end users based on their behavior patterns, a practice sometimes referred to as "content billing" or "content charging."[126]

5. Detecting Data Discrimination[127]

Although differential data treatment may be easy to detect in some instances, like outright blocking, in many instances it may be more difficult for an end user to distinguish between performance problems resulting from deliberate discrimination and problems resulting from other, more general causes.[128] For example, an end user whose Internet traffic is treated differently than other traffic might experience poor performance in one or more aspects, such as delays in transmitting data, delays in using applications, or sporadic jitter. Such effects, however, can also result from general network

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[123] *See Network Neutrality: Competition, Innovation, and Nondiscriminatory Access: Hearing Before the S. Comm. on Commerce, Sci., & Transp.*, 109th Cong. 13 (2006) (testimony of Earl W. Comstock, President and CEO, COMPTEL), *available at* http://www.digmedia.org/docs/comstock-020706.pdf.

[124] *Id.* at 14.

[125] Peha, *supra* note 36, at 6.

[126] *Id.*

[127] The difficulties associated with end-user detection of data discrimination discussed in this Section would appear to be equally applicable to enforcement of any network neutrality regulation that prohibited data discrimination by ISPs and other network operators.

[128] *See, e.g.*, Pepper, Tr. I at 93. According to Pepper:

> [T]here are techniques that consumers actually have readily available to them to test their own bandwidth and performance latency between . . . the home, or the office, and the first POP [(point of presence)], right?
>
> And so, those techniques are actually relatively available. The problem is that, depending on the service you're trying to download, the application that you're using, it may – you may be going through two or three hops [between networks], or as many as a dozen hops across the Internet. When you go across multiple hops across multiple networks, it's more difficult for a consumer to know.

Id. *See also* Brenner, Tr. II at 98 ("[T]here are many points between the key strokes of the customer and the download in which the speed can be affected.").

congestion.[129] Distinguishing the two may be particularly difficult for end users not possessing a technical background. Researchers, however, are working to develop diagnostic tools to detect the differential treatment of data.[130]

6. Potential End-user Responses to Data Discrimination

a. Bypassing Discriminatory Networks

Some computer experts have suggested that the prospect of networks treating some data differently than others might give rise to a kind of arms race between network operators seeking to employ technical measures to manage their networks and end users seeking to employ countermeasures to avoid them.[131] They suggest, for example, that end users can bypass networks to a limited degree through cooperative access sharing.[132] On a small scale, a group of neighbors with access to multiple, distinct broadband Internet service providers might each set up an open-access Wi-Fi router, giving everyone in the group access to each other's service provider. If one provider engages in data discrimination, members of the cooperative could bypass it by accessing the Internet through another provider in the pool. Such a strategy, however, depends on a last-mile network operator allowing the use of open-access Wi-Fi access points in the first place.[133] To the extent that last-mile networks allow the resale of their services through open-access wireless networks, competition from resellers might have a similar effect.[134] Alternatively, a municipality might set up its own wireline or wireless network if its residents are not satisfied with the service provided by private providers. It is conceivable, however, that a municipal network could also engage in certain practices that some of its residents consider to be discriminatory.[135]

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[129] *See*, *e.g.*, Felten, *supra* note 36, at 4.

[130] Robert McMillan, *Black Hat: Researcher Creates Net Neutrality Test*, COMPUTERWORLD, Aug. 2, 2006, *available at* http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=9002154.

[131] *See generally* William H. Lehr et al., *Scenarios for the Network Neutrality Arms Race*, 34th Research Conference on Communication, Information, & Internet Policy (2006), *available at* http://web.si.umich.edu/tprc/papers/2006/561/TPRC2006_Lehr%20Sirbu%20Peha%20Gillett%20Net%20Neutrality%20Arms%20Race.pdf. *See also* Lehr, Tr. I at 52.

[132] Lehr et al., *supra* note 131, at 10-13. *See also* Lehr, Tr. I at 41-43.

[133] Lehr et al., *supra* note 131, at 10-13.

[134] *Id*. at 13-14 (describing the Wi-Fi resale business model of FON); Lehr, Tr. I at 42-43. *See also* FON, What's FON, http://www.fon.com/en/info/whatsFon (last visited May 14, 2007).

[135] Lehr et al., *supra* note 131, at 15; Lehr, Tr. I at 43.

b. Technical Measures to Counter Data Discrimination

Countering data discrimination, like detecting it in the first place, may be difficult, especially for end users without technical backgrounds. Several technical measures to counter data discrimination do exist, however, at least to a limited degree. Several potential methods for circumventing applications-based degradation or blocking involve the computer port numbers that typically indicate which software application a computer should use to open a packet. Computer users and applications developers can prevent networks from identifying the application associated with a packet by employing port numbers not commonly associated with a particular application or by assigning and reassigning port numbers dynamically.[136] Alternatively, applications developers can use TCP port 80, the number used by most hypertext transfer protocol ("HTTP") traffic and, thus, potentially make an application's traffic indistinguishable from most other Web browser-based traffic.[137]

To evade differential treatment based on a sender or receiver's IP address, an end user could access information from the Internet through a proxy that reroutes data through another server, camouflaging its source and destination.[138] Likewise, packets might be encrypted so that a network cannot use packet inspection to identify their contents or related application.[139] Such encrypted packets could also be transmitted through a VPN to a gateway computer outside the ISP's network, where the packets could be decrypted and forwarded to their recipient.[140] In such a scenario, the last-mile ISP would see only streams of encrypted packets traveling from the end user through the VPN, thus preventing the ISP from identifying the computers with which the sender is communicating.[141] Some ISPs have responded to these measures by banning the use of VPNs and encryption protocols or charging a fee for their use.[142] Alternatively, a network might simply relegate or drop altogether encrypted packets when it cannot identify their contents.

An alternate encryption system called "onion routing" conceals packets' content, source, and destination without the use of a VPN. A packet is enveloped in several layers of encryption and then sent through a special network of links and unique routers called

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[136] Lehr et al., *supra* note 131, at 19-20. *See also* Lehr, Tr. I at 45-46.

[137] Lehr et al., *supra* note 131, at 20-21.

[138] *Id.*

[139] For example, some P2P software has been rewritten using the Internet IP Security protocol ("IPSec") to encrypt everything in the packets except the IP header. *Id.*

[140] Felten, *supra* note 36, at 8-9.

[141] *Id.*

[142] Lehr et al., *supra* note 131, at 22.

"routing anonymizers" or "onion routers."[143] A layer of encryption is removed at each router until the packet is stripped of encryption and delivered to its destination. Onion routing prevents network operators from knowing who is communicating with whom, and the content of the communication is encrypted up to the point where the traffic leaves the onion-routing network.[144]

Even with encryption, however, a network might be able to infer the type of packet through flow classification and continue to target certain packets for discrimination.[145] An end user might try to evade flow classification by altering the size and timing of packets, adding blank packets to the flow, or mixing packets from multiple flows.[146] A network might respond, however, by degrading or blocking all of the user's traffic or by manipulating that traffic in a way that affects one type of application much more than it does other types of traffic.[147]

Alternatively, end users might be able to offset the effects of certain kinds of discrimination to some extent by using buffering techniques to preload data streams into a computer's memory and then accessing them after a period of time, thereby alleviating problems with latency or jitter. Such techniques, however, may not be useful for real-time applications like VoIP and streaming video.[148] In some circumstances, caching content closer to end users might also effectively circumvent discriminatory practices that are implemented further into the core of the Internet.[149]

* * *

The text above provides historical and technical background regarding the Internet to help inform the policy discussion in this Report. In the next Chapter, we address the jurisdiction of the relevant federal agencies in the area of broadband Internet access, as well as the legal and regulatory developments that have prompted the current debate over network neutrality.

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[143] *Id.*

[144] *Id. See also generally* U.S. Navy, Onion Routing: Executive Summary, http://www.onion-router.net/Summary.html (last visited June 15, 2007).

[145] Felten, *supra* note 36, at 8-9; Lehr et al., *supra* note 131, at 23; *see* Peha, *supra* note 36, at 4.

[146] Lehr et al., *supra* note 131, at 23.

[147] Felten, *supra* note 36, at 9.

[148] Lehr, Tr. I at 48-49.

[149] *Id.* at 49.

II. LEGAL AND REGULATORY BACKGROUND AND DEVELOPMENTS

If recent years have seen considerable change in the development and deployment of platforms for broadband Internet access, they also have seen considerable flux in the field of broadband regulation. A comprehensive review of federal and state law issues pertinent to the provision of broadband Internet access would go well beyond the scope of this Report.[150] This Chapter, however, provides a basic legal and regulatory framework for the policy discussion to follow in the remainder of the Report. To that end, it sketches the central elements of FTC (in Section A) and FCC (in Section B) jurisdiction over broadband services, including the statutory bases of that jurisdiction. This Chapter also reviews (in Section C) certain decisions of the courts and the agencies, including recent enforcement activity, rulemaking, and policy statements that have served to clarify both jurisdictional and substantive questions about broadband Internet access.

In brief, federal regulatory jurisdiction over broadband services generally is subject to the shared jurisdiction of the FCC, the FTC, and the DOJ. FCC jurisdiction comes chiefly from the Communications Act,[151] which established the FCC and provides for the regulation of "interstate and foreign commerce in communication by wire and radio."[152] FTC jurisdiction over broadband services comes chiefly from its statutory mandate to prevent "unfair methods of competition" and "unfair or deceptive acts or practices in or affecting commerce" under the FTC's enabling legislation, the FTC Act.[153] The FTC's authority to enforce the federal antitrust laws generally is shared with DOJ's Antitrust Division.[154]

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[150] For a more detailed treatment of the pertinent legal background, see, e.g., PETER W. HUBER ET AL., FEDERAL TELECOMMUNICATIONS LAW (2d ed. 1999) (especially Chapters 3, 10-12, Supp. (2005), and Supp. (2006)). *See also* NUECHTERLEIN & WEISER, *supra* note 30 (discussing Internet commerce, policy, and law).

[151] 47 U.S.C. §§ 151 *et seq.* Significant amendments to the Communications Act of 1934, 48 Stat. 1064 (1934), were imposed by the Telecommunications Act of 1996. *See* Pub. L. No. 104-104, 110 Stat. 56 (1996). Although broad in scope, the Telecommunications Act of 1996 did not replace the Communications Act, but amended it.

[152] 47 U.S.C. § 151.

[153] 15 U.S.C. §§ 41 *et seq*. Although the FTC Act is central to the FTC's jurisdiction over broadband Internet access, and competition and consumer protection issues generally, it is not the only statutory basis of FTC authority pertinent to the larger Internet debate. With regard to competition concerns, the FTC is also charged under, for example, the Clayton Act (15 U.S.C. §§ 12-27); the Hart-Scott-Rodino Antitrust Improvements Act of 1976 (15 U.S.C. § 18a) (amending the Clayton Act); and the International Antitrust Enforcement Assistance Act of 1994 (15 U.S.C. §§ 46, 57b-1, 1311, 1312, 6201, 6201 note, 6202-6212).

[154] The FTC and DOJ share antitrust authority with regard to most areas of the economy. The two antitrust agencies have long-standing arrangements, first established in 1948, that allow them to avoid inconsistent or duplicative efforts. See *infra* notes 218-19 for a discussion of various DOJ merger reviews in the area of Internet broadband access.

A. FTC Jurisdiction under the FTC Act

The FTC Act gives the FTC broad authority with regard to both competition and consumer protection matters in most sectors of the economy.[155] Under the FTC Act, "[u]nfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce," are prohibited,[156] and the FTC has a general statutory mandate "to prevent persons, partnerships, or corporations," from engaging in such prohibited methods, acts, and practices.[157]

At the same time, the FTC Act cabins this general grant of statutory authority with regard to certain activities. In particular, the FTC's enforcement authority under the FTC Act does not reach "common carriers subject to the Communications Act of 1934," as amended.[158] An entity is a common carrier, however, only with respect to services that it provides on a common carrier basis.[159] As discussed below in Chapter II.C, because most broadband Internet access services are not provided on a common carrier basis, they are part of the larger economy subject to the FTC's general competition and consumer protection authority with regard to methods, acts, or practices in or affecting commerce.

Exercising its statutory authority over competition matters, the FTC has, where appropriate, investigated and brought enforcement actions in matters involving access to content via broadband and other Internet access services. For example, the FTC challenged the proposed merger between America Online ("AOL") and Time Warner, on the basis that the merger threatened to harm competition and injure consumers in several markets, including those for broadband Internet access and residential Internet transport services (*i.e.*, "last mile" access).[160] The consent order resolving the agency challenge required the merged entity to open its cable system to competitor Internet service

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[155] The FTC's authority is defined broadly to deal with "methods . . . acts or practices in or affecting commerce." 15 U.S.C. § 45(a)(2). But for certain limited market sectors that are expressly excluded from the FTC's enforcement authority, and for the areas in which FTC jurisdiction over various market sectors is shared, the FTC's authority ranges broadly over "commerce," without restriction to particular segments of the economy. *See id.* (FTC authority generally; express exclusion for, e.g., common carriers); *supra* note 154 and accompanying text (shared FTC/DOJ antitrust authority).

[156] 15 U.S.C. § 45(a)(1). In 1994, Congress defined an "unfair" act or practice over which the FTC has authority as one that "causes or is likely to cause substantial injury to consumers which is not reasonably avoidable by consumers themselves and not outweighed by countervailing benefits to consumers or to competition." *Id.* § 45(n).

[157] *Id.* § 45(a)(2).

[158] *Id.*

[159] 47 U.S.C. § 153(44) (provider of telecommunications services deemed a common carrier under the Communications Act "only to the extent that it is engaged in providing telecommunications services").

[160] Am. Online, Inc. & Time Warner, Inc., FTC Dkt. No. C-3989 (Dec. 17, 2000) (complaint), *available at* http://www.ftc.gov/os/2000/12/aolcomplaint.pdf.

providers on a non-discriminatory basis, for all content.[161] The order also prevented the company from interfering with the content of non-affiliated ISPs or with the ability of non-affiliated providers of interactive TV services to access the AOL/Time Warner system.[162] Moreover, the order required the company, in areas where it provided cable broadband service, to offer AOL's DSL service in the same manner and at the same retail pricing as in areas where it did not provide cable broadband service.[163]

The FTC has addressed Internet access and related issues in a number of other merger investigations as well.[164] For example, the FTC investigated the acquisition by Comcast and Time Warner of the cable assets of Adelphia Communications and, in a related matter, the exchange of various cable systems between Comcast and Time Warner. In the course of that investigation, the FTC examined, among other things, the likely effects of the transactions on access to and pricing of content. The investigation eventually was closed because a majority of the Commission concluded that the acquisitions were unlikely to foreclose competition or result in increased prices.[165]

In addition to such competition issues are various consumer protection issues that have been raised in the larger Internet access context. Over the past decade, the FTC has brought a variety of cases against Internet service providers that have engaged in allegedly deceptive marketing and billing practices.[166] For example, in 1997, the FTC separately sued America Online, CompuServe, and Prodigy, alleging that each company had offered "free" trial periods that resulted in unexpected charges to consumers.[167] One Prodigy advertisement, for example, touted a "Free Trial" and "FREE 1ST MONTH'S MEMBERSHIP" conspicuously, while a fine print statement at the bottom of the back panel of the advertisement stipulated: "Usage beyond the trial offer will result in extra

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[161] *Id.* (Apr. 17, 2001) (consent order), *available at* http://www.ftc.gov/os/2001/04/aoltwdo.pdf.

[162] *Id.*

[163] *Id.*

[164] *See, e.g.*, Cablevision Sys. Corp., 125 F.T.C. 813 (1998) (consent order); Summit Commun. Group, 120 F.T.C. 846 (1995) (consent order).

[165] *See* Statement of Chairman Majoras, Commissioner Kovacic, and Commissioner Rosch Concerning the Closing of the Investigation into Transactions Involving Comcast, Time Warner Cable, and Adelphia Communications (Jan. 31, 2006) (FTC File No. 051-0151); *see also* Statement of Commissioners Jon Leibowitz and Pamela Jones Harbour (Concurring in Part, Dissenting in Part), Time Warner/Comcast/Adelphia (Jan. 31, 2006) (FTC File No. 051-0151). Both statements are available at http://www.ftc.gov/opa/2006/01/fyi0609.htm.

[166] *See, e.g.*, Am. Online, Inc. & CompuServe Interactive Servs., Inc., FTC Dkt. No. C-4105 (Jan. 28, 2004) (consent order), *available at* http://www.ftc.gov/os/caselist/0023000/0023000aol.shtm; Juno Online Servs., Inc., FTC Dkt. No. C-4016 (June 25, 2001) (consent order), *available at* http://www.ftc.gov/os/caselist/c4016.shtm.

[167] *See* Am. Online, Inc., FTC Dkt. No. C-3787 (Mar. 16, 1998) (consent order), *available at* http://www.ftc.gov/os/1997/05/ameronli.pdf; CompuServe, Inc., 125 F.T.C. 451 (1998) (consent order); Prodigy, Inc., 125 F.T.C. 430 (1998) (consent order).

fees, even during the first month."[168] Other alleged misrepresentations included AOL's failure to inform consumers that fifteen seconds of connect time was added to each online session (in addition to the practice of rounding chargeable portions of a minute up to the next whole minute),[169] as well as its misrepresentation that it would not debit customers' bank accounts before receiving authorization.[170] The settlement orders in these matters prohibited the companies from, among other things, misrepresenting the terms or conditions of any trial offer of online service. Although all three matters involved dial-up, or narrowband, Internet access, the orders are not limited by their terms to narrowband services.

More recently, in the matter of *FTC v. Cyberspace.com*,[171] the federal district court for the Western District of Washington granted summary judgment in favor of the FTC, finding, among other things, that the defendants had violated the FTC Act by mailing false or misleading purported rebate or refund checks to millions of consumers and businesses without disclosing, clearly and conspicuously, that cashing the checks would prompt monthly charges for Internet access services on the consumers' and businesses' telephone bills. Following a trial on the issue of consumer injury, the court ordered the defendants to pay more than $17 million to remedy the injury caused by their fraudulent conduct. The Court of Appeals for the Ninth Circuit affirmed the trial court's liability finding last year.[172]

In addition, the FTC has brought numerous cases involving the hijacking of consumers' modems.[173] For example, in *FTC v. Verity International Ltd.*,[174] the Commission alleged that the defendants orchestrated a scheme whereby consumers seeking online entertainment were disconnected from their regular ISPs and reconnected to a Madagascar phone number. The consumers were then charged between $3.99 and

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[168] *Prodigy*, 125 F.T.C. at 430 exhibit A (complaint). Similar complaints were lodged against America Online and CompuServe.

[169] For example, "an online session of 2 minutes and 46 seconds, with the 15 second supplement, totals 3 minutes and 1 second and is billed as 4 minutes." *Am. Online*, FTC Dkt. No. C-3787 at 4 exhibit E (complaint).

[170] *See id.* at 5-6 exhibit F.

[171] No. C00-1806L, 2002 U.S. Dist. LEXIS 25565 (W.D. Wash. July 10, 2002), *aff'd*, 453 F.3d 1196 (9th Cir. 2006).

[172] *Cyberspace.com*, 453 F.3d at 1196.

[173] A list of FTC enforcement actions involving the Internet and online services generally, and modem hijacking allegations in particular, can be found at http://www.ftc.gov/bcp/internet/cases-internet.pdf. These actions include the following: FTC v. Sheinkin, No. 2-00-3636-18 (D.S.C. 2001); FTC v. RJB Telcom, Inc., No. CV 00-2017 PHX SRB (D. Ariz. 2000); FTC v. Ty Anderson, No. C 00-1843P (W.D. Wash. 2000); FTC v. Audiotex Connection, Inc., No. CV-97-0726 (DRH) (E.D.N.Y. 1997).

[174] 335 F. Supp. 2d 479 (S.D.N.Y. 2004), *aff'd in part, rev'd in part*, 443 F.3d 48 (2d Cir. 2006), *cert. denied*, 127 S. Ct. 1868 (2007).

$7.78 per minute for the duration of each connection. In that case, AT&T and Sprint – which were not parties to the FTC enforcement action – had carried the calls connecting the consumers' computers to the defendants' servers. Consumers were billed at AT&T's and Sprint's filed rates for calls to Madagascar. The defendants therefore argued that the entertainment service in question was provided on a common carrier basis and thus outside the FTC's jurisdiction. One defendant also claimed to be a common carrier itself and hence beyond FTC jurisdiction. Although both the District Court and the Court of Appeals rejected those arguments, the FTC had to expend substantial time and resources litigating the question of jurisdiction.[175]

As the *Verity* case demonstrates, enforcement difficulties posed by the common carrier exemption are not merely speculative. The FTC regards the common carrier exemption in the FTC Act as outmoded and, as it creates a jurisdictional gap, an obstacle to sound competition and consumer protection policy. As the FTC has explained before Congress, technological advances have blurred traditional boundaries between telecommunications, entertainment, and high technology.[176] For example, providers routinely include telecommunications services, such as telephone service, and non-telecommunications services, such as Internet access, in bundled offerings. As the telecommunications and Internet industries continue to converge, the common carrier exemption is likely to frustrate the FTC's efforts to combat unfair or deceptive acts and practices and unfair methods of competition in these interconnected markets.

Finally, based on the above discussion of the FTC's jurisdiction over broadband services, three general points may be in order. First, as the investigations and enforcement actions described above suggest, the FTC has both authority and experience in the enforcement of competition and consumer protection law provisions pertinent to broadband Internet access. Second, the FTC Act provisions regarding "[u]nfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce," are general and flexible in nature, as demonstrated by judicial and administrative decisions across diverse markets.[177] Third, the FTC's investigative and enforcement actions have been party- and market-specific; that is, neither the general body of antitrust and consumer protection law nor the FTC's enforcement and policy record determines any particular broadband connectivity policy or commits the Commission to favoring any particular model of broadband deployment.

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[175] In response to a request from the district court, the FCC filed an amicus brief in support of the FTC's jurisdiction in this matter. *See Verity*, 443 F.3d at 56, 61.

[176] *See FTC Jurisdiction over Broadband Internet Access Services: Hearing Before the S. Comm. on the Judiciary*, 109th Cong. 9-11 (2006) (statement of William E. Kovacic, Comm'r, FTC), *available at* http://www.ftc.gov/opa/2006/06/broadband.shtm.

[177] "Congress has deliberately left these phrases undefined so that the parameters of the FTC's powers and the scope of its administrative and judicial functions could be responsive to a wide variety of business practices." ABA SECTION OF ANTITRUST LAW, ANTITRUST LAW DEVELOPMENTS 643 & n.4 (6th ed. 2007) (citing FTC v. Sperry & Hutchinson Co., 405 U.S. 233, 239-44 (1972); FTC v. R.F. Keppel & Bro., 291 U.S. 304, 310-12 (1934)).

B. FCC Jurisdiction under the Communications Act

As noted above, FCC jurisdiction over broadband services arises under the Communications Act.[178] Central to the broadband discussion is a distinction under that Act between "telecommunications services" and "information services."[179] The former, but not the latter, are subject to substantial mandatory common carrier regulations under Title II of the Communications Act.[180] While not subject to the Title II common carrier regulations, information services are treated by the FCC as subject to its general, ancillary jurisdiction under Title I of the Communications Act.[181]

Under Title II, providers of telecommunications services are bound to, among other things, enable functional physical connections with competing carriers,[182] at "just and reasonable" rates,[183] which the FCC may prescribe,[184] and are prohibited from

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[178] 47 U.S.C. §§ 151 *et seq.*

[179] Under the Communications Act, an "information service . . . means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications . . . ." 47 U.S.C. § 153(20). In contrast, "'telecommunications service' means the offering of telecommunications for a fee directly to the public . . . regardless of the facilities used," *id.* § 153(46), and "'telecommunications' means 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." *Id.* § 153(43). In brief, to act simply as a transmitter or transducer of information is to provide a telecommunications service, whereas to act as a transformer of information is to provide an information service.

[180] The Communications Act is divided into seven Titles. *See generally* 47 U.S.C. §§ 151 *et seq*. Under Title I are "General Provisions," including, for example, the purposes of the Act, definitions, the establishment of the FCC, and the structure and operations of the FCC. Under Title II are the "Common Carriers" provisions, including, among others, common carrier regulations and "Universal Service" requirements. Under Title III are "Provisions Relating to Radio." Under Title IV are "Procedural and Administrative Provisions." Under Title V are "Penal Provisions." Under Title VI are provisions relating to "Cable Communications." Finally, miscellaneous additional provisions are included under Title VII.

[181] *See, e.g.*, *In re* Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, 20 FCC Rcd 14853, 14914 (2005) (report and order and notice of proposed rulemaking) ("We recognize that . . . the predicates for ancillary jurisdiction are likely satisfied for any consumer protection, network reliability, or national security obligation that we may subsequently decide to impose on wireline broadband Internet access service providers."). Although the scope of the FCC's ancillary jurisdiction over broadband services has not been defined by the courts, it should be noted that the Supreme Court, in *dicta*, has recognized the application of the FCC's ancillary jurisdiction over information service providers. *See Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 976 (2005).

[182] 47 U.S.C. § 201(a).

[183] *Id.* § 201(b).

[184] *Id.* § 205.

making "any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services . . . ."[185]

There are, however, several important qualifications on these Title II common carrier requirements. First, the Communications Act expressly provides for regulatory flexibility to facilitate competition. In particular, with regard to telecommunications carriers or services, the FCC

> shall forebear from applying any regulation or any provision of this Act . . . if the Commission determines that–(1) enforcement . . . is not necessary to ensure that the charges, practices, classifications, or regulations . . . are just and reasonable and are not unjustly or unreasonably discriminatory; (2) enforcement . . . is not necessary for the protection of consumers; and (3) forbearance from applying such provision or regulation is consistent with the public interest.[186]

In addition, in determining such "public interest," the FCC must "consider whether forbearance from enforcing the provision or regulation promotes competitive market conditions."[187] Finally, the Communications Act expressly states that "[i]t shall be the policy of the United States to encourage the provision of new technologies and services to the public."[188] As a consequence, any person "(other than the Commission) who opposes a new technology or service proposed to be permitted under this Act shall have the burden to demonstrate that such proposal is inconsistent with the public interest."[189]

C. Regulatory and Judicial Clarification

As noted above, a series of regulatory and judicial decisions have helped to clarify both the distinction between information and telecommunications services and the status of broadband services as information services. That clarification is, to an extent, in tension with early regulatory and judicial attempts to grapple with the novel technologies that enabled the provision of Internet access. For example, in 1980, the FCC promulgated rules designed to address, among other things, the growing commerce in data-processing services available via telephone wires (the "Computer II Rules").[190] With reference to those rules, the FCC subsequently applied certain common carrier obligations, such as non-discrimination, to local telephone companies providing early

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[185] *Id.* § 202.

[186] *Id.* § 160(a).

[187] *Id.* § 160(b).

[188] *Id.* § 157(a).

[189] *Id.* § 160(b).

[190] *See In re* Amendment of Section 64.702 of the Comm'n's Rules & Regulations (Second Computer Inquiry), 77 F.C.C.2d 384, 417-23 (1980) [hereinafter *Computer II Rules*].

DSL services.[191] Further, as recently as 2000, the Court of Appeals for the Ninth Circuit held that "the transmission of Internet service to subscribers over cable broadband facilities is a telecommunications service under the Communications Act."[192]

Still, the FCC's current view that broadband services are information services has its roots in earlier decisions by the FCC and the courts. The same Computer II Rules that grounded the early DSL determination distinguished between "basic" and "enhanced" services and did not subject the latter to Title II common carrier regulation.[193] In the following decade, the FCC recognized that ISPs provide not just "a physical connection [to the Internet], but also . . . the ability to translate raw Internet data into information [consumers] may both view on their personal computers and transmit to other computers connected to the Internet."[194] Moreover, the 1998 Universal Service Report regarded "non-facilities-based" ISPs – those that do not own their own transmission facilities – solely as information service providers.[195] Indeed, even the Ninth Circuit opinion that held that ISPs offering cable broadband were offering telecommunications services recognized that, under the Communications Act and FCC implementing regulations, a significant portion of those services were information services.[196]

In 2000, the FCC issued a Notice of Inquiry to resolve, among other things, the application of the Communications Act's information/telecommunications distinction to cable broadband ISPs.[197] In its subsequent declaratory ruling in 2002, the FCC concluded that broadband cable Internet access services were information services, not

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[191] In a 1998 order, the FCC found, among other things, that incumbent local exchange carriers are subject to various interconnection obligations under Title II of the Communications Act. *See In re* Deployment of Wireline Servs. Offering Advanced Telecomms. Capability, 13 FCC Rcd 24011 (1998) (memorandum opinion and order and notice of proposed rulemaking). The FCC noted that, although DSL and other advanced services could "also be deployed using other technologies over satellite, cable, and wireless systems, [it would] limit the discussion here to wireline services, because none of the petitioners raise issues about these other technologies." *Id.* at 24016 n.11. *See also* GTE Operating Cos. Tariff No. 1, 13 FCC Rcd 22466 (1998).

[192] AT&T Corp. v. City of Portland, 216 F.3d 871, 880 (9th Cir. 2000).

[193] *See Computer II Rules*, 77 F.C.C.2d at 428-32.

[194] *In re* Fed.-State Joint Bd. on Universal Serv., 13 FCC Rcd 11501, 11531 (1998).

[195] *See id.* at 11530.

[196] *See AT&T*, 216 F.3d at 877-78.

[197] *In re* Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities, 15 FCC Rcd 19287 (2000) (notice of inquiry). As noted above, this notice of inquiry had been expressly limited in its application to broadband services provided by local telephone companies over wireline. Prior to 2000, the FCC had not ruled on the application of common carrier obligations to broadband services provided via cable. It sought, in this notice of inquiry, "to instill a measure of regulatory stability in the market," and to resolve a split in the Circuit courts regarding the regulatory status of "cable modem" broadband services. *See id.* at 19288 & n.3 (*comparing AT&T*, 216 F.3d 871 *with* Gulf Power Co. v. FCC, 208 F.3d 1263 (11th Cir. 2000)).

telecommunications services, and hence not subject to common carrier regulation under Title II.[198] In reaching that conclusion, the FCC emphasized the information coding, storage, and transformation processes that were central to such services, as it had in concluding that non-facilities-based services were information services in its Universal Service Report.[199] Moreover, the FCC concluded that there was no principled or statutory basis for treating facilities-based and non-facilities-based services differently, as both offered "a single, integrated service that enables the subscriber to utilize Internet access service . . . ."[200]

In response, several parties sought judicial review of the FCC's determination in a dispute eventually heard by the Supreme Court, in *National Cable & Telecommunications Association v. Brand X Internet Services* ("*Brand X*").[201] In *Brand X*, the Court upheld the FCC's determination that cable broadband is an information service as a reasonable construction of the Communications Act, reversing a Ninth Circuit decision that had relied on *City of Portland* as precedent.[202]

In the wake of the *Brand X* decision, the FCC has continued to expand, platform by platform, upon the broadband policy defended in that case. In 2005, the FCC released the *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities* ("Wireline Order"), in which it reclassified wireline broadband Internet access service by facilities-based carriers as an information service.[203] That reclassification pertains to both "wireline broadband Internet access service . . . [and] its transmission component,"[204] and is independent of the underlying technology employed.[205] The

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[198] *In re* Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities, 17 FCC Rcd 4798, 4821-22 (2002) (declaratory ruling and notice of proposed rulemaking).

[199] *Id.* at 4820-23.

[200] *Id.* at 4823.

[201] 545 U.S. 967 (2005).

[202] *Id.* at 973-74. It should be noted that *Brand X* is fundamentally a *Chevron* decision. That is, the Court did not examine the question of the status of cable broadband services as an abstract or *de novo* issue of statutory construction. Rather, the Court held that the FCC's ruling was – because based on reasonable policy grounds – a permissible resolution of ambiguous statutory language in the Telecommunications Act of 1996, given the FCC's authority under the Communications Act, the Administrative Procedures Act, and standards of agency deference the Court had articulated in *Chevron v. NRDC*. *See id.* at 973 (citing Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837 (1984) and 5 U.S.C. §§ 551 *et seq.*).

[203] *In re* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 FCC Rcd 14853 (2005) (report and order and notice of proposed rulemaking).

[204] *Id.* at 14856.

[205] *Id.* at 14860 n.15 ("We stress that our actions in this Order are limited to wireline broadband Internet access service and its underlying broadband transmission component, whether that component is provided over all copper loops, hybrid copper-fiber loops, a fiber-to-the-curb or fiber-to-the-premises (FTTP) network, or any other type of wireline facilities, and whether that component is provided using circuit-switched, packet-based, or any other technology.").

Wireline Order does, however, *permit* facilities-based wireline carriers *to elect* to provide broadband transmission service on a common carrier basis.[206]

In 2006, the FCC released an order in which it classified broadband-over-powerline Internet access services as information services.[207] Also in 2006, the FCC granted – by operation of law – Verizon's petition for forbearance from Title II and Computer Inquiry Rules[208] with respect to its broadband services.[209] Verizon had asked for forbearance "from traditional common-carriage requirements for all broadband services," seeking relief chiefly with regard to certain commercial broadband services not expressly addressed in the Wireline Order or other rulemaking.[210]

Most recently, the FCC clarified more generally the status of wireless services as information services, issuing in 2007 a declaratory ruling finding: (1) "that wireless broadband Internet access service is an information service"; (2) that while the underlying transmission component of such service is "telecommunications," offering telecommunications transmission "as a part of a functionally integrated Internet access service is not 'telecommunications service' under section 3 of the Act"; and (3) "that

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[206] *Id.*

[207] *In re* United Power Line Council's Petition for Declaratory Ruling Regarding the Classification of Broadband Over Power Line Internet Access Serv. as an Info. Serv., 21 FCC Rcd 13281 (2006) (memorandum opinion and order).

[208] *See In re* Regulatory & Policy Problems Presented by the Interdependence of Computer & Commun. Servs. & Facilities, 28 F.C.C.2d 267 (1971) (final decision and order) ("Computer I"); *In re* Amendment of Section 64.702 of the Comm'n's Rules & Regulations (Second Computer Inquiry), 77 F.C.C.2d 384 (1980) (final decision) ("Computer II"); *In re* Computer III Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs., 14 FCC Rcd 4289 (1999) (report and order). Collectively, these matters are known as the "Computer Inquiry Rules."

[209] *See* Press Release, FCC, Verizon Telephone Companies' Petition for Forbearance from Title II and Computer Inquiry Rules with Respect to Their Broadband Services Is Granted by Operation of Law (Mar. 20, 2006), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-264436A1.pdf (explaining that a forbearance petition will be deemed granted if the FCC does not deny the petition within one year of receipt, unless one-year period is extended by the FCC). Although the FCC did not explicitly grant such relief, "the effect given to the petition by operation of law grants Verizon's further broadband relief, continuing our policy to encourage new investment." *In re* Petition of the Verizon Tel. Cos. for Forbearance under 47 U.S.C. § 160(c) from Title II & Computer Inquiry Rules with Respect to Their Broadband Servs., WC Docket 04-440 (2006), 2006 FCC LEXIS 1333 (Chairman Martin & Comm'r Tate, concurring).

[210] Such services included: (1) packet-switched services capable of 200 Kbps in each direction and (2) certain optical networking, hubbing, and transmission services. *See In re* Petition of the Verizon Tel. Cos. for Forbearance under 47 U.S.C. § 160(c) from Title II & Computer Inquiry Rules with Respect to Their Broadband Servs., WC Docket 04-440 (Feb. 7, 2006) (*ex parte* letter from Verizon Tel. Cos.), *available at* http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6518324844.

mobile wireless broadband Internet access service is not a 'commercial mobile service' under section 332 of the Act."[211]

Thus, over the past few years, the FCC has essentially unified the regulatory status of cable, wireline, powerline, and wireless broadband Internet access services as information services that are not subject to Title II common carrier requirements.[212] In doing so, the FCC has focused on the abstract functional properties of ISPs as they ranged across varying implementations or platforms. Underlying this unification has been a significant degree of deregulation across broadband technologies, in keeping with the statutory interest under the Communications Act in furthering competition and the development of new technologies.[213]

The FCC has nonetheless continued to demonstrate an interest in, and commitment to, broadband Internet access. Certain policy statements have sought to guide industry conduct to avoid both FCC enforcement actions and the "potentially destructive" impact of overbroad and premature regulation of an "emerging market."[214] In 2004, then-FCC Chairman Michael Powell challenged the industry to preserve four "Internet Freedoms" to that end. They were:

(1) *The "Freedom to Access Content* . . . consumers should have access to their choice of legal content" (within "reasonable limits" imposed by legitimate network management needs);

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[211] *In re* Appropriate Regulatory Treatment for Broadband Access to the Internet Over Wireless Networks, 22 FCC Rcd 5901, 5901-02 (2007) (declaratory ruling).

[212] *See id.* ("This approach is consistent with the framework that the Commission established for cable modem Internet access service, wireline broadband Internet access service, and Broadband over Power Line (BPL) – enabled Internet access service and it establishes a minimal regulatory environment for wireless broadband Internet access service that promotes our goal of ubiquitous availability of broadband to all Americans.") (citations omitted).

[213] *See, e.g., Assessing the Communications Marketplace: A View from the FCC: Hearing Before the S. Comm. on Commerce, Sci., & Transp.*, 110th Cong. 2 (2007) (statement of Kevin J. Martin, Chairman, FCC), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270192A1.pdf ("In 2005, the Commission created a deregulatory environment that fueled private sector investment. . . . Broadband deployment has been our top priority at the Commission, and we have begun to see some success as a result of our efforts."); *see also, e.g.*, Thorne, Tr. II at 34 ("Over the past ten years, the policy of Congress and the Federal Communications Commission has been to encourage investment and innovation in broadband networks. This policy has been wildly successful."). In addition, the FCC had undertaken to expand the supply of broadband access services by, for example, promoting the use of unlicensed spectrum in rural areas. *See In re* Implementation of the Commercial Spectrum Enhancement Act & Modernization of the Comm'n's Competitive Bidding Rules & Procedures, 20 FCC Rcd 11268 (2005) (declaratory ruling and notice of proposed rulemaking) (implementing Enhance 911 Services Act, Pub. L. No. 108-494, 118 Stat. 3986, Title II (2004)). See *infra* Chapter VI.D for a more detailed discussion of federal spectrum policies.

[214] Michael K. Powell, Chairman, FCC, Keynote Address at the Silicon Flatirons Symposium: Preserving Internet Freedom: Guiding Principles for the Industry (Feb. 8, 2004), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-243556A1.pdf.

(2) *The "Freedom to Use Applications* . . . consumers should be able to run the applications of their choice" (within service plan limits and provided the applications do not "harm the provider's network");
(3) *The "Freedom to Attach Personal Devices* . . . consumers should be permitted to attach any devices they choose to the connection in their homes" (within service plan limits, provided the devices do not "harm the provider's network or enable theft of service"); and
(4) *The "Freedom to Obtain Service Plan Information* . . . consumers should receive meaningful information regarding their service plans" (so that "broadband consumers can easily obtain the information they need to make rational choices.").[215]

With some modification, those four Internet Freedoms were incorporated into an FCC policy statement ("Broadband Policy Statement"), issued to accompany the Wireline Order in 2005.[216] Recast as FCC principles, they included:

(1) The ability of consumers to "access the lawful Internet content of their choice";
(2) the ability of consumers to "run applications and use services of their choice, subject to the needs of law enforcement";
(3) the ability of consumers to "connect their choice of legal devices that do not harm the network"; and
(4) the existence of "competition among network providers, application and service providers, and content providers."[217]

In approving the AT&T/SBC and Verizon/MCI mergers in 2005, the FCC required the companies to adhere to connectivity principles set forth in its Broadband Policy Statement for a period of two years.[218] More recently, in approving the

[215] *Id.* (italics included in published version of address).

[216] *See In re* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 FCC Rcd 14986 (2005) (policy statement).

[217] *Id.* Also in 2005 – prior to issuance of the Wireline Order – the FCC took enforcement action against allegedly discriminatory behavior by an ISP. *In re* Madison River Communs., LLC, 20 FCC Rcd 4295, 4297 (2005). The resulting consent decree in that matter required a small North Carolina ISP to "not block ports used for VoIP applications or otherwise prevent customers from using VoIP applications." *Id.* Because the FCC used its Title II authority in this case, under which it can regulate common carrier services, this case may not be precedent for future enforcement authority over such services now characterized as information services and regulated under the FCC's Title I ancillary jurisdiction. See also *infra* Chapters VII.B and IX.B for additional discussion of the *Madison River* matter.

[218] *See In re* SBC Communs. Inc. & AT&T Corp. Applications for Approval of Transfer of Control, 20 FCC Rcd 18290 (2005) (memorandum opinion and order) (especially appendix F); *In re* Verizon Communs. Inc. & MCI Inc. Applications for Approval of Transfer of Control, 20 FCC Rcd 18433 (2005) (memorandum opinion and order) (especially appendix G).

The DOJ also examined the proposed mergers and successfully sought, under the Tunney Act, the divestiture of certain assets as conditions to such mergers. *See* United States v. SBC Communs., Inc., Civ.

AT&T/BellSouth merger, the FCC required the combined company to agree not to provide or sell (for a period of thirty months following the merger closing date) "any service that privileges, degrades, or prioritizes any packet transmitted over AT&T/BellSouth's wireline broadband Internet access services based on its source, ownership, or destination."[219]

Most recently, the FCC announced an inquiry "to better understand the behavior of participants in the market for broadband services."[220] Among other things, the FCC is seeking information regarding the following:

- How broadband providers are managing Internet traffic on their networks today;
- Whether providers charge different prices for different speeds or capacities of service;
- Whether our policies should distinguish between content providers that charge end users for access to content and those that do not; and
- How consumers are affected by these practices.[221]

In addition, the FCC has asked for comments "on whether the [Broadband] Policy Statement should incorporate a new principle of nondiscrimination and, if so, how would 'nondiscrimination' be defined, and how would such a principle read."[222]

Action Nos. 05-2102 (EGS) & 05-2103 (EGS), 2007 WL 1020746 (D.D.C. Mar. 29, 2007). In particular, the merging parties were required to divest themselves of long-term interests in certain local private line, or special access, facilities. *Id.* at *5 (noting that "[a]part from the difference in geographic scope due to the identities of the parties, the proposed final judgments are practically identical and require the same type of divestitures."). See *infra* Chapter VI.B for a discussion of special access facilities and their relationship with broadband Internet services.

[219] *In re* AT&T Inc. & BellSouth Corp. Application for Transfer of Control, 22 FCC Rcd 5662 (2006) (memorandum opinion and order). Two FCC Commissioners issued a concurring statement expressing their view that "[t]he conditions regarding net-neutrality have very little to do with the merger at hand and very well may cause greater problems than the speculative problems they seek to address." *Id.* at 5826 (Chairman Martin & Comm'r Tate, concurring).

The DOJ also reviewed the AT&T/BellSouth merger, examining, among other things, the merged firm's ability or incentive to favor its own Internet content over that of its rivals. *See* Press Release, DOJ, Statement by Assistant Attorney General Thomas O. Barnett Regarding the Closing of the Investigation of AT&T's Acquisition of BellSouth 3 (Oct. 11, 2006), *available at* http://www.usdoj.gov/atr/public/press_releases/2006/218904.pdf. The DOJ concluded its investigation last October, finding that "the merger would neither significantly increase concentration in markets for the provision of broadband services to end users nor increase Internet backbone market shares significantly." *Id.*

[220] Press Release, FCC, FCC Launches Inquiry into Broadband Market Practices (Mar. 22, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-271687A1.pdf.

[221] *Id.*

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The legal and regulatory developments discussed above have prompted the current debate over network neutrality regulation. In the next Chapter, we provide an overview of the arguments in favor and against such regulation that have been put forth to date.

[222] *Id.*

III. OVERVIEW OF ARGUMENTS IN FAVOR OF AND AGAINST NETWORK NEUTRALITY REGULATION

Technology experts have recognized since the Internet's earliest days that network resources are scarce and that traffic congestion may lead to reduced performance.[223] Although such experts continued to explore different data-transmission protocols and the viability of market-based pricing mechanisms through the 1980s and 1990s, the current debate over broadband connectivity policy did not accelerate until more recently.[224] At about the same time that the FCC began its cable broadband rulemaking proceedings in 2000,[225] data routing technologies advanced to the point where some network operators began openly to consider using prioritization and other active management practices to improve network management and provide certain premium services for a fee.[226]

Various interested parties, including some content and applications providers, non-facilities-based providers of Internet services, and third-party commentators, have expressed concern about network operators' use of these routing technologies in an environment that is not subject to common carrier regulation. Some of them, therefore, have proposed that the transmission of data on the Internet be subject to some type of "network neutrality" rules that forbid or place restraints on some types of data or price discrimination by network operators.[227] This Chapter summarizes the major arguments in favor of (in Section A) and against (in Section B) the enactment of some form of network neutrality regulation put forth to date.[228] Arguments involving data discrimination and prioritization, as well as competition and consumer protection issues, are addressed in more detail below in Chapters IV through VIII of this Report.

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[223] *See supra* Chapter I.A.

[224] *See generally* Vinton G. Cerf & David Farber, The Great Debate: What is Net Neutrality?, Hosted by the Center for American Progress (July 17, 2006), *available at* http://www.americanprogress.org/kf/060717%20net%20neutrality.pdf; Tim Wu & Christopher Yoo, *Keeping the Internet Neutral?: Timothy Wu and Christopher Yoo Debate* (Vand. Pub. Law, Research Paper No. 0-27, 2006), *available at* http://ssrn.com/abstract=953989.

[225] See *supra* Chapter II.C for a discussion of relevant FCC proceedings.

[226] *See supra* Chapter I.A.

[227] *See, e.g.*, Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH. L. 141, 151 (2005) ("Over the history of communications regulation, the Government has employed both common carriage requirements (similar to the neutrality regime discussed here) and limits on vertical integration as [a] means of preventing unwanted discrimination."). *See also* Cohen, Tr. II at 195 (arguing that network neutrality regulation "is really a return to the status quo as where it was [in August 2005 and before Brand X] so it's not . . . a new set of regulations").

[228] This Chapter is not intended to be a comprehensive treatment of the many arguments put forth in favor of and against network neutrality. Instead, this Chapter serves as a general survey of the types of arguments raised by both sides of the network neutrality debate. Nor does this Chapter attribute every single argument or variation thereon to every individual or entity that has made such arguments.

A. Arguments in Favor of Network Neutrality Regulation

Proponents of network neutrality regulation argue, among other things, that the existing jurisdiction of the FCC, FTC, and DOJ, as well as oversight by Congress, are insufficient to deal with what they predict will be inevitable and far-reaching harms from so-called non-neutral practices. They suggest that after recent legal and regulatory determinations, providers of certain broadband Internet services now have the legal authority to act as gatekeepers of content and applications on their networks.

Principally, these advocates express concern about: (1) blockage, degradation, and prioritization of content and applications; (2) vertical integration by network operators into content and applications; (3) effects on innovation at the "edges" of the network (*i.e.*, by content and applications providers); (4) lack of competition in "last-mile" broadband services; (5) legal and regulatory uncertainty in the area of Internet access; and (6) diminution of political and other expression on the Internet. Net neutrality proponents argue that various harms are likely to occur in the absence of neutrality regulation and that it will be difficult or impossible to return to the status quo if non-neutral practices are allowed to become commonplace. Proponents thus see an immediate need to enact neutrality regulation.[229]

1. Concerns about Blockage and Degradation of Non-Favored Content and Applications

Network neutrality advocates suggest that, without neutrality rules, network operators will use packet-inspection technologies to favor the transmission of their own content and applications, or those of their affiliates, over those of other providers instead of offering the unrestricted access generally available to end users today.[230] They frequently suggest that end users' access to the wider Internet will become balkanized and restricted to what network operators choose to display in their own proprietary "walled gardens." Proponents believe such walled gardens will look more like the original America Online dial-up service or even an Internet version of cable television, with access to only a limited number of favored sites. Proponents further point to preferential practices in other industries, such as cable television and telephony, as indications of the likelihood that network operators will adopt comparable practices in the absence of net neutrality regulation.[231]

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[229] *See, e.g.*, Cohen, Tr. II at 150 ("I can't take the view that we should start from the premise of wait until it's all destroyed before we do anything about it.").

[230] *See, e.g.*, Wu, *supra* note 227. *See also* EARL W. COMSTOCK, WHAT IS NET NEUTRALITY? (2006), *available at* http://www.comptel.org/content.asp?contentid=658; G. Sohn, Tr. I at 98; Farrell, Tr. I at 220.

[231] *See, e.g.*, Lawrence Lessig & Robert W. McChesney, *No Tolls on the Internet*, WASH. POST, June 8, 2006, at A23. Lessig and McChesney suggest that "[w]ithout net neutrality, the Internet would start to look like cable TV. A handful of massive companies would control access and distribution of content, deciding what you get to see and how much it costs." *Id*. *See also* Tulipane, Tr. I at 259-66. In Tulipane's view, "prioritization based on source or content will result in a closed network, just like the cable system today." *Id*. at 266. Similarly, Sohn suggests: "[s]hort of outright blocking, ISPs could engage in various forms of

Advocates of net neutrality point to certain statements by ISP executives as evidence of their intent to treat some content and applications differently than others.[232] They cite to the *Madison River*[233] matter as evidence that network operators do, in fact, have the technological means and incentive to actively degrade or outright block certain content and applications.[234] They also question whether end users will be able to determine readily why certain content and applications might be unavailable or executing more slowly or less reliably than others.[235] Some also suggest that the introduction of specialized, virtual private networks ("VPNs") that require users to purchase premium service packages foreshadows the advent of a balkanized, non-neutral Internet.[236]

In particular, these proponents warn that network operators might try to disfavor some content and applications by inhibiting or forbidding users from attaching related devices to their networks, such as the VoIP phone equipment of competing Internet telephony providers or VoIP-enabled mobile phones.[237] They also state that cable companies have, in fact, blocked streaming video applications to protect their own cable television businesses and that wireless phone companies have placed limits on the types of content and applications that can be accessed using their wireless Internet services.[238]

Some network neutrality proponents also contend that network operator bans on the use of basic residential packages to operate VPNs, open-access Wi-Fi antennas that support multiple users, home networks, and computer servers all amount to violations of neutrality principles.[239] Some, but not all, proponents, however, believe that such

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discrimination, and the fears [sic] that could have the practical effect of driving innovators to really have now a practical need to seek deals with each recipient's ISP." D. Sohn, Tr. II at 227-28.

[232] *See supra* note 64.

[233] In *Madison River*, an ISP allegedly blocked its customers from accessing a competing VoIP provider. The ISP entered into a consent decree with the FCC that prohibited the ISP from blocking ports used for VoIP traffic. The ISP also made a voluntary payment of $15,000 to the U.S. Treasury. *In re* Madison River Communs., LLC, 20 F.C.C.R. 4295, 4297 (2005).

[234] *See, e.g.*, Davidson, Tr. I at 227-28. For Davidson, "prioritization in the last mile creates real concerns. Particularly, we are concerned that prioritization through router-based discrimination in the last mile degrades computing services, and creates incentives to relegate some of those computing services to a slow lane." *Id*.

[235] *See supra* Chapter I.C.5.

[236] *See, e.g.*, Yokubaitis, Tr. II at 108.

[237] *See, e.g.*, Libertelli, Tr. I at 73 ("[F]or Skype, network neutrality is about protecting our users' ability to connect to each other, whenever and wherever they want. We support net neutrality[] because it embodies a policy of decentralized innovation.").

[238] *See, e.g.*, John Windhausen, Jr., *Good Fences Make Bad Broadband: Preserving an Open Internet Through Net Neutrality* 16-23 (Public Knowledge White Paper, 2006), *available at* http://www.publicknowledge.org/pdf/pk-net-neutrality-whitep-20060206.pdf.

[239] *See, e.g.*, *id*.

restrictions may be justified because they are meant to solve situations in which a few users generate costs that are imposed on other users.[240]

2. Concerns about Charging Content and Applications Providers for Prioritized Data Delivery

Net neutrality advocates also express concern that, short of outright blockage or active degradation, network operators will present certain content and applications to users in a preferential manner in exchange for payment. They express concern that network operators may, for example, use packet-inspection technology to provide quicker load times for certain providers' Web pages or faster and more consistent connections for favored VoIP or streaming video providers.[241] Some network operators have, in fact, indicated that they would like to offer certain prioritized services or other kinds of quality-of-service guarantees in exchange for a premium fee.[242]

Some neutrality advocates object to the idea of a network offering prioritized data transmission or quality-of-service guarantees in exchange for payment.[243] That is, they object to a deviation from the long-standing first-in-first-out and best-efforts transmission characteristics of the Internet. They are concerned about the potential for prioritization to result in blocking or degradation of non-favored content and applications. These advocates are concerned that content and applications from providers affiliated with the network operator or having a greater ability to pay will be available in a "fast lane," while others will be relegated to a "slow lane," discriminated against, or excluded altogether.[244] Further, creating priority fast lanes, according to some advocates, necessarily would

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[240] *See, e.g.*, Wu, *supra* note 227, at 152.

[241] *See, e.g.*, Editorial, *Open Net*, THE NEW REPUBLIC, June 26, 2006, *available at* http://www.tnr.com/doc.mhtml?pt=oy4NRC5%2Bfnu%2Fm585FtGwlC%3D%3D.

[242] *See infra* Chapter III.B.

[243] *See, e.g.*, Davidson, Tr. I at 228. In his view:

> [W]hat we're worried about is in that context, the power to prioritize in the last mile effectively becomes the power to control the applications and content that customers can effectively use.
>
> So, imagine, for example, that a last mile provider with market power might be able to use prioritization to, for example, relegate a competing Voice over IP provider to a lower quality slow lane. It might prevent a competing video provider – prevent a competing video service from accessing a higher tier of priority necessary to provide good service, and preference its own services instead.

Id. *See also* Tulipane, Tr. I at 259-66.

[244] *See, e.g.*, Davidson, Tr. I at 229-30. According to Davidson, "[w]e are concerned about creating a fast lane tier of traffic that is susceptible of exclusive dealings." *Id*. at 229. In his view, "prioritization that provides an incentive to create slow lanes so that you can charge people for the fast lanes is something that we think is problematic." *Id*. at 230.

result in (intentionally or effectively) degraded service in the remainder of the network.[245] Likewise, some advocates object to the creation of private networks that might provide prioritized data transmission or other forms of quality of service to only a limited number of customers, arguing that this will represent the "end" of the Internet as we know it.[246]

Some advocates, therefore, argue that content and applications providers should not be allowed to pay a premium fee for prioritized data transmission, even if they want to do so. They object, for example, to a possible two-sided market model where content and applications providers pay networks for prioritization in the same way that merchants subsidize the purchase price of a newspaper by paying for the placement of advertisements in return for greater consumer exposure to their advertisements.[247] Instead, in this view, networks should be required to derive revenues principally from providing Internet access to residential and business customers.[248] Some advocates who object to prioritized data transmission would, however, allow network operators to charge end users more for the consumption of larger amounts of bandwidth.[249]

Other advocates do not strictly object to prioritization or quality of service for a fee.[250] They argue, however, that different levels of prioritization should be offered on uniform terms to all "similar" content and applications providers and that all end users be

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[245] *See, e.g.*, *id.* at 228-30 ("[P]rioritization . . . in the last mile degrades competing services, and creates incentives to relegate some of those competing services to a slow lane . . . [given] that the only way that you can have a fast lane that you can charge for, that is useful, is if there are also slow lanes that are less useful, and less attractive.").

[246] *See, e.g.*, Lessig & McChesney, *supra* note 231. Lessig and McChesney predict that, without neutrality rules, network operators will use data prioritization "to sell access to the express lane to deep-pocketed corporations and relegate everyone else to the digital equivalent of a winding dirt road." In their view, "[n]et neutrality means simply that all like Internet content must be treated alike and moves at the same speed over the network." *Id*.

[247] *See* Pepper, Tr. I at 87 ("The last set of questions on net neutrality concern who can be charged for what service on broadband connections. Should the Internet access be funded solely by consumers, or can the cost be shared with content providers and application providers?").

[248] *See, e.g.*, Editorial, *supra* note 241 ("Net neutrality would prohibit all of this. Telecoms could make money they way they always have – by charging homes and businesses for an Internet connection – but they couldn't make money from the content providers themselves."). *See also* Sidak, Tr. I at 107 ("In other words, they don't have a problem with network operators and end users contracting for prioritized delivery. The problem they have is . . . with suppliers of content.").

[249] *See, e.g.*, Davidson, Tr. I at 228 ("Not all network management is anti-competitive prioritization. And there are a lot of things I think many of us agree that are not problematic in this context. So, charging end users, whether it's businesses or consumers, more for more bandwidth, not a problem here."). *See also* COMSTOCK, *supra* note 230.

[250] *See, e.g.*, D. Sohn, Tr. II at 230. In Sohn's view, network neutrality regulation "wouldn't need to involve a complete ban on all prioritization, even on the Internet part. I think in particular, an ISP should be free to offer prioritization capability that enables subscribers to choose what services to use it with." *Id.* *See also* Cohen, Tr. II at 150 ("There are and should remain many networks on which network providers are free to discriminate based on the source, ownership or destination of data . . . .").

guaranteed a minimum level of access to the entire universe of Internet content.[251] Another advocate suggests that network operators should be free to create specialized service parameters and to provide prioritized data transmission, but with a requirement that networks also maintain a basic level of best-efforts Internet service.[252]

Some network neutrality proponents further suggest that, as the speed of the Internet continues to increase with the deployment of faster technologies like fiber-optic wirelines and improved wireless transmissions, the issue of prioritization may become irrelevant.[253] They suggest that when Internet speeds of upwards of 100 megabits per second ("Mbps") are widely available, first-in-first-out and best-efforts delivery at these rates should be sufficient to transmit all Internet traffic without any problems, even for advanced and time-sensitive applications. These proponents suggest that all congestion and bandwidth scarcity issues will effectively disappear at these speeds and the issue of prioritization will eventually be moot. A neutrality regime, therefore, can be seen as a temporary remedy for a problem that ultimately will be outgrown and an important measure that will prevent network operators from creating artificial scarcity in their networks in the meantime to derive additional revenues by charging content and applications providers for new types of data transmission.[254] Thus, some of these

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[251] *See, e.g.*, Wilkie, Tr. I at 170 ("The caveat might be that you might want to add that tiering and offering higher levels of prioritization are allowable, but they would have to be offered on a non-discriminatory basis, or what economists call 'second degree price discrimination,' that is, the prices are functions of the level of functionality offered, not the identity of the customer."). *See also* G. Sohn, Tr. I at 128 (advocating that if one content or applications provider negotiates a particular service arrangement with a network operator, a second competing content or applications provider should "absolutely" be provided with an identical arrangement by the operator without having to engage in separate negotiations).

[252] *See, e.g.*, Press Release, USC Annenberg Center, Annenberg Center Releases Principles for Network Neutrality (2006), *available at* http://www.annenberg.edu/news/news.php?id=13. *See also* D. Sohn, Tr. II at 226 (suggesting that the optimum outcome is "to keep this neutral open Internet at an acceptable level of service, to keep that in existence even as experimentation with other networks . . . proceeds").

[253] *See, e.g.*, *Network Neutrality: Competition, Innovation, and Nondiscriminatory Access: Hearing Before the S. Comm. on Commerce, Sci., & Transp.*, 109th Cong. (2006) (testimony of Gary R. Bachula, Vice President, Internet2) [hereinafter Bachula Senate Testimony], *available at* http://commerce.senate.gov/pdf/bachula-020706.pdf; Bachula, Tr. II at 164-74. *See also* Davidson, Tr. I at 231 ("In most cases, the best way to deal with any concerns about prioritization is to provide better broadband, higher bandwidth offerings to consumers.").

[254] According to Bachula:

> When we first began to deploy our Internet2 network some eight years ago, our engineers started with the assumption that we would have to find technical ways of prioritizing certain bits, such as streaming video or video conferencing, in order to ensure that they arrived without delay.
>
> For a number of years, we seriously explored various quality of service techniques, conducted a number of workshops and even convened an ongoing quality of service working group, but as it developed, all of our research and practical experience supported the conclusion that it was far more cost effective to simply provide more bandwidth. It was cheaper to provide more bandwidth than to install these sophisticated quality of service prioritization techniques.

proponents believe that, instead of allowing network operators to engage in prioritization, policy makers should focus on creating incentives for the deployment of next-generation, high-speed networks.[255]

3. Concerns about Vertical Integration

Net neutrality proponents also express concern about the prospect of network operators integrating vertically into the provision of content and applications. Proponents argue that network operators now have the legal and technological ability to control both their own physical networks and the ability of content and applications providers to reach end users. Proponents further suggest that vertically integrated network operators will favor their own content and applications, or those of their affiliates, over others.[256] Some of these proponents, therefore, argue that network operators' ability to vertically integrate should be legally restricted or forbidden altogether.[257]

4. Concerns about Innovation at the "Edges" of the Internet

Proponents suggest that if so-called non-neutral practices are allowed to flourish in the core of the networks that comprise the Internet, innovation by content and applications developers that are connected to the Internet's "edges" will suffer. Some proponents, for example, are concerned about the complexity and cost that content and applications providers would experience if they had to negotiate deals with numerous network operators worldwide. They suggest that content and applications providers will need to expend considerable resources to negotiate and enter into prioritization agreements or other preferential arrangements with numerous networks and that many (particularly, small) companies will not be able to pay the fees that operators will demand to reach end users in a competitive manner.[258] Thus, they fear that innovators will be

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> With enough bandwidth in the network, there is no congestion, and video bits do not need preferential treatment. All the bits arrive fast enough even if intermingled.

Bachula, Tr. II at 169.

[255] Robert D. Atkinson & Philip J. Weiser, *A "Third Way" on Network Neutrality*, 13 THE NEW ATLANTIS 47, 58-59 (2006), *available at* http://www.thenewatlantis.com/archive/13/TNA13-AtkinsonWeiser.pdf. These commentators suggest that Congress should allow companies investing in broadband networks to expense new broadband investments in the first year and also extend the moratorium on federal, state, and local broadband-specific taxes, but make it contingent upon provision of an open, best-efforts level of Internet service. *Id. See also generally* Lehr, Tr. I at 36 ("[Over time, network] penetration saturates. And so, revenues growth slows. And the question is that if we want the industry to continue to meet the growth in traffic, we have to figure [out] what the incentives are.").

[256] *See, e.g.*, Joseph Farrell, *Open Access Arguments: Why Confidence is Misplaced*, *in* NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND SERVICES BE REGULATED?, *supra* note 42, at 195.

[257] *See, e.g.*, Christian Hogendorn, *Regulating Vertical Integration in Broadband: Open Access Versus Common Carriage*, 4 REV. NETWORK ECON. 19, 30 (2005).

[258] *See, e.g.*, Davidson, Tr. I at 224-33. According to Davidson, "[a]s our founders have said, two graduate students in a dorm room with a good idea would not have been able to create this service if the first thing that they had to do was to hire an army of lawyers and try to reach carriage agreements with providers all

blocked, actively degraded, or provided with low-priority data transmissions, and the development of the next revolutionary Internet site or application may be inhibited. They predict that spontaneous innovation will be precluded or forced to proceed through established businesses already having significant capital and favored relationships with network operators.[259] Similarly, net neutrality proponents sometimes argue that non-profit and educational entities may be at a disadvantage relative to highly capitalized businesses.[260]

5. Concerns about "Last-Mile" Competition in Broadband Service

Net neutrality proponents typically argue that a cable-telephone duopoly exists in most markets for last-mile broadband connections and that competition from only two broadband providers is not sufficient to check the harms that they envision. Net neutrality proponents generally do not believe that one of these competitors will provide users with an acceptable, alternative open service if the other decides to pursue exclusive deals or data prioritization. Proponents also typically express doubt about the potential of newer technologies like wireless Internet and broadband over powerlines to provide in the near future a robust, competitive alternative to the access offered by the cable and telephone companies.[261]

A related concern expressed by some network neutrality proponents is that last-mile ISPs might not disclose to end users the ISPs' differential treatment of certain data and that they will be able to get away with such non-disclosure due to a lack of viable competitive alternatives in the marketplace or the difficulty of tracing problems to ISPs' practices. Proponents also suggest that, to the extent that such disclosures are made by ISPs, many end users will not be able to readily understand them, making such

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around the world." *Id*. at 226. *See also* Cohen, Tr. II at 152 ("[Historically, Internet start-ups] did not have to negotiate. They did not have to persuade or cajole network providers for special treatment."); Center for Creative Voices in Media, Public Comment 6, at 2 ("Artists must have the freedom to distribute their works over the broadband Internet, and the American public must have the freedom to choose from among those works, rather than have the cable and telephone broadband providers who overwhelmingly control the market for broadband deny those freedoms and make those choices for them.").

[259] *See, e.g.*, Mark. A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925 (2001). Lemley and Lessig suggest that, "[i]f that strategic actor owns the transmission lines itself, it has the power to decide what can and cannot be done on the Internet. The result is effectively to centralize Internet innovation within that company and its licensees." *Id*. at 932. *See also* Farrell, Tr. I at 154 ("[T]here is a concern if you allow last mile providers to make charges on content providers, there is a concern about possible expropriation of successful content providers.").

[260] *See, e.g., Reconsidering Our Communications Laws: Ensuring Competition and Innovation: Hearing Before the S. Comm. on the Judiciary*, 109th Cong. (2006) (statement of Jeff C. Kuhns, Senior Director, Consulting and Support Services, Information Technology Services, The Pennsylvania State University), *available at* http://judiciary.senate.gov/testimony.cfm?id=1937&wit_id=5418.

[261] *See, e.g.*, Feld, Tr. II at 18-19; Putala, Tr. II at 29 ("The much heralded independent alternatives are still tiny."); Wu, Tr. II at 255 ("I have been hearing that for ten years. I've never met anyone who has a connection, broadband over power line, and it has been used a million times . . . .").

disclosures ineffective in checking potential ISP misconduct.[262] Some network neutrality proponents also argue that the use of data packet inspection and other traffic analysis technologies by network operators may give rise to privacy concerns that end users might not readily recognize.[263]

6. Concerns about Legal and Regulatory Uncertainty

Net neutrality advocates suggest that the FCC's recently issued broadband principles, its ancillary jurisdiction over broadband providers under Title I of the Communications Act of 1934, and the antitrust laws are insufficient to prevent or police potentially harmful conduct by broadband providers.[264] In particular, they argue that the FCC's broadband principles are not legally enforceable, that the full scope of its Title I authority has yet to be determined, and that any remedial action is likely to result in years of litigation and appeals, leaving the status of the Internet in doubt.[265] Neutrality advocates argue that more concrete examples of alleged harms, beyond *Madison River*, do not exist primarily because network operators have been on their best behavior in the short time since recent legal and regulatory determinations were handed down, to avoid attracting further scrutiny. Proponents argue that without further regulation, however, network operators will likely engage in such practices in the future and that there will be no practical way to prevent or remedy the resulting harms without a comprehensive, *ex ante* regulatory regime.[266]

7. Concerns about Political and Other Expression on the Internet

Advocates suggest that, without a network neutrality rule, operators will likely engage in practices that will reduce the variety and quality of content available to users, generally. In particular, they suggest network operators may degrade or block content that they find to be politically or otherwise objectionable or contrary to their own

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[262] *See, e.g.*, Kenney, Tr. II at 103 ("I think these disclosure issues are important, but I don't think that's the issue here today. In fact, the elephant in the room is whether or not disclosure of prioritization practices is sufficient to remedy the harm.").

[263] *See, e.g.*, *id*. ("I don't think anyone has a full understanding of what sort of security and vulnerability issues are at stake with deep packet inspection technologies.").

[264] *See, e.g.*, Libertelli, Tr. I at 117 ("[W]e're talking about a policy statement [(the FCC principles)]; we're not necessarily talking about a binding rule of decision."); Farrell, Tr. I at 159 ("I am not convinced that anti-trust, as currently enforced, is going to do a good job on those potential problems.").

[265] *See, e.g.*, *Network Neutrality: Competition, Innovation, and Nondiscriminatory Access: Hearing Before the H. Comm. on the Judiciary, Task Force on Telecom & Antitrust*, 109th Cong. 23, 35 (2006) (prepared statement of Earl W. Comstock, President and CEO, COMPTEL) [hereinafter Comstock House Testimony], *available at* http://judiciary.house.gov/media/pdfs/printers/109th/27225.pdf.

[266] *See, e.g.*, Misener, Tr. II at 142 ("[W]e really believe that it would be in consumers and industry's best interest for certainty and for a national policy to be set by the Federal Government at the very highest level . . . .").

business interests.[267] Neutrality advocates suggest that other types of speech, such as individuals' Web logs, may also be disfavored or blocked as the incidental result of an operator's more general decisions about favoring certain content providers over others.[268] This argument appears to be a variation on the suggestion that, without a neutrality regime, innovation (or, in this case, speech) at the edges of the network will be inhibited.[269]

B. Arguments against Network Neutrality Regulation

Opponents of network neutrality regulation include facilities-based wireline and wireless network operators, certain hardware providers, and other commentators. These parties maintain that imposing network neutrality regulation will impede investment in upgrading Internet access and may actually hamper innovation. They also argue that, apart from the *Madison River* case, the harms projected by net neutrality proponents are merely hypothetical and do not merit a new, *ex ante* regulatory regime.

Principally, these opponents argue that: (1) the Internet is not neutral and never truly has been, and a neutrality rule would effectively set in stone the status quo and preclude further technical innovation; (2) effective network management practices require some data to be prioritized and may also require certain content, applications, and attached devices to be blocked altogether; (3) there are efficiencies and consumer benefits from data prioritization; (4) new content and applications also require this kind of network intelligence; (5) network operators should be allowed to innovate freely and differentiate their networks as a form of competition that will lead to enhanced service offerings for content and applications providers and other end users; (6) prohibiting network operators from charging different prices for prioritized delivery and other types of quality-of-service assurances will reduce incentives for network investment generally

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[267] *See, e.g.*, Bill D. Herman, *Opening Bottlenecks: On Behalf of Mandated Network Neutrality*, 59 FED. COMM. L.J. 107, 118 (2007) (submitted to FTC as Public Comment 26) ("A broadband provider should no more be able to stop a customer's email or blog post due to its political content than a telephone company should be permitted to dictate the content of customers' conversations."). *See also* Peha, Tr. I at 26 ("There could also be content filtering for other reasons. Perhaps for political reasons I will want to limit access to advocacy groups for issues I oppose, or candidates I oppose.").

[268] *See, e.g.*, Barbara A. Cherry, *Misusing Network Neutrality to Eliminate Common Carriage Threatens Free Speech and the Postal System*, 33 N. KY. L. REV. 483, 507 (2006) (submitted to FTC as Public Comment 8) ("If antitrust principles are insufficient to substitute for the functions that common carriage and public utility obligations have served in providing access, then free speech rights of individuals will be sacrificed to serve economic interests of corporate owners of broadband facilities."); Feld, Tr. II at 15 ("Goal number . . . two is the Internet is open and diverse as it exists today or better. . . . The First Amendment cares about this stuff. Our democracy depends on this stuff, and Congress has told us to protect it as part of the policy. Any policy that doesn't protect that, even if it is more economically efficient, is a failed policy."). *But compare* Thomas B. Leary, *The Significance of Variety in Antitrust Analysis*, 68 ANTITRUST L.J. 1007, 1019 (2001) (raising the question of "whether an increase or decrease in available variety, by itself, merits independent consideration in antitrust analysis").

[269] *See, e.g.*, G. Sohn, Tr. I at 134 ("The Internet actually takes away the gate keepers, so people can engage in democratic discourse, eCommerce, innovation. It's been great. And at a certain point, we have to ask ourselves, do we want it to remain that way?").

and prevent networks from recouping their investments from a broader base of customers, a practice which might, in turn, reduce prices for some end users; (7) vertical integration by network operators into content and applications and certain bundling practices may produce efficiencies that ultimately benefit consumers; and (8) there is insufficient evidence of potential harm to justify an entirely new regulatory regime, especially when competition in broadband services is robust and intensifying and the market is generally characterized by rapid, evolutionary technological change.

1. Historical and Existing Non-Neutrality of the Internet

Opponents of network neutrality regulation argue that the Internet is not, and never truly has been, "neutral."[270] These opponents generally agree that the first-in-first-out and best-efforts characteristics of the TCP/IP data-transmission protocol have played a significant role in the development of the Internet.[271] They point out, however, that since the earliest days of the Internet, computer scientists have recognized that data congestion may lead to reduced network performance and have thus explored different ways of dealing with this problem.[272]

Net neutrality opponents point out that all network routers must make decisions about transmitting data and argue that such decisions invariably have implications that may not be strictly uniform or neutral. In particular, they note that networks have long employed "hot potato" routing policies that hand off to other networks at the earliest possible point data that is not destined for termination on their own networks. A principal goal of hot potato routing is to reduce the usage of network resources.[273] Opponents note that, during periods of congestion, data packets may be rerouted along another path or dropped altogether and that packets may need to be re-sent when transmission errors occur.

Opponents of net neutrality regulation argue that the TCP/IP protocol itself may have differential effects for various content and applications.[274] For example, static Web page content like text and photos and applications like e-mail generally are not sensitive to latency. Thus, users typically can access them via the TCP/IP protocol without

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[270] *See, e.g.*, Ryan, Tr. I at 238 ("IP networks do prioritize. They have from the beginning of time. The prioritization that they had in the network at its inception was basically a first in line prioritization, first in/first out. So it's prioritization based on time, and time alone."). *See also* McTaggart, *supra* note 117.

[271] See *supra* Chapter I.A for a discussion of the TCP/IP protocol.

[272] *See generally supra* Chapter I. *See also* Peha, Tr. I at 17 ("Actually, the [TCP/IP] protocol for 35 years has allowed priority. But, for the most part, people haven't used it. Or even implemented it.").

[273] *See, e.g.*, McTaggart, *supra* note 117, at 10-12.

[274] *See, e.g.*, Yoo, Tr. II at 219. According to Yoo, "every protocol inherently favors some applications over others. TCP/IP, first come, first served, very good at some things, worse at others. In a sense, there is no neutral way to go here, by choosing one protocol over the other, you will actually be choosing winners and losers." *Id*.

noticeable problems, even during periods of congestion. Applications like streaming video and videoconferencing, however, may be sensitive to latency and jitter.[275] Net neutrality opponents argue, therefore, that while first-in-first-out and best-efforts principles may sound neutral in the abstract, their practical effect may be to disfavor certain latency- and jitter-sensitive content and applications because prioritization cannot be used to deliver the continuous, steady stream of data that users expect even during periods of congestion.[276]

Network neutrality critics also note that content providers increasingly are using local caching techniques to copy their content to multiple computer servers distributed around the world, and argue that this practice effectively bypasses the first-in-first-out and best-efforts characteristics of the TCP/IP protocol.[277] Critics further observe that network operators have preferential partnerships with Internet "portal" sites to provide users with greeting homepages when they log on, as well as customized and exclusive content and applications.[278] Similarly, they note that portals, search engines, and other content providers often give premium placement to advertisers based on their willingness to pay.[279] In their view, these practices all constitute additional indicia of existing non-neutrality.

2. Prioritization, Blockage, and Network Management Requirements

Network neutrality opponents frequently argue that operators should be allowed actively to restrict or block data that they believe may be harmful to the performance of

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[275] *See, e.g.*, Pepper, Tr. I at 85-86 ("The problem with non-discrimination is that it does not recognize that treating different packets differently is necessary for the effective delivery of many services. As more real-time interactive services dominate Internet traffic, it's going to be more important to differentiate among packets."). *See also* McTaggart, *supra* note 117, at 12-14.

[276] Some network neutrality proponents, such as Wu, have concluded that, "[a]s the universe of applications has grown, the original conception of [Internet Protocol] neutrality has [become] dated; for IP was only neutral among *data* applications. Internet networks tend to favor, as a class, applications insensitive to latency (delay) or jitter (signal distortion)." Wu, *supra* note 227, at 149. Expanding on this point, some network neutrality opponents, such as Yoo, have concluded that, because "TCP/IP routes packets anonymously on a 'first come, first served' and 'best efforts' basis . . . it is poorly suited to applications that are less tolerant of variations in throughput rates, such as streaming media and VoIP, and is biased against network-based security features that protect e-commerce and ward off viruses and spam." Christopher S. Yoo, *Beyond Network Neutrality*, 19 HARV. J.L. & TECH. 1, 8 (2005). Therefore, in his view, "[c]ontrary to what the nomenclature might suggest, network neutrality is anything but neutral." *Id.*

[277] *See, e.g.*, McTaggart, *supra* note 117, at 6-7 (discussing Google's distributed computing network).

[278] *See, e.g.*, *id.* at 4-5 (discussing network partnerships with portals such as Yahoo!, Microsoft MSN, and Lycos). *See also* Waz, Tr. II at 162 (discussing the premium placement of portals on mobile phones).

[279] *See, e.g.*, McCormick, Tr. I at 273 ("[I]f any of us want to kind of envision what prioritization on the Internet might look like, I mean, I think the clearest understanding of what we know prioritization would be is looking at a Google search page.").

their networks,[280] citing reports that a relatively small number of users can potentially overwhelm network resources through the use of bandwidth-intensive applications, such as peer-to-peer file-sharing and streaming video.[281] They warn that active network management, prioritization, and other types of quality-of-service assurances are needed to prevent the Internet, or its individual parts, from slowing down or crashing altogether in a high-tech "tragedy of the commons."[282] In their view, merely expanding network capacity is expensive and may not be the most cost-effective method of network management, and future content and applications may be even more resource-intensive than applications like BitTorrent are today.[283]

3. Efficiencies and Consumer Benefits from Prioritization

Network neutrality opponents argue that market transactions for prioritization and other forms of quality of service can, in many cases, allocate scarce network resources in

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[280] Network neutrality proponents generally allow that some active management is necessary to maintain network performance, but typically maintain that it should be limited. *See, e.g.*, PUBLIC KNOWLEDGE, PRINCIPLES FOR AN OPEN BROADBAND FUTURE: A PUBLIC KNOWLEDGE WHITE PAPER (2005), *available at* http://www.publicknowledge.org/pdf/open-broadband-future.pdf. According to this group, "[s]ome have maintained that network operators must have the ability to restrict access to the network for legitimate law enforcement purposes, or for network management. While these examples may be valid, this authority can be easily abused and should not be broadly permitted." *Id*. at 10.

[281] *See supra* Chapter I.C.1.

[282] *See, e.g.*, McCormick, Tr. I at 243. According to McCormick, "[a] better Internet doesn't simply come by adding capacity. Like road networks, rail networks, electrical networks, and traditional telephone networks, the advanced networks that comprise the Internet cannot function efficiently and cost-effectively without management. No network has ever been built without regard to prioritization of traffic, peak loads, and capacity management." *Id*. Wireless network operators, in particular, argue that because their networks may not have as much bandwidth as other wireline providers, they must be allowed to limit or block certain content and applications like BitTorrent and to otherwise actively manage the use of their networks' resources. Network neutrality opponents state that any unintended consequences produced by neutrality rules may have particularly acute consequences for such networks. *See, e.g.*, Altschul, Tr. II at 51 (maintaining that applying network neutrality regulations to wireless broadband networks "would have unique effects and they would be negative effects").

[283] *See, e.g.*, Thorne, Tr. II at 34-39 (discussing the costs of deploying broadband networks). According to Thorne:

> When Verizon puts its fiber down a street, it costs us, in round numbers, $800 per home. It costs us again, in round numbers, another $840 to connect the home that actually takes the service. We spend the money to pass the home, but we don't know whether the customer is going to buy broadband service at all, or buy it from us.

Id. at 39. *See also* Schwartz, Tr. I at 255 ("Economically, it doesn't make sense that the solution is always to build more. That's going to involve carrying a lot of excess capacity, which is going to be expensive."); T. Randolph Beard et al., *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, 430 (2002) (estimating the cost of fiber-optic wireline deployment in a metropolitan area at approximately $3 million per mile).

a manner more consistent with the actual priorities of end users.[284] Opponents further suggest that prioritizing streaming telemedicine video, for example, ahead of e-mail or network gaming transmissions to reduce latency and jitter would be socially beneficial.[285]

Net neutrality opponents thus argue that network operators should be allowed to prioritize the transmission of certain data or provide quality-of-service assurances for a fee in the same way that consumers pay for priority mail service. Some observers note that many other types of paid prioritization arrangements such as first-class airline seating, congestion pricing for automobile traffic and public transportation, and premium advertisement placements are commonplace and generally considered to be socially beneficial.[286] In addition, they dispute the notion that non-prioritized data will be relegated to an unacceptable, antiquated slow lane. Rather, they argue that non-prioritized data traffic will continue to receive an acceptable level of basic service that will continue to improve over time along with more general advances in data transmission methods.[287]

4. New Content and Applications and the Need for Network "Intelligence"

Network neutrality opponents argue that new types of specialized services and premium content require sophisticated, "intelligent" data-traffic management at both the core and edges of the Internet.[288] Principal examples include VoIP, streaming video for movies and telemedicine, large video download files, interactive network video games, and customized business applications. In their view, "dumb" networks based on the original TCP/IP protocol's first-in-first-out and best-efforts standards are becoming

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[284] *See, e.g.*, Schwartz, Tr. I at 255-56 ("[I]t makes sense to use the price system as a signal of which things merit priority.").

[285] *See, e.g.*, McCormick, Tr. I at 244 ("A communication about your health, for example, is clearly more important than how quickly your kid can download a video featuring the antics of someone's pet hamster.").

[286] *See, e.g.*, Sidak, Tr. I at 112 ("Obviously, we observe price discrimination in competitive markets all the time."). *See also* Farrell, Tr. I at 157 ("Price discrimination, as you have probably all heard many economists say in forums like this, is not necessarily harmful. And that's correct, given the other alternatives available.").

[287] *See, e.g.*, J. Gregory Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, 2 J. COMPETITION L. & ECON. 349, 355 (2006) ("Rather than being forced down Lessig's 'digital equivalent of a winding dirt road,' these content providers would be relegated to something more like a business-class seat on a flight to Paris.").

[288] *See, e.g.*, Verizon Communications Inc., Public Comment 60, at 6-8. Verizon, for example, suggests that "[n]ew Internet content and applications require innovative new broadband delivery methods" and that networks need to be able to prioritize data "to manage bandwidth and control traffic on their network – for example, to offer different levels of service for content and applications providers to reach their customers." *Id.* at 7-8.

increasingly outdated for certain content and applications.[289] Opponents argue that many of these newer applications are sensitive to different levels of speed, latency, jitter, symmetry, bursting, and capacity. For example, virtual teleconferencing generally requires high speed, low latency, and symmetry, while some one-time video downloads might require only high speed. By contrast, VoIP does not require significant bandwidth, but is sensitive to latency and jitter. Neutrality critics argue, therefore, that network intelligence will be increasingly necessary to provide the optimal transmission climate for each of these new types of content and applications and that both content and applications providers and other end users should be allowed to purchase services appropriate to their particular needs.

5. Network Innovation and Competition

Network neutrality opponents contend that network operators should be allowed to innovate freely and differentiate their networks as a form of competition that will lead to enhanced service offerings for content and applications providers and other end users. This perspective has been described as an argument in favor of "network diversity."[290] Thus, opponents believe that network operators should be able to experiment with new data-transmission methods and a variety of business plans to better serve the evolving demands of end users. If such experiments turn out to be failures, network operators will learn from their mistakes and improve their offerings or simply return to the status quo, consistent with the normal dynamics of the market process.[291] In their view, a ban on prioritization would effectively restrict new types of competition, hinder innovation, potentially preclude price reductions for consumers, hamper efficiencies, and lock in one kind of business model.[292] They warn that in the nascent and evolving market for broadband services, mandating a single business plan is likely to lead to inefficient and unintended outcomes.[293] They also assert that allowing content and applications

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[289] *See, e.g.*, Adam Thierer, *Are "Dumb Pipe" Mandates Smart Public Policy? Vertical Integration, Net Neutrality, and the Network Layers Model*, *in* NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED?, *supra* note 42, at 73. *See also* Pepper, Tr. I at 81-83.

[290] *See, e.g.*, Yoo, *supra* note 276, at 9 ("In other words, standardization of TCP/IP would have the effect of narrowing the dimensions of competition, forcing networks to compete solely on the basis of price and network size.").

[291] *See, e.g.*, Yoo, Tr. II at 220 ("If we have four players and one wants to experiment with a different architecture, if they are wrong, they will get hammered and they will come back to the fold. If they are right, it's precisely the kind of innovation we should tolerate and encourage.").

[292] *See, e.g.*, American Bar Association Section of Antitrust Law, Public Comment 2, at 8 ("Ultimately, we believe that the competitive process will drive investment and innovation in the Internet. That investment and innovation will inure to the benefit of all consumers. We do not think that imposing non-discrimination statutes, regulations or policies will offer any offsetting benefits economically.").

[293] *See, e.g.*, Pepper, Tr. I at 88 ("[One] concern is really whether net neutrality regulation designed to prevent anti-competitive conduct could limit, or prohibit consumer welfare-enhancing network functionality and management, as well as discourage innovation. In other words, regulation is not costless.").

providers to purchase quality-of-service assurances and prioritization may allow new content and applications providers to counteract the competitive advantages typically enjoyed by incumbent providers, such as the ability to pay for large server farms or third-party data caching services.[294]

6. Network Investment and Potential Consumer Benefits

Opponents argue that prohibiting network operators from charging different prices for prioritized delivery and other types of specialized services and premium content will make it more difficult to recoup the costs of infrastructure investments and, thereby, reduce incentives for network investment generally.[295] They argue that both end users and content and applications providers should be free to select any level of service provided by network operators under market-negotiated terms.[296]

Network neutrality opponents also stress that, although the Internet began as a research and government communications network, its explosive growth since the mid-1990s has been fueled mainly by private, risk-bearing investment.[297] They emphasize that the individual, decentralized networks that make up the Internet mostly are owned and operated by private companies and, generally speaking, are private property, even though they may be subject to certain legal requirements like rights of way permissions.[298] They point out that deploying and upgrading broadband networks can entail billions of dollars in up-front, sunk costs.[299] Thus, they argue, any regulation that reduces network operators' ability to recoup their investments also effectively increases

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[294] Similarly, some network neutrality opponents argue that efforts by current leading content providers to codify the status quo under the guise of neutrality rules are really nothing more than a veiled strategy to commoditize data transmission and, thereby, preserve their own existing competitive advantages against possible competitive threats based on new data-transmission techniques. *See, e.g.*, Yoo, *supra* note 276, at 9 ("[T]he commodification of bandwidth would foreclose one avenue for mitigating the advantages enjoyed by the largest players."). *See also* George S. Ford et al., *Network Neutrality and Industry Structure* 1 (Phoenix Center Policy Paper No. 24, 2006) ("[P]olicymakers should avoid Network Neutrality mandates that have the intent or effect of 'commoditizing' broadband access services since such a policy approach is likely to deter facilities-based competition, reduce the expansion and deployment of advanced networks, and increase prices.").

[295] *See, e.g.*, Lenard, Tr. I at 181 (arguing there is a "striking lack of concern about the effect on incentives to invest and innovate").

[296] *See, e.g.*, Sidak, Tr. I at 107 ("Well, why do you need to have a federal law prohibiting one kind of transaction, when you're perfectly happy with the other?").

[297] *See, e.g.*, Waz, Tr. II at 155-61. Waz states that "[a]ll that competitive investment is what makes it possible for a Google and Yahoo! and eBay and Amazon and others to be here today . . . ." *Id*. at 158.

[298] *See, e.g.*, Bruce Owen & Gregory L. Rosston, *Local Broadband Access: Primum Non Nocere or Primum Processi? A Property Rights Approach*, *in* NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED?, *supra* note 42, at 163.

[299] *See, e.g.*, Thorne, Participant Presentation, at 1 (identifying Verizon Communications capital expenditures of approximately $45 billion during 2004-06).

their risk profile to investors and, accordingly, would prompt capital markets to demand an adjusted, higher rate of return. They suggest such an increase in the cost of capital, in turn, would decrease the likelihood that projects underway could be completed on their planned scale.[300]

In addition to reducing incentives for network investment generally, opponents argue that banning network operators from selling prioritized data delivery services to content and applications providers will prevent networks from recouping their investments from a broader base of customers.[301] In particular, they suggest that networks should be allowed to experiment with a model in which content and applications providers pay networks for prioritization and other premium services in the same way that merchants pay for the placement of advertisements in newspapers and other publications.[302] They suggest that such a business model might reduce prices for some end users, much as advertising subsidizes the subscription prices of ad-supported publications, thereby allowing marginal customers to afford broadband service.[303] They further suggest that such increased end-user penetration would also increase the effective demand for content and applications, generally, and thereby benefit their providers.[304]

7. Economies of Scope from Vertical Integration and Bundling

Net neutrality opponents argue that vertical integration by network operators into content and applications, along with related bundling practices, may produce economies

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[300] Sidak, *supra* note 287, at 357. In addition, some commentators characterize neutrality rules as being a kind of regulatory taking of private property that can no longer be justified under a theory of natural monopoly or other similar grounds. *See, e.g.*, Thomas W. Hazlett, *Neutering the Net*, FIN. TIMES, Mar. 20, 2006; Richard A. Epstein, *What We Need is Regulatory Bed Rest*, FIN. TIMES, Mar. 20, 2006. Both articles are available at http://www.ft.com/cms/s/392ad708-b837-11da-bfc5-0000779e2340.html.

[301] *See, e.g.*, Yoo, Tr. II at 217 ("[W]e need to allow more flexibility on the server side. . . . Part of those costs should also vary based on who, which servers, which content and applications providers need those services."). *See also* Sidak, *supra* note 287, at 367-68.

[302] *See, e.g.*, Yoo, Tr. II at 217 ("[W]e have learned in fact, these are two-sided markets. Basically, upgrades to the network have to be paid for either by consumers or by the server content application side."). *See also* Schwartz, Tr. I at 258-59 ("[N]obody knows what the right pricing structure is. I don't claim to know it; nobody does. There is no presumption that the right structure is to recover all of the cost of consumer broadband networks from consumers alone."). Other examples of two-sided or, more generally, multi-sided markets include credit cards (involving merchants and cardholders); dating services (men and women); video game platforms (developers and players); and telephone networks (callers and receivers). *See generally* Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report* (Institut d'Économie Industrielle (IDEI), Toulouse, Working Paper No. 275, 2005), *available at* http://idei.fr/doc/wp/2005/2sided_markets.pdf.

[303] *See, e.g.*, Schwartz, Tr. I at 259 ("What economics predicts–and it's independent of a monopoly or–it's independent of the degree of competition in broadband access–the prediction is if you allow them to charge content providers, in their own interest they will now reduce prices to consumers, and therefore, encourage penetration.").

[304] *See, e.g.*, *id.*; Sidak, *supra* note 287, at 367-68; Sidak, Tr. I at 114-15.

of scope and price reductions. They point out that many areas of telecommunications are increasingly converging. For example, both cable and traditional telecommunications companies increasingly are offering "triple-" and "quadruple-play" bundles of high-speed data, telephony, television, and wireless services.[305] In addition, they state that the vertical integration of distribution with other types of media content is already commonplace because consumers typically do not want distribution alone, but, instead, want the particular content enabled by that distribution.[306] Some opponents also suggest that the prospect of additional revenue streams derived from vertical integration and bundling could promote additional competition in last-mile broadband services and provide other benefits to end users.[307]

8. Insufficient Evidence of Harm to Justify New Regulation

Network neutrality opponents argue that there is insufficient evidence of harm to justify an entirely new *ex ante* regime, particularly when, in their view, competition in broadband services is robust and intensifying due, in large part, to de-regulation. They state that, apart from the *Madison River* case, which was quickly resolved by the FCC, the harms projected by network neutrality proponents are merely hypothetical and, therefore, do not merit new rules.[308] Also, they note that a number of network operators have publicly pledged not to block or degrade end users' use of their services.[309] They

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[305] *See generally* Marguerite Reardon, *Cable Goes for the Quadruple Play*, CNET NEWS.COM, Nov. 7, 2005, http://news.com.com/2100-1034_3-5933340.html. *See also generally Your Television is Ringing*, ECONOMIST, Oct. 14, 2006, at 3 (special survey of telecommunications convergence).

[306] *See, e.g.*, Lenard, Tr. I at 177 ("So what may be needed for a successful business model may be a bundled product offering that is sufficiently attractive to attract enough consumers to become subscribers at prices that are going to pay off the costs of these very large investments."). *See also* Thomas L. Lenard & David T. Scheffman, *Distribution, Vertical Integration and the Net Neutrality Debate*, *in* NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED?, *supra* note 42, at 1, 13.

[307] *See, e.g.*, Rosston, Tr. I at 164-65. According to Rosston, "some of these vertical relationships that people are concerned about that may increase the profits of a new entrant may be the thing that is necessary, in order to get a new entrant, in order to compete." *Id.* *See also* Thorne, Tr. II at 57-58. Verizon, for example, suggests that it would be interested in partnering with hospitals to develop specialized medical applications that could be delivered over its fiber-optic wireline networks to allow the remote treatment of patients. *Id*. Likewise, some observers have pointed to Google's involvement in advertisement-supported municipal wireless Internet systems as an example of how vertical integration may enhance last-mile competition and benefit consumers. *See, e.g.*, Sidak, Tr. I at 108-09; Thorne, Tr. II at 37; Wallsten, Tr. II at 59.

[308] *See, e.g.*, Wolf, Tr. II at 143-44 ("[J]ust as a doctor would not prescribe needless medication for a growing adolescent on the possibility that some day that adolescent might develop a condition, so, too, we think Federal regulators are prudent to refrain from prescribing conditions that may in fact stifle or injure needed growth."). *See also* Kahn, Tr. I at 185 ("I think the lesson of history is be very, very careful that you don't meddle with a process that is clearly characterized by Schumpeterian [dynamic] competition.").

[309] *See, e.g.*, Thorne, Tr. II at 40 ("[Verizon has] made clear [that] when consumers buy Internet access capacity from us, they should be able to reach any lawful website they want to get to with that capacity, and we do not and will not block, degrade, or interfere with consumers' access to any website."); *Net Neutrality: Hearing Before the S. Comm. on Commerce, Sci., & Transp.*, 109th Cong. 21 (2006) (statement of Kyle McSlarrow, President & CEO, National Cable & Telecommunications Association), *available at*

argue that operators do not have sufficient power over the distribution of content and applications[310] and, in fact, would alienate their end-user customers if they tried to engage in such practices.[311] Furthermore, they question whether it would even be cost-effective for network operators to search for and block specific kinds of content and applications in an ever-expanding Internet universe, given that an increasing number of proxy servers and encryption techniques are available to end users to counter any such blocking.[312] Similarly, some observers suggest that if such practices are detected, end users can quickly publicize them and thereby "embarrass" the relevant network operator engaging in such conduct.[313]

Finally, network neutrality opponents suggest that the existing jurisdiction of the antitrust agencies and the FCC is sufficient to deal with any prospective problems resulting from the use of new data-transmission methods.[314] Generally, network neutrality opponents suggest that any such problems should be handled on a case-by-case basis – not through *ex ante* legislation or regulation.[315] They express concern that any such regime might be manipulated in order to achieve strategic, anticompetitive outcomes or be subject to other forms of rent-seeking behavior and unintended consequences.

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http://commerce.senate.gov/public/_files/30115.pdf ("NCTA's members have not, and will not, block the ability of their high speed Internet service customers to access any lawful content, application, or services available over the public Internet.").

[310] *See, e.g.*, Thorne, Tr. II at 42 ("Does Verizon have the ability to prevent Google or eBay or these others from reaching end users, when the most we could do is temporarily shut off a couple percent of the end users they can see? . . . There is no single broadband provider that has that kind of power.").

[311] Opponents argue that a shift away from the America Online-type walled-garden model has taken place and predict, therefore, that customers would vigorously protest any attempt to return to it after becoming accustomed to generally unrestricted Internet access. *See, e.g.*, Pepper, Tr. I at 136-37.

[312] *See, e.g.*, Thorne, Tr. II at 43 ("What we are selling is precisely the capacity to reach all lawful content and applications. Broadband providers are motivated to maximize the content and applications available to our customers because doing that maximizes the value of our network and the sales we can make."). *See also generally Cat and Mouse, On the Web*, ECONOMIST, Dec. 2, 2006, at 3 (The Economist Technology Quarterly survey) (discussing the ability of networks to block end users' access to desired content and applications and methods that end users may employ to circumvent such practices).

[313] *See, e.g.*, Lehr, Tr. I at 44 ("So, if there is a particular behavior that a carrier is doing, some sort of quality of service differentiation that really has no justification in cost, and looks really high-handed, it's very common for this to get, you know, blogged in real time, and for this to embarrass the carrier so that – I mean, the carriers and the operators – and force them to change their behavior."). *See also* Weiser, Tr. II at 92 (making the same point).

[314] *See, e.g.*, Muris, Tr. II at 122 ("If problems of the sort imagined by the advocates of regulation emerge, the appropriate law enforcement authorities have the jurisdiction and expertise necessary to address them.").

[315] *See, e.g.*, Schwartz, Tr. I at 254 ("[I]f foreclosure does rise to the level of a serious competitive problem, the right response is to address it at the time, on a case-by-case basis–at least that's my view.").

IV. DISCRIMINATION, BLOCKAGE, AND VERTICAL INTEGRATION

As discussed in the preceding Chapter, proponents of network neutrality regulation have raised a variety of concerns about the effects of vertical integration in broadband markets, as broadband Internet access providers have begun to offer online content and applications in addition to their primary access services. In particular, proponents are concerned that providers may block or discriminate against unaffiliated content and applications, to the benefit of affiliated offerings. Because such concerns may stem from diverse vertical arrangements, this Chapter will construe vertical "integration" broadly to include any arrangement under which a broadband Internet access provider may claim income generated by content or applications, such as joint ventures and exclusive dealing arrangements, as well as outright ownership of content or applications.

This is a particularly complicated issue because vertical integration into content and applications provision can create both incentives to engage in procompetitive, socially beneficial behavior and incentives to engage in anticompetitive, socially harmful behavior. Vertical integration generally need not be anticompetitive or otherwise pernicious[316] and is often driven by efficiency considerations.[317] For example, such integration may facilitate further network or content and applications development, and it may spur development of network, content, and applications more optimally suited to each other. Both price and non-price dimensions of broadband Internet service may thus improve. As a result, the notion that vertical integration tends generally to be anticompetitive has been widely rejected in antitrust law and economics for several decades.[318]

Many net neutrality proponents argue that their concerns about vertical integration arise only when there is insufficient competition in the underlying Internet access market. In that case, a vertically integrated last-mile access provider might exercise its market power to block access to competing content or applications, degrade the transmission of competing content or applications, or reduce investment in best-efforts Internet access services in favor of priority services that carry the access provider's own or affiliated content or applications. Other proponents, however, have concerns that are independent of the degree of market power the access provider enjoys in the access market itself. These include concerns about the so-called terminating access monopoly problem and the potential "balkanization" of the Internet.

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[316] *See, e.g.*, Farrell, Tr. I at 154 (concerns about vertical integration in broadband markets are substantial but contingent, sometimes highly uncertain, and "very hard to observe, and pin down").

[317] *See, e.g.*, Yoo, Tr. II at 213-14 (citing research by FTC Bureau of Economics Director Michael Salinger regarding efficiencies in vertical integration in the telecommunications industry).

[318] *See, e.g.*, Joseph Farrell & Philip Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85, 87 (2003).

This Chapter of the Report discusses concerns that net neutrality proponents have raised about vertical integration in broadband Internet services. Section A discusses problems that are most likely to arise when a provider enjoys substantial market power in the provision of last-mile Internet access; Section B discusses certain problems that may arise independent of the degree of market power attributed to an access provider; Section C discusses various benefits that may be derived from increased vertical integration in these markets; and Section D provides a brief summary of the competing arguments and remaining uncertainties.

Because several types of alleged problems with vertical integration are tied in some way to price or data discrimination, and because both definitions and applications of "discrimination" have been contentious in the broadband Internet access discussion,[319] this Chapter first briefly clarifies that the economic meaning of discrimination is that of differentiation and is not intended to have any negative connotation.[320] Thus, this Report – in particular, this Chapter and Chapter V – does not assume that price discrimination or any form of product or service differentiation is necessarily anticompetitive or anti-consumer.[321] Even where demand conditions allow a seller to price above marginal cost, price discrimination can provide a means of increasing overall consumer welfare by, for example, providing access to goods or services for some consumers who otherwise would be priced out of the market.[322]

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[319] *See, e.g.*, Ford, Tr. II at 239 (criticizing imprecise usage of terms like "discrimination" in the broadband policy discussion). *Cf.* Farrell, Tr. I at 204-05 (noting disagreement in price discrimination terminology within Workshop, but suggesting semantic dispute is unproductive); Lehr, Tr. I at 37-38 (trying to "move away from the loaded term" of "discrimination"); William H. Page & John R. Woodbury, *Paper Trail: Working Papers and Recent Scholarship*, THE ANTITRUST SOURCE, Apr. 2007, at 6, *available at* http://www.abanet.org/antitrust/at-source/07/04/Apr07-PTrail4=27f.pdf (criticizing Workshop participant Sidak's discussion of price discrimination and Ramsey pricing).

[320] That is, we generally attach no negative connotation to "discrimination." Plainly, however, as mentioned above and discussed throughout this Chapter and Chapter V of this Report, concerns have been raised about particular potential forms of discrimination, such as blocking or degradation of competing content and applications.

[321] Classical price discrimination can, depending on its form, involve a combination of differential pricing and product differentiation. *See generally* ARTHUR C. PIGOU, THE ECONOMICS OF WELFARE (Transaction Publishers 2002) (1920) (articulating, among other things, a general theory of price discrimination). The idealized model discussed by Pigou involves monopoly pricing; there is no suggestion here that any particular entities in the broadband Internet access market enjoy monopoly power or its approximation. *Cf.* William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power*, 70 ANTITRUST L.J. 661, 662 (2003) ("[I]t is competition, rather than its absence, that in many cases serves to impose discriminatory pricing."); Alfred E. Kahn, *Telecommunications, the Transition from Regulation to Antitrust*, 5 J. ON TELECOMM. & HIGH TECH. L. 159, 177 (2006) (emphasizing "the difference between price discriminations, such as *might* be taken to reflect inadequacies of competition, and differentiations on the basis of differences in costs, such as would unequivocally be reflective of effective competition").

[322] That is, by producing and selling additional units priced between the highest-priced good or service and the marginal-cost good or service. Hal Varian demonstrated generally that an increase in output is necessary for profit-maximizing price discrimination to increase welfare. *See* Hal R. Varian, *Price Discrimination and Social Welfare*, 75 AM. ECON. REV. 870, 875 (1985); *see also generally* JEAN TIROLE,

Product differentiation in its simplest form can be a means of offering different versions of a good to different consumers, according to their demands. A common example is airline travel. Although all passengers receive the same basic product (transport from one airport to another), airlines offer different fares based on different levels of service during the flight (first class or coach) and flexibility in making arrangements (leisure travel advance fares or last-minute business fares). By linking price and product differentiation, a seller may be able to capture profits that would have been available under unitary pricing and yet serve segments of the market that otherwise would be excluded.[323]

A. Last-mile Access Concerns Contingent on Market Power

Some net neutrality proponents have argued that vertically integrated broadband providers possessing market power in the provision of last-mile access could leverage that power in ways ultimately harmful to consumers. There are two major related concerns. First, such providers could have incentives to discriminate against competing content or applications providers.[324] Second, such providers could have incentives to underinvest in the facilities used to provide common, best-efforts Internet access services.

Because techniques such as deep packet inspection can reveal source or content information, there is some concern that vertically integrated providers with sufficient incentives to discriminate against competing content could do so.[325] Such blocking could take several forms. A broadband provider with an interest in content or applications could block competing content or applications outright. Less extreme forms of discrimination could impose degraded or otherwise inferior transmission on competing

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THE THEORY OF INDUSTRIAL ORGANIZATION 137-39 (1988). Several Workshop participants applied this general point to the broadband competition discussion. *See, e.g.*, Sidak, Tr. I at 114-15. Several others focused on the particular variant of so-called Ramsey price discrimination, observing, for example, that Ramsey pricing is "the most efficient way to recover fixed costs." *See* Yoo, Tr. II at 217; Lehr, Tr. I at 38. In a seminal paper based on then-current models of monopolist price discrimination, Frank Ramsey considered how a proportionate tax system might be structured to raise a given amount of revenue while imposing a minimum decrease in utility. *See* F.P. Ramsey, *A Contribution to the Theory of Taxation*, 37 ECON. J. 47, 47 (1927). The most general answer – that, "the taxes should be such as to diminish in the same proportion the production of each commodity taxed" – provided a foundation not just for models of taxation, but for, among others, utility rate structures and constrained price discrimination. *See id.* Ramsey's model mirrors monopolist price discrimination, but does so subject to a profit constraint.

[323] *See* PIGOU, *supra* note 321, at 279-80.

[324] *See, e.g.*, Farrell, Tr. I at 156.

[325] *See* Michael Geist, *ISP Must Come Clean on Traffic Shaping*, TORONTO STAR, Apr. 16, 2007, at D5, *available at* http://www.thestar.com/sciencetech/article/203408. See also *supra* Chapter I for a discussion of deep packet inspection and other traffic-shaping technologies.

content. For example, such content might be denied access to prioritized routing,[326] relegated instead to best-efforts or otherwise inferior routing.[327]

1. Discrimination against Competing Content and Applications

Some net neutrality proponents have argued that, if a broadband provider had a financial stake in particular content or applications, it could have an incentive to block its competitors' content or applications.[328] In broad economic terms, one Workshop participant identified the potential incentives to block competing content or applications as the incentives to "resist substitutes"[329] for complementary goods in which the integrated entity has a stake.[330]

The incentive to block competitors could, for example, be to protect the primary (broadband Internet access) market from future competition, especially from content or applications providers that might themselves seek a presence in the access market;[331] or the access provider could seek to facilitate price discrimination in the primary market.[332]

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[326] In the alternative, the broadband provider could charge a very high price to competing content providers to access priority routing.

[327] *See, e.g.*, CENTER FOR DIGITAL DEMOCRACY, LIFE IN THE SLOW LANE: A GUIDE TO THE UN-NEUTRAL NET (2006), *available at* http://www.democraticmedia.org/issues/UNN.html.

[328] *See, e.g.*, G. Sohn, Tr. I at 116 (regarding "the possibility" that a provider would "favor certain applications, content, and services"); *cf.* Libertelli, Tr. I at 76 (alleging actual applications discrimination or blocking in wireless broadband 3G markets).

[329] Farrell, Tr. I at 156. Farrell points out that if the broadband provider were allowed to charge competing content providers a price for access equal to profits the broadband provider would lose by customers buying the competing content instead of his own content, then there would be no incentive to block access. However, this would lead to a very high price for the content – even monopoly levels. *See also* Rosston, Tr. I at 163.

[330] Some cable companies providing broadband service are currently integrated into IP telephony (in addition to cable services, including video on demand). Conversely, some telephone companies providing broadband service are currently integrated into cable-type video services (in addition to telephone services). For example, AT&T through its affiliation with Akimbo Systems will branch out into other Internet content as well. *See* Laurie Sullivan, *AT&T Aims for Internet Television*, TECHWEB TECH. NEWS, Apr. 18, 2006, http://www.techweb.com/wire/networking/185303601. IP telephony faces competition from third-party providers such as Vonage, while video on demand services are now beginning to see competition from third-party sources. *See, e.g.*, Saul Hansell, *Smaller Video Producers Seek Audiences on Net*, N.Y. TIMES, Oct. 6, 2005, at C1, *available at* http://www.nytimes.com/2005/10/06/technology/06video.html?ei=5090&en=042ceaad45ac8536&ex=1286251200 (smaller producers trying to bypass traditional TV networks and sell directly to consumers over Internet).

[331] *See* Farrell & Weiser, *supra* note 318, at 109-10.

[332] *See id.* at 107 ("Participating in, or dominating, the applications market can help a platform monopolist to price discriminate; this objective may make even inefficient vertical leveraging profitable.").

The assumptions underlying these concerns are controversial. First, to the extent that such concerns about vertical integration depend on the vertically integrated entity having significant market power in a relevant broadband Internet access market, there is considerable disagreement as to whether such market power exists.[333] Even if an access provider has sufficient market power to discriminate against competitors in complementary content or applications markets, there remains the question of whether it has sufficient incentive to do so. In an oft-cited article suggesting that there are legitimate concerns about vertical integration in broadband markets, Farrell and Weiser (both of whom participated in the Workshop) observed that an access provider, depending on various contingencies, might or might not have sufficient incentives to block competition in content or applications markets.[334] In that article, Farrell and Weiser argue that "[p]rice discrimination need not in itself be inefficient or anticonsumer, but the platform monopolist's desire to price discriminate can . . . lead it to exclude efficient competition or price competition in complementary products."[335] They further argue, however, that "platform monopolists" will balance the fact that the platform business is more valuable when complements are supplied efficiently against the possibility that "competition in the complement can sometimes threaten the primary monopoly."[336]

Others argue that countervailing incentives are dominant and that discrimination problems are merely hypothetical.[337] Specifically, they assert that a broadband access provider's chief incentive is to maximize the value of its core business – its network – to present and potential customers.[338] Because that value depends centrally on the content and applications to which the network provides access, several Workshop participants maintained that providers would not have an adequate incentive "to limit their end users' experience on the public internet."[339]

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[333] Chapter VI of this Report, *infra*, discusses more fully the present and (likely) future state of competition in broadband access markets.

[334] *See* Farrell & Weiser, *supra* note 318, at 100-01.

[335] *Id.* at 108.

[336] *Id.* at 109.

[337] *See, e.g.*, Lenard, Tr. I at 195. *See also* U.S. INTERNET INDUS. ASS'N, NETWORK NEUTRALITY AND TIERED BROADBAND (2006), *available at* http://www.usiia.org/pubs/neutrality.doc.

[338] *See* Lenard & Scheffman, *supra* note 306, at 18-19 ("[U]nder any market structure, the platform provider has a strong incentive to maximize the value of the platform to consumers . . . . Broadband providers benefit from having applications and content markets that maximize value to their customers. Anything that detracts from user value will also reduce the demand (and hence the price that can be charged) for the platform.").

[339] Thorne, Tr. II at 42-43; *see also* Sidak, Tr. I at 104 ("Network operators provide a complementary service to Internet content. They do not have an interest in reducing the supply of a complement.").

Thus, the degree to which a last-mile broadband access provider has a sufficient incentive to discriminate against competing content and applications is an empirical question. The broadband provider must weigh potential profits from additional revenue from additional sales of its own content, against potential losses stemming from the diminution of content or applications that consumers view as essential complements to the access service. Certain net neutrality proponents have cited the *Madison River* matter as evidence that the incentive to discriminate is, or could be, sufficient to prompt an ISP to block a rival's application.[340] Opponents of net neutrality regulation, noting a dearth of similar controversies, have argued that *Madison River* represents a rare and distinctive case that is unlikely to recur in the marketplace.[341]

There is the further empirical question of whether such discrimination against content or application providers would be harmful, on balance, were it to occur.[342] In the short run, consumers of content or applications could face reduced choice or higher prices, and, in the long run, such discrimination could discourage entry into content or applications markets[343] or innovation in them.[344] On the other hand, certain forms of discrimination might have mixed or even positive implications for certain consumers. For example, when a seller of one good uses a complementary good as a metering device, excluding rivals from selling the complementary good may facilitate price discrimination that is favorable to the marginal consumer.[345] It appears that, thus far, little attention has been paid in the net neutrality debate to the question how possible harms and benefits from such discrimination might be assessed in the broadband Internet access context.

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[340] *See, e.g.*, SAVE THE INTERNET, THE THREAT IS REAL, http://www.savetheinternet.com/=threat#examples (last visited June 12, 2007). For an overview of the *Madison River* matter, and diverse views on its significance, see Chapter IX, text accompanying notes 713-18, *infra*.

[341] *See, e.g.*, Pepper, Tr. I at 89-90. As noted in the previous footnote, the possible implications of the *Madison River* matter are discussed more fully in Chapter IX, *infra*. It should be noted that, despite disagreements about the particulars of *Madison River* and its significance as a model case, many opponents of net neutrality view the blocking conduct at issue in *Madison River* as problematic. *See, e.g.*, Kahn, Tr. I at 186.

[342] *See* Farrell, Tr. I at 156.

[343] *See* Farrell & Weiser, *supra* note 318, at 110-11 (citing DOJ's challenge to General Electric's licensing policies for medical imaging equipment).

[344] *See id.* at 113-14.

[345] For example, A.B. Dick Co., which had a patent on mimeograph machines technology, required its machine customers to buy ink from A.B. Dick. Heavy users of the machines used more ink, and therefore paid more to A.B. Dick, than light users. Thus, A.B. Dick was able to price discriminate among its customers. Had A.B. Dick been allowed to sell only the machines, it likely would have sought to maximize profit by setting a price for the machine that would have been prohibitory for smaller users. In this example, low-volume users benefit but high-volume users may be worse off. *See* DENNIS CARLTON & JEFFERY PERLOFF, MODERN INDUSTRIAL ORGANIZATION, 333-35 (4th ed. 2005); *see also* TIROLE, *supra* note 322, at 148 (1988) ("The important caveat here is, of course, that the prohibition of a tie-in sale makes it more likely that the manufacturer serves only the high-demand consumers.").

2. The Quality of Non-prioritized Service[346]

Some net neutrality proponents have suggested that an access provider's ability to charge a premium price for priority service could create an incentive to underinvest in the quality of best-efforts or other non-prioritized services, or even to degrade them. That is, there is a concern that a provider offering prioritization will lower the quality of non-prioritized service in order to make its prioritized service more attractive to consumers of such services. This concern generally follows the recent "damaged goods" literature in economics, which seeks to identify the conditions under which firms intentionally will damage or degrade some units of a good to enable the firms to charge higher prices for others.[347]

Net neutrality opponents have argued that the incentives to degrade the quality of non-prioritized services will be exceeded by countervailing, procompetitive incentives.[348] Just as blocking highly valued competing content would reduce the value of access services, so too would reducing the general quality level of Internet access carrying both competing and non-competing content. Opponents further argue that, because the Internet inevitably will experience some congestion, the possibility of premium or priority services is critical to dealing with such congestion efficiently, thereby allocating resources where consumers value them the most.[349]

As with direct discrimination against competing content or applications, such incentives are subject to "conflicting forces,"[350] and both their likelihood and – should such discrimination occur – severity present empirical questions that cannot be answered in the abstract.

B. Potential Problems Independent of Last-mile Market Power

Network neutrality proponents also have identified two sorts of harm that could occur as a result of certain contracting practices even in a competitive last-mile access

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[346] See *infra* Chapter V for a more detailed discussion of the issues regarding data prioritization by Internet service providers and other network operators.

[347] *See generally* Raymond Deneckere & R. Preston McAfee, *Damaged Goods*, 5 J. ECON. & MGMT. STRATEGY 149 (1996).

[348] *See, e.g.*, Lenard, Tr. I at 178 ("Competitors[']content can increase subscribership at very low, or perhaps even zero, marginal cost. So it's not going to be in the provider's interest to block content that consumers want, and thereby lose subscribers that are going to be high-margin subscribers.").

[349] *See, e.g.*, Sidak, *supra* note 287, at 380 ("To achieve a Pareto-efficient usage of the network, a network operator must have the right to prioritize content to maximize economic welfare and minimize the aggregate welfare losses associated with best-efforts delivery."). See also *supra* Chapter I for a discussion of Internet data congestion. Several Workshop participants made the related point that Ramsey price discrimination is an "efficient way to recover fixed costs." *See* Yoo, Tr. II at 217; Lehr, Tr. I at 38.

[350] Farrell, Tr. I at 205.

market. These are the so-called terminating access monopoly problem and the potential balkanization of the Internet.

1. The Terminating Access Monopoly Problem

One concern raised by net neutrality proponents relates to broadband providers' potential interest in charging content providers for carrying their content over the last mile of the Internet. In particular, access providers might seek payments independent of any charges for prioritized content or application delivery. Net neutrality proponents have noted that such a practice would be analogous to a situation in telephony, in which the terminating telephone network charges the calling party's network a termination fee.[351] There, for example, if a wireline customer calls a cell phone, the wireline network pays the cell phone network a termination fee, typically calculated on a per-minute basis. The ability of the terminating network to charge a fee for delivering traffic to its own customers is known as the terminating access monopoly problem because an end user's network is a "monopolist" for anyone who wishes to connect to that end user.[352]

In the context of broadband Internet access, broadband providers might want to charge content or applications providers for delivering content or applications to end users over the last mile. As noted above, such charges could apply to both best-efforts and prioritized routing. Such charges would have the potential to create two different types of consumer harm. First, in the short run, they could raise the price to consumers of content and applications. Specifically, charges to content and applications providers would raise their costs; in the face of higher costs, such providers are likely to try to recoup at least some of those costs via the prices they seek to charge consumers. At the margin, higher prices will tend to reduce usage, lowering consumer welfare.[353]

There have been instances in the telecommunications area in which terminating access charges have resulted in substantial end-user fees. A Workshop participant provided the following example to demonstrate how such fees might increase prices and thus reduce consumer demand for a particular product: Skype (a VoIP provider) customers in Europe are charged no usage-based fees for Skype-to-Skype calls. Skype-to-landline phone calls are charged approximately two cents per minute, however, because European landline terminating access charges are about two cents per minute, and Skype-to-cell phone calls are charged 21 cents per minute because European cell phone termination charges are about 21 cents per minute.[354] In the United Kingdom, where the per-minute price is 21 cents (due to the access charges), the average usage is only 150 minutes per month. In contrast, in the United States, where the average price

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[351] *Id.* at 154.

[352] *See, e.g.*, Patrick DeGraba, *Central Office Bill and Keep as a Unified Inter-Carrier Compensation Regime*, 19 YALE J. ON REG. 37, 47 (2002).

[353] *See* Farrell, Tr. I at 171. *See also* Jean-Jacques Laffont, Patrick Rey & Jean Tirole, *Network Competition: I. Overview and Nondiscriminatory Pricing*, 29 RAND J. ECON. 1, 10-11 (1998).

[354] Wilkie, Tr. I at 171.

for the marginal minute of cell phone use is about seven cents, the average user talks on a cell phone for about 680 minutes per month.[355]

A countervailing effect could mitigate the potential harm from termination charges in the context of Internet access. To the extent that broadband providers collect termination charges on a per-customer basis (or on a usage basis that depends on the number of customers), the broadband provider has an incentive to lower the subscription price to increase the number of subscribers from which it can collect access revenues.[356] Also, some content providers whose business model is based chiefly on advertising revenue may choose to retain that model if they are charged termination fees that are sufficiently small. Here, again, the ability to collect such access fees creates an incentive for the broadband provider to lower subscription rates. However, it may also cause certain marginal, advertiser-supported content to become unprofitable and thus to exit the market.

The second type of potential harm from termination charges is a long-run harm. Broadband providers that can charge content and applications providers terminating access fees might be able to expropriate some of the value of content or applications from their providers.[357] If so, the incentives to generate such content and applications will be reduced; in the long run, consumer choice of content or applications could be reduced as well. One Workshop participant suggested that the greater ubiquity of Internet content – relative to cell phone content – might arise from the fact that, historically, the networks over which Internet content is downloaded have operated under regulations limiting terminating charges, whereas cell phone networks have not.[358]

Some net neutrality opponents argue, however, that termination and related fees may be the most efficient way to deal with what they see as inevitable Internet congestion, routing time-sensitive and time-insensitive traffic during periods of congestion according to the relative demand for content and applications.[359] Moreover, they argue that broadband providers must be able to charge directly and explicitly for desired routing to have the proper incentives to invest efficiently in the necessary infrastructure.[360] Without delivery charges, they argue, content providers whose revenues come chiefly through advertising would have an incentive to free-ride on

[355] *Id.* at 172.

[356] *Cf.* Sidak, *supra* note 287, at 361 (ISP acts as intermediary and needs end users to demand content).

[357] Farrell, Tr. I at 155.

[358] Wilkie, Tr. I at 199.

[359] *See, e.g.*, Lenard, Tr. I at 179.

[360] *See id.*

infrastructure investments. That could distort both the magnitude and distribution of infrastructure investments, as well as pricing elsewhere in the market.[361]

These issues, as discussed above, also raise difficult empirical questions about the relative magnitudes of countervailing incentives in particular present and future market contexts. Also relevant are the relative costs of providing for certain possible infrastructure investments and the marginal costs of making various improvements available to different consumers. Although systematic, empirically-based answers to these questions have not yet been forthcoming, it is clear that ongoing infrastructure investment is substantial and that desired applications will require further investment still.[362]

2. Exclusive Content and Balkanization of the Internet

Commentators also have expressed concern about the potential balkanization of the Internet.[363] The concern is that if broadband providers are allowed to sign exclusive deals with content and applications providers, end users may be unable to access much of the content and applications they desire through any single Internet service provider.

Net neutrality proponents have suggested that the experience of other markets with exclusive content arrangements is instructive. They have cited, for example, Australia's experience with cable television. Australian regulatory authorities franchised two competing cable companies, but did not impose any program access rules.[364] Thus, each cable company was able to develop proprietary content or sign existing program

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[361] Several commentators have raised concerns about distributing the costs of infrastructure improvements required only for certain services across large groups of consumers who may not demand such services. One Workshop participant suggested that, in addition to demand for very basic broadband services, there appears to be continuing demand for narrowband, or dial-up, Internet access: "Most people who have dial up say they have no interest in broadband connections, according to the Pew Internet American Trust Foundation in a recent survey they did." Wallsten, Tr. II at 47.

[362] *See, e.g., id.* at 46 (regarding ongoing investment).

[363] *See, e.g.*, Bachula, Tr. II at 174 ("To compete in this global economy, we need a simple, inexpensive and open network, not a balkanized one.").

[364] The program access rules promulgated by the FCC require any program owned by a cable company that is sent to any distributor via satellite to be made available to all program distributors. *See In re* Implementation of Sections 12 and 19 of the Cable Television Consumer Protection and Competition Act of 1992: Development of Competition and Diversity in Video Programming Distribution and Carriage, 8 FCC Rcd 3359 (1993) (first report and order) (implementing the Cable Television Consumer Protection and Competition Act of 1992, Pub. L. No. 102-385, §628(c)(2)(D), 106 Stat. 1460, 1494-95 (1992)). Any program owned by a cable company that is sent to distributors over terrestrial wire can be limited to any distributor that the owner desires. This is known as the "terrestrial loophole" because Section 628(c)(2)(D) only addresses satellite delivered programming. A rationale behind the loophole is that typically only local programming is distributed terrestrially, and this rule gives extra incentives to invest in local programming by allowing the developer to sell exclusive rights to distribute the programming. *See* NAT'L CABLE & TELECOMMS. ASS'N, THE EXISTING PROGRAM ACCESS RULES ARE WORKING AS INTENDED (2007), *available at* http://www.ncta.com/DocumentBinary.aspx?id=564.

networks to exclusive contracts. According to a Workshop participant, the result of this regulatory regime in Australia has been that virtually all available programming is carried on either one cable system or the other, but not both. Despite facing demographics in many regards similar to those of the United States, Australia's cable industry is reported as having only a 22% penetration rate.[365]

Opponents of net neutrality have argued that certain exclusive arrangements may be necessary in some cases. One Workshop participant argued that "the ability to bundle, make exclusive deals, [and] otherwise have non-neutral business models, may be the key to facilitating entry."[366] The participant elaborated: "there are three pretty salient facts about the broadband business. One is that is a very young business[,] . . . the second is that it is a distribution business, and the third [is] that it is a business with very large fixed costs."[367] He also stated that "[n]on-neutral business models may very well be essential to provide sufficient revenues to cover the cost of investments"[368] and that "exclusive deals . . . may be key to facilitating entry."[369]

In addition, net neutrality opponents have noted that there may be significant market pressures against exclusive dealing arrangements, as consumers accustomed to a broad range of content and application offerings may be unsatisfied with narrower ones. As one Workshop participant argued, "we have attempts at service providers putting together walled gardens. And they uniformly failed, right? AOL was a walled garden. People didn't want it."[370]

C. Potential Benefits of Vertical Integration

The potential costs of vertical integration by broadband providers into content or applications must be weighed against the potential benefits offered by vertical integration. The most-cited benefit is that the potential to earn additional profits from

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[365] *See* Wilkie, Tr. I at 175.

[366] Lenard, Tr. I at 178. Lenard noted that "a possible example is the Clearwire / Bell Canada deal in which Clearwire entered into some sort of an exclusive deal with Bell Canada to provide services in exchange for a $100 million investment." *Id.* Clearwire is a provider of wireless non-line-of-sight broadband access. It signed a deal with Bell Canada to make Bell Canada the exclusive provider of VoIP capabilities for Clearwire's VoIP offering to its customers. As part of the deal, Bell Canada invested $100 million in Clearwire. *See* Press Release, Bell Canada Enters., Bell Canada and Clearwire Corporation Form Alliance (Mar. 8, 2005), *available at* http://www.bce.ca/en/news/releases/bc/2005/03/08/72179.html; *see also* Ed Sutherland, *Clearwire Clouds VoIP Picture*, WI-FI PLANET, Mar. 31, 2005, http://www.wi-fiplanet.com/columns/article.php/3494171 (noting that Clearwire blocks access to other VoIP services).

[367] Lenard, Tr. I at 176.

[368] *Id.* at 177.

[369] *Id.* at 178. Similarly, another Workshop participant suggested that perhaps there should be different rules governing the behavior of entrants than incumbents. *See* Rosston, Tr. I at 165.

[370] Pepper, Tr. I at 136-37.

selling its content or applications to more customers will increase the vertically integrated firm's incentives both to build out the network (*i.e.*, extend its reach) and to invest in technology that will increase the types and/or amount of content it can offer.[371] In addition, there may be technical or information efficiencies for a vertically integrated entity, even where a platform provider tries to cooperate with independent content or applications developers.[372]

It is well understood that, when a delivery system owns the product it delivers, the delivery system has a greater incentive to serve more consumers.[373] Thus, sharing in the profits of content gives a broadband provider a greater incentive to build out its network and to lower access prices to reach additional customers. In addition to giving incumbents incentives to expand, net neutrality opponents also argue that certain vertical relationships might be beneficial to generating new entry, "and some of these vertical relationships that people are concerned about . . . may increase the profits of a new entrant, [and] may be the thing that is necessary in order to get a new entrant . . . to compete."[374]

A second potential benefit from vertical integration is increased choice of content and applications. Just as increased content revenue can provide an incentive for build-out of a network, so too can the prospect of new subscribers create an incentive to invest in content or applications that might attract additional customers – even if the revenues that would be derived from the content or applications as stand-alone offerings would not cover their costs.[375] For example, according to a Workshop participant, vertical integration by cable television providers in the early days of the cable industry gave those providers additional incentives to invest in content to make the entire cable package more attractive to potential subscribers.[376]

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[371] *See* Rosston, Tr. I at 165 ("[B]ut on the other hand you do need to have incentives to – for the incumbents to upgrade their networks, as well, and to try to provide higher speed access."); *see also* Lenard, Tr. I at 177.

[372] *See, e.g.*, Farrell & Weiser, *supra* note 318, at 102.

[373] *See id.* at 101.

[374] Lenard, Tr. I at 164-65.

[375] *Compare* Farrell, Tr. I at 204 ("[A]lthough, as an economist, I certainly agree that there are kinds of innovation for which you really do need to make sure that the financial incentives are there, I also think it's important to remember that openness to many, many millions of people doing little stuff is quite important."), *with* Rosston, Tr. I at 214 ("[W]hen you say ample supply of content on the Internet, it's true, there is a lot of stuff out there. But it may not be the right stuff that people want to use that, for example, may cause people to increase their demand for broadband, even though it may be a zero profit on the content side.").

[376] Rosston, Tr. I at 197.

D. Brief Summary and Remaining Questions

The prospect of increased vertical integration of broadband services raises various and competing concerns. In particular, vertical integration in broadband Internet goods and services markets could prompt Internet access providers to block or degrade content or applications or charge higher prices. On the other hand, because vertical integration may offer certain efficiencies that are procompetitive and pro-consumer, and because potential harms are contingent, not all vertical integration is problematic. In particular, some degree of vertical integration may facilitate investment in infrastructure, investment in content or applications, optimization of fit between content and delivery systems, and pricing benefits for certain consumers. Some degree of vertical integration may also facilitate entry, and thereby increase competition, in broadband Internet access markets. The balance between competing incentives raises complex empirical questions and may call for substantial additional study of the market generally, of local markets, or of particular transactions.

There are also important questions regarding the costs of various proposed means of addressing the harms vertical integration may cause, should they arise. For example, one Workshop participant who has done considerable work to chart possible harms from vertical integration in this market suggested that a vertical separation "*could* be part of the discussion,"[377] but that it is not necessarily cost-justified, and that the debate on net neutrality has not yet provided "any good exposition of answers to that question."[378] Another participant suggested that "the terminating monopoly problem, the problem of final interconnection is real," but stated that existing laws and regulations were adequate to deal with it and that one ought to "proceed with prudence and caution."[379]

[377] Farrell, Tr. I at 213 (emphasis added).

[378] *Id.* at 215.

[379] Wilkie, Tr. I at 218.

V. DATA PRIORITIZATION

One of the central issues in the network neutrality debate is network operators' use of prioritization – that is, differential treatment of Internet traffic on the basis of certain characteristics of the data. As discussed in Chapter I, to date, the Internet has used primarily a best-efforts protocol that transmits packets on a first-in-first-out basis. Widespread adoption of new prioritization technologies that can provide specialized handling for particular packets based on their application type, source, or content could result in significant changes in the functioning of the Internet.

Prioritization can occur in numerous forms. For purposes of this Chapter, prioritization refers to the provision of higher or lower transmission priority to packets of data. Such priority can be given to packets by different entities in the provision and delivery of data, through various technologies and business models. These prioritization efforts can occur throughout the network, including at the last-mile and in the backbone.[380] As described in Chapter I, last-mile ISP prioritization may involve utilization of special algorithms in routers to prefer packets based on their application type, source, or content by, for example, channeling them into separate bandwidths, scheduling them ahead of other packets, providing shorter paths to their destinations, and making them less likely to be dropped should the number of waiting packets become too large.[381]

To some extent, long-standing techniques provide a means of traffic handling whose effects are similar to the effects of prioritization. For example, a content or applications provider may have a preferred connection to the Internet through its "first-mile" ISP, via a higher-capacity link, resulting in faster uploads than those available to other such providers.[382] Recently, though, technologies for prioritization have significantly increased the options for favoring some transmissions and disfavoring

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[380] While some prioritization does occur on the backbone, prioritization generally has not been necessary – nor would it apparently have much effect – in the backbone, given the large capacity of the networks comprising the backbone. *See* Ryan, Tr. I at 239-40. However, new bandwidth-intensive technologies may test backbone capacity in the future.

[381] Peha, *supra* note 36, at 5-6.

[382] *Id.* at 5. This option, priority at the "first mile" rather than the "last mile," prioritizes the upload of some data packets over others, though Peha claims that "it alone does not allow the network to discriminate among traffic from a given source." *Id.* Also, a recent OECD report notes that "administrators have implemented traffic shaping to smooth out traffic flows and prevent bottlenecks, typically in an effort to improve the user's experience" in a way that did not use "high-speed deep-packet inspection and prioritisation." ORG. FOR ECON. COOPERATION & DEV., INTERNET TRAFFIC PRIORITISATION: AN OVERVIEW 8 (2007) [hereinafter OECD Report], *available at* http://www.oecd.org/dataoecd/43/63/38405781.pdf. Further, as described in Chapter I, network operators can provide separate, dedicated bandwidth for certain applications such as video through VPNs. That is, not all broadband IP communications need be part of the Internet. Such use of VPNs currently does not raise much objection, *see, e.g.*, Davidson, Tr. I at 229, though some commentators are concerned that continued growth of this practice eventually could decrease the total amount of bandwidth available for the wider Internet and possibly transform the Internet itself into a "slow lane." *See* Lehr, Tr. I at 63.

others. The development of such technologies appears to be based in part on the increasing demand for content and applications that benefit from improved quality of service ("QoS"), which "typically involves the amount of time it takes a packet to traverse the network, the rate at which packets can be sent, and the fraction of packets lost along the way."[383]

Even with prioritization, ISPs or other network operators may not be able to guarantee a promised level of QoS because network operators can only control for delivery within their own networks and not for delivery throughout the rest of the Internet's multiple networks (absent agreements between networks to honor each other's QoS determinations).[384] Nevertheless, within the last-mile ISP's network, prioritization could allow the ISP to offer different levels of QoS.

The debate over prioritization focuses on disagreements about what advantages prioritization may have for ISPs, content and applications providers, and end users, and under what circumstances; whether it entails countervailing harms; what the effects on broadband prices, innovation, and investment may be; and whether there are better alternatives. As a result of numerous conflicting views and concerns, policy makers considering whether to regulate prioritization need to examine the complexity of prioritization and its potential implications for the future of the Internet.

This Chapter is organized as follows. Section A addresses the potential reasons for ISPs and other network operators to prioritize data within their networks; Section B examines the feasibility of network operators expanding the capacity of their networks as an alternative to data prioritization; Section C discusses the several potential types and uses of data prioritization; and Section D provides concluding observations on prioritization.

A. Why prioritize data?

The Internet provides access to a vast range and volume of content and applications, for a huge number of firms and individuals providing and/or using them. Nonetheless, transmission capacity is finite, and peak demand at certain periods and locations may strain a network. Networks use different technologies with different overall capacities. With increasing numbers and sizes of transmissions to increasing numbers of users, congestion – especially at the last mile – can be a problem. From the perspective of end users, the best-efforts delivery approach provides an adequate experience for many uses, but congestion in a best-efforts context may render use of certain content and applications undesirable, and perhaps even impossible.

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[383] Peha, *supra* note 36, at 5. Some commentators use the term more broadly to include aspects such as security controls.

[384] OECD Report, *supra* note 382, at 9. As one company has noted in its comments to the Commission, the "current 'best efforts' Internet only permits a packet of data to arrive at its destination as fast as the slowest network over which it traverses." Alcatel-Lucent, Public Comment 1, at 5. *See also supra* note 120.

Some content and applications, such as live streaming video, some VoIP services, and online games, are latency-sensitive; that is, if packets do not arrive sufficiently close together, the communication will be unsuccessful.[385] Some transmissions, such as software downloads or movies, might be large enough that interference due to congestion would cause user frustration and cancellation. From the perspective of providers of such content and applications, the value of their product may be substantially enhanced by mechanisms to avoid congestion problems, which could include prioritization. The availability of prioritization also could enhance innovation with respect to new applications that require higher QoS for successful use.[386] On the other hand, some argue that the need for enhanced QoS is the exception rather than the rule. As one commentator observed, "watching prerecorded audio or video streams doesn't need QoS, because you can use buffering."[387] Moreover, according to commentators and industry participants, even "many VoIP systems seem to work pretty well without any special QoS support in the network."[388]

Further, extensive use of some high-demand content and applications, such as peer-to-peer ("P2P") file sharing, could overcrowd existing capacity and significantly interfere with access to even non-sensitive content and applications.[389] From the ISPs' perspective, the importance of providing successful transmission may at times necessitate the use of traffic-handling mechanisms, and prioritization of packets has become an option for such traffic handling.[390] The value to both users and content and applications providers of avoiding congestion may provide opportunities for ISPs to increase both their own direct revenue and their customer base through prioritization.

In addition, the Internet provides users with a wealth of choices of content and applications. From any provider's perspective, prioritization in delivery can be a means of making its offering better than those of its competitors – faster, more reliable, and more effective. For example, a provider of a high-quality, expensive application may choose, if given the opportunity, to pay for a high level of certainty that all its packets will arrive quickly, while an application that has a slightly greater tolerance for delay or

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[385] For example, VoIP applications require their voice data packets to be received by the end user within 50 milliseconds after they are first spoken. Otherwise, delay in the voice transmission degrades the VoIP experience so that a "real-time conversation" cannot occur. Peha, *supra* note 36, at 8. In contrast, e-mail data packets are not time-sensitive, and an additional delay of a few seconds (or even minutes) of the data packets making such an electronic text message does not significantly affect the user's experience with this application.

[386] *See* Ryan, Tr. I at 241.

[387] Felten, *supra* note 36, at 9.

[388] *Id.*; *see also* Davidson, Tr. I at 274 (stating that "many providers of Voice Over IP do not believe that they need prioritization in order to offer their service, including [Google's voice service]").

[389] *See supra* Chapter I.C.

[390] *See supra* Chapter I.C.

dropped packets may decline to pay for priority in an effort to keep costs down.[391] From the ISPs' perspective, the value placed by content and applications providers on priority treatment may create opportunities to increase ISP revenues, through general fees, partnerships, or financial interests in affiliated providers.

However, prioritization also could lead to countermeasures by some providers or users, leading ISPs to degrade a broader range of packets and/or fine tune their routers to deal with these circumventions, thus sparking an Internet "arms race" to provide or thwart prioritization.[392] For example, a user could encrypt all traffic using a particular application, which may prevent the ISP from recognizing and deprioritizing the application; the ISP, in turn, could respond by deprioritizing all encrypted transmissions. The potential for such an arms race and the unpredictability of its outcome adds an extra level of difficulty to determining the potential value and effects of prioritization.

B. Prioritization versus Capacity Expansion

Some commentators predict a future of Internet traffic problems that will necessitate the use of prioritization technologies. For example, at the Workshop, a participant cited a report suggesting that if YouTube alone becomes a high-definition application, it would double the capacity needs of the entire Internet.[393] Others believe that these concerns are overblown and that prioritization at the last mile will not be required if individual users who desire increased capacity pay for increased bandwidth.[394]

Network expansion to build out capacity at a rate that outpaces congestion might eliminate any need for prioritization. A Workshop participant explains this view:

> Note that the incentive to discriminate with respect to QoS and price is based on the assumption that there are limited resources. In fact, a network has a choice on that. Networks can deploy far more communications capacity than is usually needed, so congestion is simply not a problem.[395]

Another Workshop participant noted that his company's backbone network has far more capacity than normally needed, which readily allows for bursts in usage, outages, and other circumstances.[396] Similarly, the creators of the private Internet2 high-speed

[391] Schwartz, Tr. I at 257-58.

[392] *See generally* Lehr et al., *supra* note 131.

[393] McCormick, Tr. I at 244; *see also* Wolf, Tr. II at 146-48.

[394] *See*, *e.g.*, Davidson, Tr. I at 231.

[395] Peha, *supra* note 36, at 8.

[396] Ryan, Tr. I at 239-40.

network decided not to use prioritization techniques and instead relied on increased capacity at the last mile.[397]

Building and maintaining higher-capacity networks obviously creates costs, as do deploying and maintaining prioritization technologies. At issue is whether the costs of having enough capacity for peak loads, leaving substantial excess capacity at other times, outweigh the (direct and indirect) costs of using prioritization techniques instead. A participant has commented that "[e]conomically, it doesn't make sense that the solution is always to build more. That's going to involve carrying a lot of excess capacity, which is going to be expensive."[398] In contrast, another participant has suggested the possibility that higher-capacity networks could provide cost savings through the use of cheaper processors that do not engage in sophisticated packet inspection and allow for simplified billing of capacity usage rather than using complicated prioritization algorithms.[399] The 1990s saw dramatic improvements in fiber-optics technology that forestalled the need for more expensive prioritization technologies to handle capacity issues.[400] However, progress in routing technology may upend this trend, and experts disagree on the question of whether network operators will have a greater incentive to continue increasing capacity or to turn to new prioritization technologies.[401] Opportunities for additional revenue through prioritization and costs attendant on these opportunities, as discussed below, also could be factors.[402] In the end, "[t]he best strategy depends on whether processing or communicating gets cheaper at a faster rate."[403]

Another issue is whether broadband capacity can continue without limit to expand faster than the demands placed on it by new content and applications. For example, one last-mile network operator has estimated that "peer-to-peer file sharing services such as

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[397] Bachula, Tr. II at 169 ("It was cheaper [for Internet2] to provide more bandwidth than to install these sophisticated quality of service prioritization techniques. With enough bandwidth in the network, there is no congestion, and video bits do not need preferential treatment. All the bits arrive fast enough even if intermingled."). A Workshop participant noted, however, that Internet2 operates for a limited number of academic users and suggested that it should not be a model for the commercial Internet. Wolf, Tr. II at 175.

[398] Schwartz, Tr. I at 255.

[399] Peha, *supra* note 36, at 8.

[400] *Id.*

[401] *Id.* at 8-9.

[402] One means for ISPs to reap additional income from excess capacity, as opposed to prioritization, is selling available extra capacity to providers or users as "boosts" of extra bandwidth for such specific tasks as downloading a movie or software. *E.g.*, Marguerite Reardon, *Comcast Gives Broadband Users a Speed Boost*, CNET NEWS.COM (June 1, 2006), http://news.com.com/Comcast+gives+broadband+users+a+speed+boost/2100-1034_3-6079070.html.

[403] Peha, *supra* note 36, at 8.

BitTorrent already consume more than one-half of Internet bandwidth."[404] Given the use of P2P and the possibility of other new bandwidth-intensive technologies such as high-definition Internet video, capacity expansion alone may not be capable of warding off congestion.[405]

Because there is little publicly available data regarding current traffic rates, it is difficult to ascertain the extent of congestion problems at this time.[406] The greater the actual or perceived congestion effects are, the greater are the incentives for each party involved to adopt approaches for active traffic handling. A variety of prioritization approaches have the potential to address congestion. The discussion below focuses on the provision of last-mile broadband access by DSL and cable modem services. Other broadband platforms (such as wireless, satellite, or broadband over powerlines) may have different overall capacity constraints and, therefore, may entail different tradeoffs between capacity increases and prioritization to handle increasing amounts of traffic.

C. Types and Uses of Data Prioritization

1. Prioritization Based on Type of Application

The individual types and uses of prioritization are discussed separately because their advantages and disadvantages vary significantly. Perhaps the least controversial type of prioritization is uniform application-based prioritization or "access tiering," under which all applications of a certain type, such as VoIP or video, are in the same access tier and receive equal priority in delivery.

ISPs can manage traffic flow based on application type by, among other methods, identifying and assigning low priority to high-bandwidth applications to preserve sufficient bandwidth for other applications.[407] For example, routers that can identify P2P packets could allocate such traffic in a number of ways to prevent them from overwhelming the network. Routers can be programmed to prioritize packets so that a portion of the network is able to run non-P2P traffic without competing with high-bit-

[404] *See* Verizon Communications Inc., Public Comment 60, at 14.

[405] *See* Xiaojun Hei, et al., Polytechnic University, *A Measurement Study of a Large-Scale P2P IPTV System* 1 (Nov. 2006), *available at* http://cis.poly.edu/~ross/papers/P2PliveStreamingMeasurement.pdf ("With the widespread adoption of broadband residential access, IPTV may be the next disruptive IP communication technology. With potentially hundreds of millions of users watching streams of 500 kbps or more, IPTV would not only revolutionize the entertainment and media industries, but could also overwhelm the Internet backbone and access networks with traffic."). *But see id.* at 13 ("Our study demonstrates that the current Internet infrastructure is capable of providing the performance requirements of IPTV at low cost and with minimal dedicated infrastructure.").

[406] Lehr, Tr. I at 36.

[407] Peha suggests ISPs may deprioritize the packets of applications that do not include within themselves mechanisms to reduce transmission rates in times of congestion. Peha, *supra* note 36, at 7.

demand P2P traffic.[408] Similarly, routers can allocate peak-time bandwidth by providing certain types of traffic with only off-peak priority. For example, an Australian ISP assigns low priority to P2P traffic between noon and midnight. Such a policy is meant to create incentives for users who use P2P technologies to shift such usage to off-peak hours.[409]

Conversely, ISPs can identify data packets that are more sensitive to delayed delivery than others and give these packets higher priority to ensure timely delivery. For example, VoIP packets may be given priority by routers because delay in delivering each packet of voice data could make the voice communication unacceptable. A router algorithm could meet the QoS needs of such applications by identifying each application type and its urgency level and assigning priority to time-sensitive packets. As one company described its routers' functionality, "preferential treatment can be given to latency-sensitive applications during periods of increased network congestion," and "[p]acket marking based on application classification . . . enables routers upstream or downstream . . . to prioritize traffic based on individual application requirements and address congestion at relevant network points."[410]

Some commentators have suggested that it will be difficult to define access tiers and to categorize packets, given the heterogeneity of applications and the constantly evolving nature of Internet usage.[411] Also, ISPs and providers may disagree on the appropriate tier for particular applications. For example, disputes could emerge regarding whether applications belong in the voice tier or video tier – especially as applications converge.

a. Charging for Application-based Prioritization

Although the use of application-based prioritization algorithms to improve delivery of certain types of applications (*e.g.*, latency-sensitive ones) or deprioritize others (*e.g.*, P2P) purely as an internally defined traffic-management tool has not raised significant controversy, the same cannot be said of the prospect of ISPs and other network operators charging fees for such application-based prioritization. As explained by an opponent of network neutrality, when an ISP seeks payment for priority based on

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[408] Oregon State University ResNet: Bandwidth, Security & Architecture, http://oregonstate.edu/resnet/guides/security_architecture.php (last visited May 17, 2007) ("Web browsing, SSH, telnet and games are set to a higher priority. . . . All other traffic bound for the Internet (not counting P2P) such as ftp, streaming audio or video, is given a lower priority. If the bandwidth is available, then the only limit is our bandwidth cap. Peer to Peer (P2P) is given the lowest priority.").

[409] OECD Report, *supra* note 382, at 31. In another example, a United Kingdom ISP recently announced traffic-shaping policies that created priority categories based on the type of application and the user's broadband service plan. *Id.* P2P traffic is slated for the next-to-last level of priority. *Id.*

[410] CISCO SYS., CISCO SERVICE CONTROL: A GUIDE TO SUSTAINED BROADBAND PROFITABILITY 4-5 (2005), *available at* http://www.democraticmedia.org/PDFs/CiscoBroadbandProfit.pdf.

[411] *See* Lehr, Tr. I at 32-33.

type of application, it provides a revenue stream to the ISP to support the service and, perhaps, additional investment in its network.[412] Further, as one commentator has maintained, "[i]f broadband companies did not believe they could maximize the value of the technology by selling premium products to purchasers willing to acquire them, they would likely invest in other areas."[413]

ISPs receiving payments from content and applications providers for priority service might choose to lower access prices for users and thus increase broadband penetration, providing even greater value to providers. The market for broadband Internet access has been described as a "two-sided market" because "both consumers and content/applications providers derive value from the sale of broadband access."[414] An ISP has asserted that last-mile ISPs can "allocate charges based on each side's willingness and ability to pay," which will allow last-mile ISPs to "keep prices for consumers lower than they would otherwise be."[415] Further, a Workshop participant has argued that charging providers for prioritization would "increase economic welfare by increasing broadband penetration[] because it would enable network operators to subsidize access prices for income constrained or price-sensitive end-users who currently forgo broadband entirely."[416] On the other hand, according to some network neutrality proponents, users could experience higher costs to access Internet content and applications, reflecting their costs for priority service.[417] Some proponents further suggest that network operators already receive significant fees for access by content and applications providers.[418]

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[412] Verizon Communications Inc., Public Comment 60, at 13-14. *See also* Telecommunications Industry Association, Public Comment 56, at 4 ("Broadband Internet access service is no different tha[n] any other market. Network neutrality rules that restrict [differentiated pricing and product offerings] could end up harming consumers and driving up costs because network providers will lose the incentive to maintain and upgrade their increasingly congested networks."); U.S. Chamber of Commerce, Public Comment 58, at 4 ("Mandating 'net neutrality' provisions will create regulatory barriers that deter investment in these high-speed broadband networks, which will ultimately hurt every American and, certainly, the nation's small businesses.").

[413] American Bar Association Section of Antitrust Law, Public Comment 2, at 6.

[414] Verizon Communications Inc., Public Comment 60, at ii.

[415] *Id.*

[416] Sidak, *supra* note 287, at 362; *see also* Schwartz, Tr. I at 258; Kahn, Tr. I at 188-89 ("Would you say that newspapers should be prohibited from charging advertisers, and should get their money entirely from the people who buy the newspapers?").

[417] "'It seems to me that if broadband operators are charging Google and Amazon for the use of their network, then those costs will automatically get passed on to consumers,' said Gigi Sohn, president and co-founder of Public Knowledge, a Beltway advocacy group. 'And ultimately that will lead to higher prices for consumers.'" Marguerite Reardon, *Without "Net Neutrality," Will Consumers Pay Twice*?, CNET NEWS.COM (Feb. 7, 2006), http://news.com.com/Without+Net+neutrality,+will+consumers+pay+twice/2100-1034_3-6035906.html.

[418] *See, e.g.*, Davidson, Tr. I at 289; Tulipane, Tr. I at 264.

Charging for application-based prioritization raises two further issues of substantial concern to commentators. First, there is disagreement among participants in the network neutrality debate on whether creating priority "fast" lanes necessarily would result in degraded service in the remainder of a given network. For example, a Workshop participant has stated that prioritization in the last mile "degrades competing services, and creates incentives to relegate some of those competing services to a slow lane . . . [given] that the only way that you can have a fast lane that you can charge for, that is useful, is if there are also slow lanes that are less useful, and less attractive."[419] By contrast, an ISP has asserted that "providing better quality to some does not necessarily entail inferior service for others; next-generation broadband networks will have enough capacity and functionality to provide superior services across the board."[420]

ISPs have incentives to maintain sufficient best-efforts service that allows access to all content and applications providers because the value of an ISP priority service to a provider would be affected by the size of the ISP's customer base. ISPs may lose subscribers if they do not provide sufficient access. Some Workshop participants argued, however, that ISPs also have an incentive to create scarcity of bandwidth so that "they can charge more, restricting output in order to raise prices, and charging monopoly rents."[421] Whether preferred priority arrangements lead to an ineffective slow lane likely would depend on various factors, including the extent of capacity constraints, application and content requirements, and the demand for prioritization services, as well as the potential tradeoff in income streams from content and applications providers paying for priority transmission and from customers that demand non-prioritized Internet access.

Second, access-tier prioritization could require content and applications providers to make payment arrangements with multiple last-mile ISPs worldwide. Currently, as a general matter, both providers and users have contracts only with their own ISPs. Each ISP and other network operator has arrangements with others that result in the delivery of the packets across networks. Some commentators have observed that, if last-mile ISPs impose charges on remote providers for priority delivery to their own customers, providers would need to make arrangements with every such ISP to obtain priority treatment for packets directed to the ISPs' customers.[422]

Aggregator services or other kinds of settlement services could simplify this situation.[423] Despite an initial phase of multiplicity of arrangements, market forces may

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[419] Davidson, Tr. I at 228-30; *see also* Lehr et al., *supra* note 131, at 19; CENTER FOR DEMOCRACY & TECHNOLOGY, PRESERVING THE ESSENTIAL INTERNET 7-8 (2006), *available at* http://www.cdt.org/speech/20060620neutrality.pdf.

[420] Verizon Communications Inc., Public Comment 60, at 17.

[421] *See, e.g.*, Bachula, Tr. II at 170.

[422] *See, e.g.*, Davidson, Tr. I at 226, 274-75.

[423] Payment settlement mechanisms for other two-sided markets, such as stock exchanges and credit cards, may provide helpful models. *See* Blumenthal, Tr. I at 287.

lead to pooling of demand for Internet access via a common ISP[424] or other companies offering to handle the multitude of transit negotiations for content and applications providers. Alternatively, fees for application-based prioritization might be incorporated into peering and other arrangements among network operators, so that the fees an applications provider pays to its own ISP would reflect the priorities granted by last-mile ISPs. The issue remains whether such arrangements between and among networks would be too complex to sustain. A Workshop participant, for example, stated that the methodology for charging for priority access has not been thought through as a technical matter and, if attempted, likely would not work at all.[425]

2. Prioritization Based on Source

Prioritization also could be based on the source of the data packet, that is, the particular content or applications provider. Prioritization by source would allow ISPs to sell differentiated transmission offerings to content and applications providers.[426] An ISP, for example, could offer two or more levels of QoS, allowing providers to choose the priority level they are willing to buy for particular content or applications.[427] This would create incentives for providers to determine accurately their data-transmission needs, and allow network operators to allocate their resources more efficiently. Providers that do not need peak performance or timing could pay less for less urgent prioritization or standard best-efforts delivery. Providers also could tailor their content and applications to account for these realities. For example, a VoIP provider could offer different on-peak and off-peak rates to its customers to mirror the rate structure of the ISP. A Workshop participant has stated that "pricing actually becomes a form of congestion control that has quantifiable advantages over more traditional technical approaches."[428]

a. Source-based, Provider-selected Priority Levels

Source-based prioritization, in which the ISP simply offers different QoS levels at graduated prices to any interested provider, can, like paid application-based prioritization, provide the ISP with an income stream and the concomitant potential for profitability, expansion, innovation, and increased broadband deployment. Charges for source-based prioritization also may create incentives for applications providers to innovate in their

[424] OECD Report, *supra* note 382, at 5.

[425] Ryan, Tr. I at 287-88.

[426] ISPs also could offer priority transmission services based on the destination of the data (for example, data packets sent to a particular content or applications provider).

[427] Schwartz, Tr. I at 257.

[428] Peha, *supra* note 36, at 8.

applications to minimize the level of priority they need.[429] A QoS system for which each provider chooses whether to have higher-quality service for a charge could encourage new types of products.[430] On the other hand, it could discourage innovative but capacity-demanding products by providers that cannot initially pay for a higher quality of service.

b. Source-based Prioritization and Preferential Arrangements

The most contentious issue regarding source-based prioritization appears to be ISPs favoring or disfavoring particular content and applications providers based on their identity, rather than the nature of their offering. For example, ISPs could favor affiliated or partnered providers. Network neutrality advocates argue that the ISP could act as a gatekeeper controlling which content and applications providers succeed and which fail – a role that could have a significant impact on the future face of the Internet. Some commentators who do not object to access tiering to resolve congestion problems do object to prioritization that discriminates among providers within a tier.[431]

Prioritization based on source would allow a content or applications provider to differentiate its product through improved delivery. Such product differentiation could aid providers in competing with others offering otherwise similar products.[432] In addition, ISPs that own or are otherwise affiliated with providers may give them priority service, for a lower charge than they make available to other providers for the same service, to the ISP's ultimate financial benefit.[433] Prioritization through preferential arrangements has the potential to provide ISPs with additional revenue, perhaps much more than other forms of prioritization. On the other hand, if a system of contracts develops between the ISPs and providers, it is possible that providers of the most popular content and applications could charge an ISP to make the providers' offerings available to the ISP's customers.[434]

Some commentators view network operators' use of prioritization as potentially creating barriers to entry or unfairly using an ISP's position with its customers to

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[429] In this respect, the development of broadband itself was a means of obtaining higher QoS, and its increased capacity encouraged providers to create continually more complex content and applications, making narrowband a less and less useful access route.

[430] Yoo, Tr. II at 220 (using the example that Medtronic will only provide heart monitoring services if it can obtain guaranteed QoS in terms of response time).

[431] *See, e.g.*, Windhausen, Jr., *supra* note 238, at iii ("Net Neutrality does not necessarily prevent network operators from offering levels of access, at higher rates, as long as the tier is offered on a nondiscriminatory basis to every provider . . . .").

[432] Schwartz, Tr. I at 259.

[433] For example, Cisco's marketing materials note that the option of higher priority delivery "provides added incentive for the nonfacility operator to partner with the service provider for joint delivery of quality services." CISCO SYS., *supra* note 410, at 8.

[434] Davidson, Tr. I at 288-89.

disadvantage competitors of its affiliated provider;[435] others consider it an appropriate business model for ISPs and providers to seek growth and investment.[436] Some believe competitive pressures will limit the use of such practices.[437] Others believe that competition among ISPs is too attenuated[438] or that information on the use of such prioritization is too inaccessible to provide a restraining force.[439]

Source-based prioritization also may raise some of the same concerns as application-based prioritization, such as the adequacy of a best-efforts "slow lane." Prioritization technologies enable not only complete blocking of disfavored content or applications, but also degrading of their delivery that may, in the limit, be tantamount to blocking.[440] If an ISP enters exclusive deals for priority and simultaneously fails to provide for adequate delivery of non-priority packets, then the ISP could effectively eliminate the traditional ability of every user to reach every content and applications provider (and vice versa) with a single Internet interface.[441]

In addition, potentially significant transaction costs could be introduced if each provider must choose and communicate its desired level of QoS. Prioritization for preferred sources requires the creation of preferred source arrangements; that is, negotiations between providers and any and all remote ISPs. A Workshop participant pointed to cable television as an illustration of such a system – one that would entail complex negotiations between every content and applications provider and ISP, imposing substantial transaction costs that do not now exist for Internet transmissions.[442] For many providers, especially new entrants, niche interest providers, and individuals posting content, the costs of obtaining priority through individual ISP arrangements could be

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[435] *See, e.g.*, Tim Wu, *The Broadband Debate: A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69, 89 (2004) ("The NN rules create a structural bias that favors entry of any player, operator or application, or equipment-developer, into the market for consumer usage of the Internet. They are designed to make the Vonage story repeat itself.").

[436] *See, e.g.*, Pepper, Tr. I at 88-89; Verizon Communications Inc., Public Comment 60, at 5-6.

[437] *See, e.g.*, Verizon Communications Inc., Public Comment 60, at 27-28; McCormick, Tr. I at 246-47.

[438] *See, e.g.*, G. Sohn, Tr. I at 96-98; Feld, Tr. II at 20-21. The state of competition in the broadband Internet access area is discussed in more detail in Chapter VI below.

[439] *See, e.g.*, Posting of Patrick Barnard to VoIP Blog, http://blog.tmcnet.com/blog/rich-tehrani/voip/is-net-neutrality-enforceable.html (Mar. 4, 2006) ("[C]onsumers can't tell whether the packets they are receiving have been properly 'prioritized' - so, in the absence of these complaints, who will be responsible for policing the Internet to make sure network operators aren't 'degrading' signals – even to the slightest of degrees?"). *But see* Pepper, Tr. I at 94 (asserting that large service providers "have the ability to identify" problems such as discrimination).

[440] *See, e.g.*, Davidson, Tr. I at 229 (citing Rogers Cable in Canada as degrading network video traffic).

[441] See also *supra* Chapter IV.B.2 for a discussion of concerns over the potential balkanization of the Internet.

[442] Tulipane, Tr. I at 260-63.

prohibitive.[443] These costs could function as an effective barrier to entry for such providers with products that require priority, and as a barrier to entry for any provider if ISPs do not maintain adequate resources for the best-efforts portions of their networks.[444]

Finally, preferred priority arrangements could entail exclusions of non-preferred content and applications providers. For a provider with an application that requires priority treatment, an ISP's preferred arrangement with a competitor may preclude that provider's ability to reach the ISP's customers. Again, if the ISP does not maintain adequate resources for best-efforts delivery, all providers excluded from priority arrangements may effectively be precluded from reaching the ISP's customers. Commentators differ considerably, however, in their projections of the likelihood of such results.[445]

c. Innovation at the "Edges" of the Internet

Some network neutrality proponents argue that innovation by content and applications providers at the "edges" of the Internet would suffer with preferential source-based prioritization, complicated fees and negotiations to distribute content and applications over the fast lane, and inadequate service on the best-efforts lane.[446] This could translate into a devaluing of the overall network as fewer offerings and participants and fewer imaginative new uses could depress the value of broadband Internet service. One response is that ISPs and other network operators have an interest in ensuring "that there is rapid innovation and vibrant competition for Internet content and applications" because consumers are interested not only in greater speeds, "but also new forms of content and application[s] that take advantage of such speeds."[447]

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[443] Libertelli, Tr. I at 73.

[444] Davidson, Tr. I at 274.

[445] For example, Harold Feld has asserted that last-mile ISPs have an opportunity to engage in discriminatory behavior, Feld, Tr. II at 70-72, while Verizon has argued that "providers will have numerous alternative means of distributing their products and services to consumers." Verizon Communications Inc., Public Comment 60, at 27.

[446] *See, e.g.*, Libertelli, Tr. I at 73 ("[Skype] support[s] net neutrality, because it embodies a policy of decentralized innovation. For [Skype], net neutrality is not a theory, but a concrete example of what is possible on the Internet when entry barriers are low."); *id.* at 75 ("If government policy becomes too focused on the interests of network owners, we put at risk all of the innovation and software development that has allowed the Internet to thrive."); Davidson, Tr. I at 226-27 ("And so, we are very eager to preserve the innovation and openness of the Internet that has allowed companies like Google to develop."); D. Sohn, Tr. II at 223-24.

[447] Verizon Communications Inc., Public Comment 60, at 6. *See also* OECD Report, *supra* note 382, at 17 ("[S]ome commentators are worried that a multi-tiered structure would introduce a new barrier to entry and stifle innovation at the edges. Any increased barriers to entry will reduce the amount of competitive entry into the market. It is not clear though how the access to higher-speed delivery would be priced and the amount of burden it would place on new firms. On the other hand, the introduction of higher-quality, guaranteed connections could also spur innovation for services that require such connectivity.").

3. Prioritization Based on Particular Content

A Workshop participant has noted that new technologies can allow network operators to determine, at least to some extent, the particular content of a data transmission.[448] These technologies make possible differentiation at an even more specific level than by application or source. The use of such mechanisms could allow higher (or lower) priority treatment targeted specifically to content such as streaming video for a medical examination or a child's tutoring.[449] The decision to favor or disfavor certain content could be done by the ISP, the provider, or the user, and the effects described above could apply at this more targeted level.[450]

D. Conclusion

Technological developments have enabled network operators, including last-mile ISPs, to identify information about the data packets such operators transmit and to differentiate the treatment that they provide to these packets, allowing a variety of prioritization mechanisms. These developments lead to a wide range of possibilities at all levels of the Internet, but there remains substantial disagreement among commentators as to both the likelihood and desirability of many of them.

Prioritization technologies provide potential benefits for ISPs, content and applications providers, and consumers. For example, prioritization may improve QoS for certain content and applications, reduce overall infrastructure costs, and allocate resources to their highest-valued uses. Prioritization may aid innovation in applications or content that need higher QoS to operate effectively. It also may enable ISPs to obtain income streams from beneficiaries of their networks besides their own customers, either generally or on a preferential basis, and could provide a dimension for both content and applications providers and ISPs to differentiate their offerings. Prioritization may thus improve ISPs' profitability and enable greater investment and innovation in network quality and expansion. Prioritization also could improve certain content and applications providers' sales and profitability, facilitating growth and innovation by such providers.

Widespread use of prioritization technologies, however, poses potential risks as well. It also could create difficulties for newer or competitively weaker providers to enter or remain online or to innovate and successfully disseminate their innovations – difficulties that are routine with most means of communication, but typically not with the Internet. Prioritization could enable not only complete blocking of disfavored content and applications, but also intentional or passive degrading of their delivery, which could be tantamount to blocking. It could enable exclusive deals for priority that, if combined with inadequate delivery of non-priority packets, might eliminate the traditional ability of

[448] Peha, *supra* note 36, at 4-5.

[449] McCormick, Tr. I at 242-44.

[450] See *infra* Chapter VIII.B.3 for a discussion of privacy and data security concerns raised by certain prioritization technologies.

every user to reach every content and applications provider through a single Internet access agreement. If an ISP has market power, use of these abilities might enable extraction of consumer surplus from Internet access markets as well as related markets. Further, whether an ISP is employing these technologies and whether any of these harms are occurring as a result may be difficult for consumers to determine.

Not every use of prioritization technologies is apt to have all of these positive or negative results. Policy makers considering whether to allow or restrict any or all usage of prioritization technologies should take into account the many and varied implications of such usage.

VI. THE CURRENT AND FUTURE STATE OF BROADBAND COMPETITION

Broadband Internet service is a relatively new industry characterized by high levels of demand growth from consumers, as well as high market shares held by incumbent cable and telephone providers and many new entrants trying to take some of that market share. As proponents and opponents of network neutrality regulation analyze the various competitive forces at work in the industry, they have fundamental differences over the current and future competitiveness of the market. As discussed throughout this Report, those differences play out not only in the regulatory policies proposed by each side, but in the proposed antitrust policies to be pursued to protect consumers.

In this Chapter, we consider the changing nature of the broadband industry, beginning with a brief, historical review of the narrowband, or dial-up, Internet access industry in Section A. Section B reviews competition among the various platforms through which broadband access is provided and then summarizes the sometimes conflicting views on current and future broadband competition in the U.S. Section C provides an overview of municipal provision of wireless Internet service, a subject that often arises in the discussion of broadband competition. Section D addresses federal spectrum policies, a subject that often is raised in the network neutrality debate as a potential source of additional broadband competition. Finally, Section E provides some international perspective on the broadband experience, identifying the various factors that have influenced broadband deployment and adoption rates in a few foreign nations that are often cited as having higher such rates than the U.S.

A. Historical Background: Dial-up Service

In the early days of commercial Internet services – that is, the late 1980s – consumer access to the Internet was provided by narrowband, or dial-up, service. Consumers purchased Internet access at speeds of up to 28 (and later 56) Kbps delivered through the same local telephone lines that delivered voice services. Because the telephone lines were analog, narrowband service required not only dial-up access but a modem to translate digital computer data into an analog signal.

Entry into the provision of Internet services through narrowband was not difficult, and the market was characterized by hundreds of small start-up companies. As in many new markets, shares of the leading companies fluctuated rapidly. First-mover America Online was the largest Internet service provider in the narrowband market, with approximately 45 percent of the narrowband market by the third quarter of 2003.[451] MSN and EarthLink were the next two largest, with approximately 10 and 8 percent of the market, respectively. Over time, broadband began to supplant narrowband: by the fourth quarter of 2003, broadband accounted for 36 percent of the total Internet access

[451] Press Release, comScore, comScore Announces Breakthrough National and Local Market ISP Benchmarking Report (Nov. 24, 2003), *available at* http://www.comscore.com/press/release.asp?press=385.

market, and AOL's share of U.S. consumer ISP subscriptions had fallen to 28 percent.[452] At the end of 2003, broadband's share of the Internet access market had reached nearly 50 percent in many major geographic areas.[453] By 2006, almost 75 percent of U.S. Internet users logged on using a broadband connection.[454]

Although narrowband is still the service of choice for some subset of consumers, as indicated above, that number is dwindling. This does not mean, however, that the narrowband market has become competitively irrelevant. As an acceptable substitute for broadband for some consumers, narrowband appears to retain some constraining influence on broadband prices, and presumably that influence would grow (or decline more slowly) if broadband prices were to rise (or quality to erode).[455] In this regard, narrowband is like any other supplanted technology whose competitive influence lasts long after the early adopters have turned to the newer alternative. Although we are not able to quantify the impact of this competitive restraint, we note its continued presence.

B. Views on the State of Broadband Competition[456]

Both proponents and opponents of net neutrality agree that broadband technologies will continue to supplant narrowband as the means of accessing the Internet. Where those groups differ is on the issue of the current and future state of competition in the broadband marketplace. One of the fundamental issues dividing the two sides is whether broadband suppliers have sufficient market power to engage in anticompetitive practices that will not only harm consumers of applications and content, but that will also degrade the open nature of the Internet and adversely impact the market dynamics for all parties connected to it.

One crucial issue in this particular debate is to determine which entities are effective current and future competitors in the provision of broadband Internet access. An initial step is thus to define what we mean by broadband service. The FCC has stated that 200 Kbps is "enough capacity to provide the most popular forms of broadband – to

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[452] Press Release, comScore, Broadband Usage Poised to Eclipse Narrowband in Largest U.S. Markets (Mar. 10, 2004), *available at* http://www.comscore.com/press/release.asp?press=439.

[453] *Id.*

[454] Carol Wilson, *Nielsen: Broadband Use Nears 75% in U.S.*, TELEPHONY ONLINE, June 22, 2006, http://telephonyonline.com/broadband/news/Nielsen_broadband_Internet_062206/index.html.

[455] *See* Wallsten, Tr. II at 47 ("Lots of things actually reduce demand for broadband. One of them is dial[-]up connections. . . . Most people who have dial[-]up say they have no interest in broadband connections, according to the Pew Internet American Trust Foundation in a recent survey they did. Sixty percent have no interest in broadband. Obviously, that's going to change as prices continue to come down and content available on[]line increases.").

[456] As discussed below in this Chapter, a detailed, locality-by-locality analysis of each broadband market in the U.S. is beyond the scope of this Report. Instead, this Chapter conveys the views on broadband competition generally that various interested parties have expressed. This Chapter also identifies certain national trends in the provision of broadband service.

change web pages as fast as one can flip through the pages of a book and to transmit full-motion video."[457] However true that may have been in 1999, that speed now is widely considered too slow.[458] No consensus has yet emerged, however, as to the appropriate definition of broadband service.[459] DSL services typically start at approximately 700 Kbps, and most emerging technologies, including wireless, are measured in megabits per second.

However it is defined, broadband service is now the appropriate focus of any inquiry into the state of competition in the delivery of Internet services. This market has quickly evolved from one in which consumers could get broadband only if they had access to cable systems offering it, to one in which many, if not most, consumers can get broadband from either a cable or telephone provider.[460] In 2000, over 80 percent of broadband service was provided by cable modem.[461] By the middle of 2006, broadband service by cable had fallen to 55.2 percent, while DSL's residential share had increased to 40.3 percent.[462] The balance of the market consisted mostly of mobile wireless, with fiber, satellite, fixed wireless, and broadband over powerlines garnering relatively small shares.

By some accounts, the broadband Internet access industry is showing signs of robust competition, including fast growth, declining prices for higher-quality service,[463]

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[457] *In re* Inquiry Concerning the Dev. of Advance Telecomms. Capability to All Americans in a Reasonable & Timely Fashion, & Possible Steps to Accelerate Such Dev. Pursuant to Section 706 of the Telecomms. Act of 1996, 14 FCC Rcd 2398, 2406 (1999).

[458] Wallsten, Tr. II at 45; G. Sohn, Tr. I at 97; Ryan, Tr. I at 267; Weiser, Tr. II at 90.

[459] Wallsten, Tr. II at 67 ("I'm pretty sure that if you tried to define it today, a year from now, it would look very different."); Feld, Tr. II at 71 ("[T]he market definition question . . . is murky.").

[460] This does not necessarily mean that most consumers have access to only two broadband providers. According to the FCC, by June 30, 2006, consumers in more than 87% of all U.S. zip codes had access to 3 or more broadband choices, while 63% of zip codes were served by 5 or more broadband providers. FCC, HIGH-SPEED SERVICES, *supra* note 18, at 20 tbl.15. However, the competitive relevance of this data has been questioned because the FCC counts a zip code as served by a broadband provider if only one customer in the zip code has access to that provider. *See* Wallsten, Tr. II at 44, 46. *Cf.* William J. Baumol et al., *Economists' Statement on Network Neutrality Policy* 1 (AEI-Brookings Joint Center, Working Paper No. RP-07-08, 2007), *available at* http://ssrn.com/abstract=976889 ("Just because a zip code has multiple providers does not mean that those providers compete directly, so whether 'enough' firms compete yet is debatable; the trend, however, is positive. Furthermore, consumers are making greater use of new technologies. Mobile wireless use went from fewer than half a million subscribers in 2005 to more than 20 million subscribers in 2006. In short, more people are getting served by more providers and more platforms.").

[461] Press Release, FCC, FCC Releases Data on High-Speed Services for Internet Access (Oct. 31, 2000), *available at* http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1000.pdf.

[462] FCC, HIGH-SPEED SERVICES, *supra* note 18, at 7 tbl.3.

[463] Sidak, Tr. I at 108; Muris, Tr. II at 120. *See also* Sidak, *supra* note 287, at 399 (documenting changes in speed and price of cable and DSL services during 2000-2006 period).

and the current market-leading technology (*i.e.*, cable modem) losing share to the more recently deregulated major alternative (*i.e.*, DSL). Broadband deployment and penetration have both increased dramatically since 2000. From June 2000 to June 2006, the number of high-speed Internet lines increased from 4.1 million to 64.6 million, with 52 percent growth from June 2005 to June 2006 alone.[464] The FCC estimated that by 2006, broadband DSL service was available to 79 percent of the households that were served by a telephone company, and cable modem service was available to 93 percent of the households to which cable companies could provide cable television service.[465] Penetration kept pace with deployment, as by 2006, broadband Internet access accounted for over 70 percent of all U.S. Internet access.[466]

Prices for DSL broadband services have also fallen rapidly as the telephone companies have competed aggressively to take market share from the cable companies. By one estimate, the average monthly revenue per user of DSL service decreased from 40 dollars in 2002 to 31 dollars in 2006.[467] From May 2005 to April 2006, AT&T reduced the monthly price of 3.0 Mbps DSL service from $29.95 to $17.99.[468] Quality-adjusted cable modem prices too have fallen.[469]

Proponents of net neutrality regulation, however, posit a duopoly with substantial market power residing with the telephone and cable companies in the delivery of Internet services to the home.[470] According to this scenario, structure is determinative and a duopoly inevitably will lead to anticompetitive conduct.[471] Alternative services are not yet seen as effective substitutes.[472] Plans to supply a quality-of-service component to the

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[464] FCC, HIGH-SPEED SERVICES, *supra* note 18, at 5 tbl.1.

[465] *Id.* at 19 tbl.14.

[466] *See supra* note 454.

[467] BERNSTEIN RESEARCH, BROADBAND UPDATE: "VALUE SHARE" AND "SUBSCRIBER SHARE" HAVE DIVERGED 4 (2006).

[468] *Id.* at 6.

[469] Robert W. Hahn & Robert E. Litan, *The Myth of Network Neutrality and What We Should Do About It* 10 (AEI-Brookings Joint Center, Working Paper No. RP-06-33, 2006), *available at* http://www.aei-brookings.org/admin/authorpdfs/page.php?id=1357 ("While the absolute price of a cable modem has not declined as rapidly, the quality-adjusted price has declined significantly, as cable modem connection speeds have more than doubled while prices held steady.").

[470] *See, e.g.*, Libertelli, Tr. I at 76; G. Sohn, Tr. I at 96; Feld, Tr. II at 21; Tulipane, Tr. I at 273.

[471] Save the Internet, Frequently Asked Questions, http://www.savetheinternet.com/=faq (last visited June 15, 2007) ("The cable and telephone companies already dominate 98 percent of the broadband access market. And when the network owners start abusing their control of the pipes, there will be nowhere else for consumers to turn.").

[472] Feld, Tr. II at 21 ("[T]here is no evidence of substitutability for other services."); Putala, Tr. II at 28; G. Sohn, Tr. I at 96.

next generation Internet, along with interest in vertically integrating into applications and content, are seen as the first and necessary steps to use that market power in an anticompetitive fashion. Net neutrality proponents also foresee plans to deny or degrade access to certain content or applications by telephone and cable companies.

Opponents of net neutrality regulation see a different market for access to high-speed Internet services. They believe that high-speed wireless services compete directly with DSL and cable modem services already and will do so increasingly as those services become ubiquitous.[473] Specifically, they note that a substantial number of consumers now have access to high-speed service from satellite technologies, as well as other wireless technologies, such as Wi-Fi, Wi MAX, and 3G cellular services. Three companies have deployed infrastructure to provide satellite broadband service to most of the U.S.[474] According to the FCC, there were over 400,000 satellite broadband customers by the end of 2005.[475] Wi-Fi, which uses unlicensed spectrum, provides download speeds of up to 20 Mbps in over 40,000 hot spots across the country.[476] A number of municipalities are exploring the deployment of Wi-Fi networks.[477] Wi MAX technology is also being deployed, with over 150 pilot projects under way by May 2006.[478] Sprint, for example, is building a nationwide Wi MAX network and expects to reach 100 million customers by 2008.[479] 3G cellular technology is already deployed, with speeds of up to 3

[473] McCormick, Tr. I at 246-47. *See also* Wireless Internet Service Providers Association, Public Comment 61, at 1-2 (not taking a position on network neutrality, but estimating that in 2004 there were 3,000-6,000 wireless ISPs ("WISPs") servicing more than 1 million customers in the U.S. and maintaining that "though many of our membership are smaller in size when compared to the larger wireline [ISPs], WISPs do constitute a 3rd Internet pipe in the US market"); CTIA – The Wireless Association, Public Comment 13, at 9-13 ("Unlike the predictable performance of a mature, oligopoly market, the market for broadband access and services is characterized by new entry and ramped-up investment and build-out using new technologies.") (describing ongoing investment of wireless carriers).

[474] *See* GOV'T ACCOUNTABILITY OFFICE, GAO-06-426, BROADBAND DEPLOYMENT IS EXTENSIVE THROUGHOUT THE UNITED STATES, BUT IT IS DIFFICULT TO ASSESS THE EXTENT OF DEPLOYMENT GAPS IN RURAL AREAS 15 (2006) [hereinafter GAO BROADBAND DEPLOYMENT].

[475] FCC, HIGH-SPEED SERVICES, *supra* note 18, at 5 tbl.1.

[476] JiWire, Wi-Fi Hotspots in the U.S., http://www.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1 (last visited June 15, 2007).

[477] See *infra* Chapter VI.C for a more detailed discussion of municipal provision of wireless Internet access.

[478] GAO BROADBAND DEPLOYMENT, *supra* note 474, at 60.

[479] Amol Sharma & Don Clark, *Sprint to Spend Up to $3 Billion to Build Network Using WiMAX*, WALL ST. J., Aug. 9, 2006, at B2. *See also* Sprint Nextel Corp., Public Comment 52, at 7 ("Sprint Nextel's investment in wireless WiMax will provide access of up to 4Mbps.").

Mbps.[480] Additionally, telephone companies are deploying fiber-optic broadband networks,[481] and BPL technology is already deployed in a handful of local markets.[482]

Net neutrality proponents dispute these characterizations of competitive alternative technologies. Proponents argue that satellite, wireless, and BPL providers face technical problems and other barriers to entry into consumer broadband markets, and that their competitive impact should be discounted as a result. They note first the small market shares and slower speeds of BPL and fixed and mobile wireless.[483] Further, satellite service is available only to those consumers that have a clear view to the satellite.[484] In addition to these technical issues, regulatory policies, such as spectrum availability and local franchise requirements, can raise barriers to entry for wireless access providers.[485]

Some commentators also have identified the area of so-called special access services as a potential obstacle to more robust competition in the area of broadband Internet access.[486] Special access services involve dedicated (typically high-capacity) facilities that run directly between the end user and a carrier's network or between two discrete end-user locations.[487] With respect to broadband Internet access, such services are sold at the retail level to large enterprise customers, particularly those with multiple locations, and at the wholesale level to various broadband access providers, including

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[480] Altschul, Tr. II at 7.

[481] *In re* Review of the Section 251 Unbundling Obligations of Incumbent Local Exch. Carriers, 18 FCC Rcd 16978, 17146 (2003) (triennial review order) ("[C]ompetitive LECs have demonstrated that they can self-deploy FTTH loops and are doing so at this time.").

[482] *See N.Y. Eases Limits on Utility Role in BPL Transactions, Says Industry Source*, COMM. DAILY, Oct. 19, 2006, at 3; Press Release, Cal. Pub. Utils. Comm'n, PUC Approves New Broadband Over Power Lines Regulatory Framework (Apr. 27, 2006). *See also* Yinka Adegoke & Robert MacMillan, *DirecTV May Try Broadband on Power Lines*, REUTERS, May 14, 2007, *available at* http://www.reuters.com/article/technologyNews/idUSN1433448320070514?feedType=RSS&rpc=22 (discussing DirecTV's potential testing of delivery of broadband over powerlines within the next year).

[483] *See* Putala, Tr. II at 29. *But see* CTIA – The Wireless Association, Public Comment 13, at 20 ("The relative speeds of the newer generations of wireless technologies are comparable to the average DSL speeds experienced by consumers, and the next generations of wireless technologies promise even faster speeds.").

[484] *See* Feld, Tr. II at 20.

[485] *See, e.g.*, Feld, Tr. II at 18-20 (identifying, among others, federal spectrum licensing and intellectual property barriers to entry); Wallsten, Tr. II at 48-49 (discussing local franchise rules for IPTV). See *infra* Chapter VI.D for a more detailed discussion of federal spectrum policies.

[486] *See, e.g.*, Sprint-Nextel Corp., Public Comment 52, at 1-5; BT Americas Inc., Public Comment 5, at 8. Special access services also are referred to as dedicated access services or local private line services.

[487] *Special Access NPRM*, 20 FCC Rcd 1994, 1997 (2005). In contrast to special access services, switched access services use local exchange switches to route originating and terminating voice and data traffic. *Id.*

other carriers competing for enterprise customers and wireless network operators that do not have their own facilities connecting their transmitters (*e.g.*, cell towers) to their switches.[488] Some commentators argue that competition in the provision of special access services is "*de minimis*"[489] and that this lack of competition constrains the ability of some ISPs, particularly wireless access providers, to compete with the ISPs that also own special access facilities.[490] After taking certain deregulatory actions in the area of special access services in 1999,[491] the FCC currently is conducting "a broad examination of the regulatory framework to apply to . . . interstate special access services . . . ."[492]

Because alternative broadband providers are not perfect substitutes for cable or DSL broadband providers, the mere counting of providers using new technologies does not answer the question of whether or not they are effective competitive alternatives to cable and DSL.[493] The alternatives must have some ability to discipline incumbents attempting to exercise market power before they can be considered part of the market. In certain circumstances, however, alternative products or services need not be perfect substitutes for all consumers to be considered part of a relevant antitrust market.[494] If a wireless broadband service appeals to a sufficient number of marginal cable modem or DSL broadband consumers to constrain pricing activity by the cable and telephone

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[488] *See id.* at 1995-96; Sprint-Nextel Corp., Public Comment 52, at 2; BT Americas Inc., Public Comment 5, at 8 n.31.

[489] Sprint-Nextel Corp., Public Comment 52, at 2-3 ("The vast majority of buildings and cell sites throughout the country have access to only one provider of these essential inputs – either AT&T or Verizon.").

[490] *See, e.g.*, *id.* at 5.

[491] *See In re* Access Charge Reform, 14 FCC Rcd 14221 (1999) (fifth report and order and further notice of proposed rulemaking), *aff'd*, WorldCom, Inc. v. FCC, 238 F.3d 449 (D.C. Cir. 2001). Some have criticized the FCC's basis – that is, a sufficient amount of competition for provision of special access services – for taking these actions. *See, e.g.*, GOV'T ACCOUNTABILITY OFFICE, GAO-07-80, FCC NEEDS TO IMPROVE ITS ABILITY TO MONITOR AND DETERMINE THE EXTENT OF COMPETITION IN DEDICATED ACCESS SERVICES (2006).

[492] *Special Access NPRM*, 20 FCC Rcd at 1995. Even with the deregulatory actions taken by the FCC, special access services remain subject to Title II of the Communications Act. Sprint Nextel Corp., Public Comment 52, at 3 n.7.

[493] Feld, Tr. II at 16 ("[T]he FTC understands that it is not just an issue of counting noses."); Waz, Tr. II at 162 ("[M]arket share is only the beginning of the analysis.").

[494] *See* FTC & DOJ, COMMENTARY ON THE HORIZONTAL MERGER GUIDELINES 15 (boundaries of a relevant antitrust product market may not be clear cut when "substitutes exist along a continuum"). *Cf. In re* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 FCC Rcd 14853, 14885 (2005) (report and order and notice of proposed rulemaking) ("We recognize that the attributes of the available broadband platforms vary, particularly as to price, speed, and ubiquity. We expect that customers will weigh these attributes for each platform and make service-related decisions based on their specific needs. For example, a customer may select a broadband Internet access service with a somewhat slower speed than that associated with other service platforms in return for the lower price of the selected service.").

companies, then it may be considered a competitive alternative and counted as part of the relevant market.

Even products or services not currently being sold to consumers may constrain anticompetitive conduct by incumbent firms. The Horizontal Merger Guidelines jointly issued by the FTC and the Department of Justice Antitrust Division provide extensive guidance on establishing relevant antitrust markets generally and on the inclusion of potential entrants in a relevant market in particular.[495] These Guidelines consider potential entrants, under certain circumstances, to be capable of affecting current business decisions of incumbent firms.[496]

* * *

The broadband marketplace is in considerable flux.[497] The competitive impact of all of the alternative broadband technologies on the incumbent telephone and cable companies, therefore, is not totally clear. Nonetheless, there are national trends that appear to show an increasing number of competitive alternatives across all markets. Of course, effective national competition for broadband customers does not mean that all consumers enjoy competitive local markets. Relevant antitrust markets in the broadband industry may be highly localized, as cable franchise laws, population density, income dispersion, and other factors may limit some consumers' current choices of broadband providers. However, without identification and analysis of each local market – which is well beyond the scope of this Report – we cannot determine which consumers currently benefit from competitive broadband markets.

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[495] *See* DOJ & FTC, HORIZONTAL MERGER GUIDELINES § 3.2 (1997).

[496] *Id.* ("The Agency generally will consider timely only those committed entry alternatives that can be achieved within two years from initial planning to significant market impact."). *See also* Yoo, Tr. II at 257 ("[I]n a world where Sprint is making a multi-billion dollar commitment to come in by the end of 2008, that's a reasonable time frame to have.").

[497] As the FCC has noted in its broadband rulemaking proceedings:

> As the Internet and related applications mature and continue to evolve, the demand for broadband Internet access services will likely grow. The presence of more content available through the Internet and the enhanced means of presenting the content, together with growth in broadband-related applications, such as streaming video, will lead more subscribers to seek broadband Internet access service. As the number of subscribers grows, so does the opportunity for alternative technologies and their respective providers. As any provider increases its market share or upgrades its broadband Internet access service, other providers are likely to mount competitive challenges, which likely will lead to wider deployment of broadband Internet access service, more choices, and better terms.

In re Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 20 FCC Rcd 14853, 14885 (2005) (report and order and notice of proposed rulemaking).

C. Municipal Provision of Wireless Internet Access

In recent years, hundreds of municipalities throughout the United States have considered whether they should provide broadband Internet access to their residents and, if so, how.[498] Some municipalities have installed costly fiber-optic or cable wiring. More recently, with the development of wireless Internet technologies that are less expensive to deploy, such as Wi-Fi and Wi MAX, municipalities also have explored and, in some cases played a role in the development of, municipal wireless broadband networks. These municipalities have done so either in conjunction with an outside entity, such as a private ISP, or in their own capacity as a municipal provider of wireless Internet service. Municipalities and other entities that have implemented such networks have most commonly used one of six general operating models: non-profit, cooperative, contracting out, public-private partnership, municipal, and government loan-grant. A variety of hybrids may be created by combining various features of each model.[499]

FTC staff issued a report in October 2006 on the *Municipal Provision of Wireless Internet*.[500] The report concluded that the arguments for and against municipal involvement in wireless Internet service may vary depending on a municipality's particular factual circumstances. Accordingly, rather than attempt to provide a single answer to the question of whether, and to what extent, a municipality should involve itself in the provision of wireless Internet services, the report provides an analytical framework for policy makers considering such a decision.[501]

Some commentators suggest that, whatever the particular operating model, municipal-based wireless networks may be a significant issue in the broadband Internet connectivity debate.[502] In particular, some suggest that municipal networks may add an additional competitive point of delivery to other existing wireline and emerging wireless technologies like third generation and fourth generation mobile broadband and satellite. Some network neutrality opponents, therefore, argue that the proliferation of municipal-level wireless networks demonstrates not only that broadband competition is sufficiently robust, but that it is increasingly intense and obviates the need for a new *ex ante* regulatory regime. In particular, they point out that some network neutrality proponents, like Google and EarthLink, are themselves working to deploy large-scale municipal

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[498] *See generally* Posting of Esme Vos to MuniWireless, http://www.muniwireless.com/article/articleview/5495 (Apr. 5, 2007, 03:14).

[499] *See generally* FTC STAFF, MUNICIPAL PROVISION OF WIRELESS INTERNET (2006), *available at* http://www.ftc.gov/os/2006/10/V060021municipalprovwirelessinternet.pdf.

[500] *Id.*

[501] *Id*. at 41-49.

[502] *See, e.g.*, Lehr, Tr. I at 43. According to Lehr, "alternative access connections, and municipal networking where communities get together, maybe with the help of their local government . . . or local utility . . . get together and provision a network. And if that network is an open access network, then that provides another way to deal with this." *Id.*

networks in competition with other technologies.[503] At lease one network neutrality proponent also has suggested that the introduction of these additional delivery points may alleviate many of the "last mile" concerns raised in the broadband connectivity debate.[504]

Others argue, however, that municipal networks are not necessarily a panacea and could themselves raise important connectivity issues.[505] Some observers view the concerns raised by network neutrality proponents as a potential stumbling block to the deployment of municipal-level networks because municipalities, in many cases, may need to rely on private network operators for their technical expertise and financial backing.[506] Some municipal network operators, however, indicate that they intend to resell non-discriminatory, wholesale access to other non-facilities-based Internet service providers in order to alleviate these concerns.[507] Some private companies also are attempting to create municipal-scale networks by distributing wireless Internet routers to consumers without charge and then deriving revenues from advertising-supported services or fees from users who are not router owners. Essentially, this business model seeks to create a wide-area network of overlapping, privately operated wireless Internet hotspots.[508]

In addition, although the potential speeds of new wireless Internet technologies are comparable to those of DSL, cable, and fiber wirelines, a wireless network's actual

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[503] Sidak, for example, argues that Google's involvement in municipal networks "has just removed one of the two principal arguments that have been made in favor by [Google] for network neutrality regulation – the supposed absence of competition in the broadband access market." Sidak, Tr. I at 109. *See also* Thorne, Tr. II at 36-38 (citing Google and EarthLink's involvement municipal wireless networks).

[504] Lawrence Lessig, a network neutrality proponent, argues that "[t]here's an explosion in municipal mesh networks . . . . [If] people unify them, the last mile is solved. The last mile is provided free of proprietary control." Gavin Clark, *Municipal WiFi is the New Hope for Net Neutrality – Thinker*, THE REGISTER, Aug. 16, 2006, *available at* http://www.theregister.com/2006/08/16/wifi_net_neutrality_lessig.

[505] *See, e.g.*, Lehr, Tr. I at 43 ("And so, in principle, that will help, because more choices [are] better. But it's possible that the municipal network, if it's not an open access network, could also be guilty of non-neutral treatment. There is no reason to presume that your municipal carrier, if it has market power, may be any better behaved than an investor-owned carrier."). *See also* Rosston, Tr. I at 210-11 (warning that cities may favor one wireless network and attempt to exclude others).

[506] Visiongain concludes that the "network neutrality [debate] is not a fuel for the municipal broadband movement in the U.S. . . . It's a . . . stumbling block." Ed Gubbins, *Neutrality and Municipalities*, TELEPHONY, Feb. 20, 2006, at 24, *available at* http://telephonyonline.com/mag/telecom_neutrality_municipalities (according to analyst Pam Baker, municipalities "need technology companies' expertise, experience, and money . . . . But they cannot afford to give those companies total, or even majority, control . . . . Yet cities repeatedly fail when they attempt to provide [networks] themselves.").

[507] Putala, Tr. II at 60 ("[EarthLink is] committed to offering as many local ISPs, to AOL, to anyone else who wants to sell capacity on our Wi-Fi networks, the ability to get the same non-discriminatory, very reasonable wholesale pricing, so they can make an offering.").

[508] *See* FON, What's FON?, http://www.fon.com/en/info/whatsFon (last visited June 18, 2007); Meraki, Our Story, http://meraki.net/about (last visited June 18, 2007).

performance may vary depending on its particular architecture, the number of users, its proximity to a high-speed backbone, and other factors like local geography or interference from other devices.[509] While current wireless technologies in many cases may be close substitutes for existing wireline technologies when used to access content and applications having light or moderate bandwidth requirements, they generally do not provide enough bandwidth to support certain applications, such as real-time video transmissions.[510]

Thus, given these varying factors, some observers view the competitive implications of municipal wireless networks as being highly fact-specific, much like the decision whether, and to what extent, a municipality should participate in providing such services in the first instance.[511] Further, some commentators suggest that an *ex ante* network neutrality regime might subject a wireless network to differential, negative effects beyond those that might befall a more traditional wireline network, due to the differing technical constraints of wireless technologies.[512]

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[509] *See, e.g.*, Peha, Tr. I at 60. *See also* FTC STAFF, *supra* note 499, at 6-12, app.

[510] *See, e.g.*, Putala, Tr. II at 30 ("For EarthLink, this means as we go to compete with Comcast and Verizon in Philadelphia, we are going to try to offer both our municipal Wi-Fi broadband service with speeds of about a meg [one megabit] up and down, as well as our eight megabits ADSL two plus or wicked fast broadband service that requires us to have access to Verizon's unbundled loops.").

[511] *See, e.g.*, Lehr, Tr. I at 53-54. According to Lehr:

> With respect to municipal entry, a lot of folks, you know, make the false conclusion that when local governments, or local communities build infrastructure, or get involved in the infrastructure provisioning question, that that's a – you know, that's a sort of binary good/bad thing, and they do it one way or they don't do it.
>
> The answer is, it's a very complex mix of strategies they face. The particular technologies and strategies they undertake, how they do that, is a very complicated thing, and has big implications for what sorts of net neutrality problems may happen.
>
> For example, if they do . . . a fiber deployment that's an open access platform, then that really does go a long way towards eliminating concerns, most of the net neutrality concerns. But such an infrastructure plan is unlikely to make sense in most communities. And other alternative sorts of strategies, if they make sense at all, need to be evaluated in this.

Id.

[512] *See, e.g.*, Altschul, Tr. II at 51-52 (stating that network neutrality regulations "would have unique effects and they would be negative effects" for wireless Internet networks); Sidak, Tr. I at 104-05 (stating that, "[o]bviously, there are very different network architecture considerations for wireless networks than for wireline networks" and warning against applying network neutrality rules without further evidence of harmful practices). *See also* Lehr, Tr. I at 56-57. Lehr explains that, generally, "spectrum is perceived to be a very scarce resource, RF spectrum. So that, generically, your bandwidth is more of something – a resource you're going to be more concerned with in the wireless world . . . . [S]o the need to, for example, carefully manage traffic on a wireless network is greater." *Id. See also id.* at 61-64 (comparing wireless, DSL, cable modem, and fiber technologies).

D. Federal Spectrum Policies[513]

Electromagnetic spectrum is a finite natural resource. The artificial scarcity of spectrum that results from government use restrictions further reduces the supply of wireless services available to consumers, including broadband Internet access. Thus, some commentators suggest that the federal government's electromagnetic spectrum policies constitute a key component of the broadband connectivity debate.[514] Wireless Internet technologies have become increasingly important alternatives to wireline (*i.e.*, DSL and cable modem) services,[515] and they may have important implications for the broader marketplace for Internet services by increasing competition among Internet access providers.[516] Some commentators suggest that making additional spectrum available to the private marketplace to enhance the competitiveness of wireless Internet services may be the best way to address concerns raised by network neutrality proponents.[517]

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[513] A comprehensive analysis of federal spectrum policies is beyond the scope of this Report. This Section merely provides a brief overview of the subject to inform the discussion of the role of spectrum policy in the broadband connectivity debate.

[514] *See, e.g.*, Lehr, Tr. I at 54 ("[A] lot of the sorts of alternatives that we talk about really depend a lot on wireless, and new sorts of wireless technologies. . . . [S]pectrum reform is, obviously, a key element in that."); Mercatus Center at George Mason University, Public Comment 4, at 20-21, 27-31.

[515] The FCC's Wireless Broadband Access Task Force, for example, concluded that "[b]roadband wireless service has the potential to compete with wireline technologies in urban and suburban markets as a primary pipe to the home and business, to complement wireline technologies by adding a component of mobility or portability, and to lead the way in rural markets where other broadband technologies are less feasible." FCC WIRELESS BROADBAND ACCESS TASK FORCE, CONNECTED & ON THE GO: BROADBAND GOES WIRELESS 46 (2005), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-257247A1.pdf.

According to the FCC's most recent survey, during the June 2005-06 period, high-speed lines (over 200 Kbps in at least one direction) increased from 376,837 to 495,365 for satellite; from 208,695 to 360,976 for fixed wireless; and from 379,536 to 11,015,968 for mobile wireless. Advanced service lines (over 200 Kbps in both directions) increased from 10,966 to 27,489 for satellite; from 191,229 to 333,072 for fixed wireless; and from 21,079 to 1,913,904 for mobile wireless. FCC, HIGH-SPEED SERVICES, *supra* note 18, at 5 tbl.1, 6 tbl.2.

[516] *See, e.g.*, Lehr, Tr. I at 67-68. Lehr suggests that making "more spectrum available down there [below one gigahertz] for commercial communication services, would open up new options to help alleviate last mile facilities competition concerns." *Id.* In his view, "the question about what we do with that 700 megahertz spectrum, I think, is an important aspect of this whole net neutrality debate." *Id. See also* Baumol et al., *supra* note 460, at 3 ("Congress and federal regulators should promote policies that increase the opportunities for competition and foster Internet innovation. One such policy would be spectrum liberalization. . . . The [FCC] should make additional licensed spectrum available for flexible use as soon as possible and allow it to be traded so that spectrum can be allocated to its highest-valued uses.").

[517] *See, e.g.*, Rosston, Tr. I at 164. According to Rosston, "the key is making sure, for example, when we get more spectrum out, that we actually enforce the anti-trust laws and make sure that we have the ability to have multiple competitors providing broadband access to the home." *Id.* Thus, in his view, "that is going to help alleviate these concerns. In my mind, this is a much better way than trying to mandate network neutrality." *Id.*

The federal government affects the availability and price[518] of wireless Internet services by determining how much spectrum is available to private companies that provide such services to consumers. The Communications Act gave the FCC a broad grant of power to regulate spectrum in the public interest.[519] The FCC has authority over spectrum usage by commercial entities and local and state governments. The Department of Commerce, through the creation of the National Telecommunications and Information Administration ("NTIA") in 1978, also plays an important role in advising the President and managing the federal government's use of spectrum.[520] Other federal agencies also assist in the development and implementation of federal spectrum policy.[521]

The FCC and NTIA manage spectrum by dividing, or allocating, the entire spectrum into blocks, or bands, of frequencies established for a particular type of service. These allocated blocks can then be further subdivided, or allotted, into bands designated for a particular service. For example, an allocation of spectrum for land mobile service can be further divided into allotments for business, public safety, and cellular uses. In the final subdivision of spectrum, particular parties receive an assignment, or license, to operate a transmitter on a specific channel or group of channels in a particular geographic area under specific conditions.[522]

In the past, the FCC relied on comparative hearings or lotteries to award licenses.[523] Over time, this approach garnered significant criticism.[524] In the early 1990s,

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[518] Making more spectrum available to the private marketplace generally will be expected to lower its price and, thereby, reduce the price of associated services for consumers. *See In re* Principles for Reallocation of Spectrum to Encourage the Dev. of Telecomms. Techs. for the New Millennium, 14 FCC Rcd 19868, 19872-73 (1999) (policy statement) [hereinafter *1999 Policy Statement*]. Recent studies estimate that the costs of current restrictions on spectrum use run into the billions of dollars, annually. *See* Jerry Ellig, *Costs and Consequences of Federal Telecommunications Regulation*, 58 FED. COMM. L.J. 37, 80 (2006) (estimating the annual costs of current spectrum policy at $77 billion or more, annually).

[519] 47 U.S.C. §§ 151 *et seq.*

[520] *See* NTIA, About the NTIA, http://www.ntia.doc.gov/ntiahome/aboutntia/aboutntia.htm (last visited June 18, 2007).

[521] *See, e.g.*, Memorandum on Spectrum Policy for the 21st Century, 39 PUB. PAPERS 605 (June 5, 2003) [hereinafter Memorandum on Spectrum Policy] (establishing a Federal Government Spectrum Task Force to improve government spectrum use).

[522] FCC, CONNECTING THE GLOBE: A REGULATOR'S GUIDE TO BUILDING A GLOBAL INFORMATION COMMUNITY VII-1 to -10 (1999), *available at* http://www.fcc.gov/connectglobe/regguide.pdf.

[523] *See generally* FCC SPECTRUM POLICY TASK FORCE, ET DOCKET NO. 02-135, REPORT (2002) [hereinafter FCC SPECTRUM POLICY TASK FORCE REPORT], *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228542A1.pdf.

[524] *See generally* Ronald Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1 (1959) (questioning the command-and-control method and suggesting a market-based approach). *See also* Ewan Kwerel & John Williams, *A Proposal for a Rapid Transition to Market Allocation of Spectrum* 1 (FCC Office of Plans and Policy, Working Paper No. 38, 2002), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228552A1.pdf ("Billions of dollars of cumulative loss to the U.S. economy have been attributed to inefficient spectrum allocations . . . .").

the FCC and NTIA began reviewing their spectrum management policies.[525] In 1993, Congress amended Title III of the Communications Act to authorize the FCC to assign licenses through a competitive bidding process, with the goal of matching spectrum to its highest-valued use.[526] The FCC began conducting auctions the next year.[527] In 1997, Congress granted the FCC express authority to allocate electromagnetic spectrum for flexible use.[528] A 1999 FCC Policy Statement outlined principles for future spectrum management to: allow for flexible spectrum use to better respond to marketplace demands; promote new spectrum-efficient technologies; develop secondary markets to improve spectrum utilization; and develop new ways to make more spectrum available.[529]

In 2002, the FCC Spectrum Policy Task Force completed the first comprehensive review of the FCC's spectrum policies. Its report concluded that, although the agency had improved its methods of spectrum allocation, FCC policy was still "not keeping pace with the relentless spectrum demands of the market."[530] Expanding on the 1999 Policy Statement's principles, the Task Force report concluded that the FCC should pursue a "balanced spectrum policy," based primarily on exclusive rights allocated via market-based mechanisms, a supplemental open-access spectrum commons, and the limited use of command-and-control regulations for certain purposes, such as public safety and national security. Thus, subject to certain exceptions, legacy command-and-control spectrum should be transitioned to the exclusive use and commons models "to the greatest extent possible."[531]

Congress, the FCC, and the NTIA have continued to make additional spectrum available to the private marketplace and have provided additional regulatory flexibility designed to foster innovation, efficient usage, and the development of secondary markets for trading spectrum rights.[532] Both the executive branch and Congress continue to investigate ways to improve spectrum use.[533]

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[525] *See, e.g.*, NTIA, U.S. SPECTRUM MANAGEMENT POLICY: AGENDA FOR THE FUTURE (1991), *available at* http://www.ntia.doc.gov/osmhome/91specagen/1991.html.

[526] 47 U.S.C. § 309(j).

[527] FCC, About Auctions, http://wireless.fcc.gov/auctions/default.htm?job=about_auctions (last visited June 18, 2007).

[528] 47 U.S.C. § 303(y).

[529] *See 1999 Policy Statement*, 14 FCC Rcd 19868 (1999). *See also In re* Principles for Promoting Efficient Use of Spectrum by Encouraging the Dev. of Secondary Mkts., 15 FCC Rcd 24178 (2000) (policy statement).

[530] FCC SPECTRUM POLICY TASK FORCE REPORT, *supra* note 523, at 1.

[531] *Id.* at 3, 6.

[532] *See generally id.* at 46-55; OFFICE OF MGMT. & BUDGET, EXECUTIVE OFFICE OF THE PRESIDENT, COMMERCIAL SPECTRUM ENHANCEMENT ACT: REPORT TO CONGRESS ON AGENCY PLANS FOR SPECTRUM

Some commentators have suggested, however, that comprehensive, market-based reform is still needed to maximize the efficient use of U.S. spectrum. Generally, these commentators propose replacing the current licensing regime with a more robust property rights system that allows for maximum transferability and flexibility of use, subject to technical considerations.[534] Some observers also suggest that innovative technologies may allow primary spectrum rights-holders to share their spectrum with non-interfering secondary users in new ways.[535] Overall, these commentators suggest that comprehensive reform, combined with emerging wireless technologies, could lead to significant improvements in spectral efficiency, competition, and consumer welfare.

Federal spectrum policy has been cited by both proponents and opponents of network neutrality as an important component of the ongoing debate. Both sides agree that improved spectrum use could potentially increase competition in the marketplace for broadband services generally.[536] Many network neutrality proponents, however, express skepticism that wireless broadband services can, in fact, be a sufficiently close substitute to wireline services to check any potential abuses by wireline broadband providers.[537]

RELOCATION FUNDS (2007), *available at* http://www.ntia.doc.gov/reports/2007/OMBSpectrumRelocationCongressionalNotification_final.pdf.

[533] *See* Memorandum on Spectrum Policy, *supra* note 521; U.S. DEP'T OF COMMERCE, SPECTRUM POLICY FOR THE 21ST CENTURY – THE PRESIDENT'S SPECTRUM POLICY INITIATIVE: REPORT 1 (2004), *available at* http://www.ntia.doc.gov/reports/specpolini/presspecpolini_report1_06242004.htm; U.S. DEP'T OF COMMERCE, SPECTRUM POLICY FOR THE 21ST CENTURY – THE PRESIDENT'S SPECTRUM POLICY INITIATIVE: REPORT 2 (2004), *available at* http://www.ntia.doc.gov/reports/specpolini/presspecpolini_report2_06242004.htm; Memorandum on Improving Spectrum Management for the 21st Century, 40 WEEKLY COMP. PRES. DOC. 2875 (Nov. 30, 2004) (directing executive branch agencies to implement the Spectrum Task Force reports' recommendations). *See also* FCC, STRATEGIC PLAN 2006-2011, at 10-12 (2006) (outlining future objectives for the efficient and effective use of spectrum), *available at* http://www.fcc.gov/omd/strategicplan.

[534] *See, e.g.*, Ellig, *supra* note 518, at 81-85. *See also generally* Reed E. Hundt & Gregory L. Rosston, *Communications Policy for 2006 and Beyond*, 58 FED. COMM. L.J. 1 (2006); Jon M. Peha, *Emerging Technology and Spectrum Policy Reform*, International ITU Workshop on Market Mechanisms for Spectrum Management (Jan. 2007), *available at* http://www.itu.int/osg/spu/stn/spectrum/speakers_pres.html.

[535] *See, e.g.*, Peha, Tr. I at 61 ("There may also be some opportunities to share spectrum more than we have in the past, at frequencies that allow you to cover large areas and rural areas."). *See also* Peha, *supra* note 36, at 1-2, 7-9.

[536] *See, e.g.*, Lehr, Tr. I at 54 ("[M]aking sure that we have a really vigorous commercial market for new wireless technologies, I think, is critical to addressing this problem. . . . [S]pectrum reform is, obviously, a key element in that.").

[537] *See, e.g.*, Putala, Tr. II at 29 ("The much heralded independent alternatives are still tiny.").

E. International Comparisons

The reasons for differing rates of broadband deployment and customer adoption across countries are the subject of considerable debate.[538] Certain factors appear to have influenced these rates in some countries. These include: government subsidization of Internet infrastructure or computer use; local loop[539] unbundling requirements; population density and demographics; and consumer demand. This Section provides an overview of the broadband experiences of South Korea, Japan, and the Netherlands, which are often cited as having more extensive broadband deployment and adoption than the U.S.[540]

1. South Korea

South Korea is frequently described as the most "wired" country in the world in terms of Internet service. Although it had less than one Internet user per 100 inhabitants in 1995, by 2002 it was one of the world's largest Internet markets, with 26 million users, and, by 2003, 78 percent of South Korean Internet users logged on via a broadband connection.[541] Several factors have been cited for this explosive growth.

The South Korean government privatized the historical monopoly telecommunications operator, Korea Telecom ("KT"), in the early 1990s and has extensively involved itself in the telecommunications sector to upgrade the country's information technology infrastructure and to promote computer use by businesses and individuals.[542] Initiated in 1995, the Korea Information Infrastructure project has emphasized public-private partnerships in funding a national, high-speed public

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[538] *See generally* FCC OFFICE OF STRATEGIC PLANNING & POLICY ANALYSIS & INT'L BUREAU, BROADBAND INTERNET ACCESS IN OECD COUNTRIES: A COMPARATIVE ANALYSIS (2003) [hereinafter FCC OECD ANALYSIS], *available at* http://www.coe.montana.edu/ee/rwolff/ee543%20papers/fcc-broadband.pdf. This report cautions that "[t]here is no simple way to compare the variety of broadband service packages available in different countries." *Id*. at 6. *See also* DANIEL K. CORREA, ASSESSING BROADBAND IN AMERICA: OECD AND ITIF BROADBAND RANKINGS (2007), *available at* http://www.itif.org/files/BroadbandRankings.pdf (examining various measurements of broadband deployment and adoption rates).

[539] For purposes of this Section, the term "local loop" is used to mean the last mile of Internet access.

[540] *See, e.g.*, Schmidt, Tr. II at 55 (reading the following question from a Workshop audience member: "Why can't consumers get cheap, super high[-]speed broadband from Verizon, EarthLink or other companies like Japanese consumers can?"). According to the OECD, as of December 2006, the number of broadband subscribers per 100 inhabitants in the United States was 19.6, while the corresponding numbers were 29.1 in South Korea, 20.2 in Japan, and 31.8 in The Netherlands. OECD, OECD BROADBAND STATISTICS TO DECEMBER 2006 (2006), *available at* http://www.oecd.org/document/7/0,3343,en_2649_34223_38446855_1_1_1_1,00.html.

[541] INT'L TELECOMMS. UNION, BROADBAND KOREA: INTERNET CASE STUDY 1, 10 (2003) [hereinafter ITU KOREA STUDY], *available at* http://www.itu.int/ITU-D/ict/cs/korea/material/CS_KOR.pdf.

[542] *Id*. at 5, 33-34.

backbone, information technology pilot projects, and technology investment funds.[543] The South Korean government also implemented local loop unbundling requirements in 2002.[544]

This environment seems to have spurred the emergence of multiple ISPs.[545] Some commentators note, however, that many of the ISPs that emerged during the last decade have experienced periods of unprofitability and suggest that market consolidation is already underway.[546] Also, in 2004, the South Korean government subjected KT to stricter service and pricing regulations on the grounds that KT's dominance was a barrier to competition in the broadband market.[547]

Another important factor in South Korea's broadband deployment appears to be the country's high average population density of 1,265 people per square mile with 82 percent of its 48 million people living in urban areas.[548] Apartments account for approximately 48 percent of South Korea's housing stock[549] and provide housing for

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[543] It is estimated that the South Korean government spent approximately $24 billion on backbone infrastructure during the 1995-2002 period and will spend over $53 billion on information technology projects during the 2003-2008 period. *Id*. The actual amount of past and projected investment may be higher, and is difficult to discern, as the government also has directed substantial amounts of private investment. Some estimates run into the tens of billions of dollars. *See, e.g.*, James B. Speta, *Commentary: Policy Levers and Demand Drivers in Korean Broadband Penetration*, J. KOREAN L., 2004-2005, at 1, 7.

[544] *Id.* at 8. Some commentators suggest, however, that the major advances in broadband deployment had already happened by 2002 and were mainly the result of facilities-based competition in a generally de-regulatory environment. *See, e.g.*, Thomas W. Hazlett, *Broadband Miracle*, WALL ST. J., Aug. 26, 2004, at A12.

[545] Heejin Lee & Bob O'Keefe, *The Growth of Broadband Internet Connections in South Korea: Contributing Factors*, 14th Bled Electronic Commerce Conference 438 (2001), *available at* http://domino.fov.uni-mb.si/proceedings.nsf/0/fa0fcb8fecb778fbc1256e9f0030a71f/$FILE/27_Lee.pdf.

[546] One survey reports: "Except for KT and one of the mobile operators, none of Korea's facilities-based telecommunications providers made a profit in 2001." ITU KOREA STUDY, *supra* note 541, at 7. KT competitor "Thrunet reorganized under bankruptcy laws in 2003, and Hanaro reported its first profits only in mid-2004." Hazlett, *supra* note 544. *See also* Kim Tae-gyu, *Hanaro Exposed to Greater M&A Risk*, Korea Times, Mar. 19, 2007.

[547] *See* Kenji Kushida & Seung-Youn OH, *Understanding South Korea and Japan's Spectacular Broadband Development: Strategic Liberalization of the Telecommunications Sectors* 22-23 (Berkeley Roundtable on the Int'l Econ., Working Paper No. 175, 2006), *available at* http://brie.berkeley.edu/publications/wp175.pdf.

[548] POPULATION REFERENCE BUREAU, SOUTH KOREA (2006), *available at* http://www.prb.org/DataFind/datafinder7.htm. The U.S., by comparison, has an average population density of 80 people per square mile and 79% of its population lives in urban areas. POPULATION REFERENCE BUREAU, UNITED STATES (2006), *available at* http://www.prb.org/DataFind/datafinder7.htm. Nearly half of South Koreans live in urban areas with more than one million people, compared to 37% of Americans. Speta, *supra* note 543, at 15.

[549] In the U.S., 27% of households live in apartment buildings. INT'L TELECOMMS. UNION, PROMOTING BROADBAND: THE CASE OF JAPAN 34 (2003) [hereinafter ITU JAPAN STUDY], *available at* http://www.itu.int/osg/spu/ni/promotebroadband/casestudies/japan.pdf.

approximately 40 percent of its population. The average distance of a customer to a telephone exchange is about two kilometers, with 95 percent of customers living within four kilometers of an exchange, the target range of asymmetric DSL. This close proximity simplifies the last-mile roll-out of such networks.[550]

In addition, some observers conclude that the Internet has become much more of a cultural phenomenon in South Korea than in some other countries.[551] For example, although South Koreans' per-capita income is less than a third of that of Americans, they are willing to spend twice as much of their household income on broadband services.[552]

2. Japan

Japan is frequently cited as having some of the lowest prices and highest speeds in the world for Internet service. The Japanese government began a partial privatization of its historical telecommunications monopoly, Nippon Telegraph & Telephone Corp. ("NTT") in the mid-1980s. Some observers have characterized Japan's communications sector since this time as shifting away from government-managed competition and toward a more dynamic, market-oriented system.[553] Japanese industrial policy since the early 1990s, however, has continued to promote the deployment of fiber-optic infrastructure through the use of subsidies and loans from the Development Bank of Japan ("DBJ"),[554] as well as extensive direct investment by NTT.[555]

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[550] ITU KOREA STUDY, *supra* note 541, at 12. "This high population density simplifies network development and lowers costs investment [sic]." *Id.* at 67.

[551] *Id.* at 12 ("[T]hough more difficult to measure, it is widely agreed that Korean 'mentality' is also a key factor. Many Korean Internet users first got a taste of high-speed access at Internet cafes . . . and subsequently wanted the same rapidity at home. There is also a 'copy-cat' syndrome; once one person gets something everyone else wants it, too."). *But see* Associated Press, *Nearly 50 Percent of Americans Have Little Use for Internet and Cell Phones, Survey Finds*, FOXNEWS.COM, May 7, 2007, http://www.foxnews.com/story/0,2933,270392,00.html (summarizing findings of the Pew Internet and American Life Project study).

[552] Speta, *supra* note 543, at 6, 10. As of 2003, Japanese spent 0.02% of their household income on broadband services, Americans spent 0.04%, and Swedes and Koreans spent 0.08%. FCC OECD ANALYSIS, *supra* note 538, at 7.

[553] In this view, Japanese broadband markets "grew out of a transition in its regulatory regime away from 'managed competition.'" Kushida & OH, *supra* note 547, at 23. That is, "[t]he shift entailed the government giving up many of the policy tools to manage competition, but adding new institutions and regulations in a transition from ex ante regulation through licenses and approval, towards an ex post mode of regulation relying on a dispute resolution commission and other institutions." *Id*.

[554] The DBJ has offered providers low or no-interest loans for broadband access lines. The Telecommunications Advancement Organization of Japan ("TAO") has subsidized up to 2% interest on DBJ loans. In addition, the government has offered corporate tax rate reductions for operators' broadband equipment and a reduction on the fixed asset tax for broadband equipment. The TAO also has a program to guarantee debt liabilities of operators introducing broadband access networks. ITU JAPAN STUDY, *supra* note 549, at 33-34.

[555] Kushida & OH, *supra* note 547, at 29.

Non-facilities-based startup firms began to offer DSL service in the late 1990s, relying primarily on access to NTT's existing infrastructure. Interconnection regulations at that time, however, did not cover these access arrangements. The new ISPs, therefore, were operating largely at the discretion of NTT, and, in 2000, the Japanese Fair Trading Commission warned NTT over its treatment of new DSL providers.[556] At the same time, the Ministry of Internal Affairs and Communications ("MIC") required NTT to clarify the terms and fees it offered competitors for access to its network, lease out its unused fiber-optic infrastructure at low prices, and unbundle its metallic and fiber-optic local loops.[557] The Japanese government has continued to review policies relating to competitors' access to NTT's network and also entertained a possible breakup of the company.[558] By 2001, the new entrant DSL providers began to make significant headway.[559]

In addition to other government industrial policy measures, Japan's regional electric power utilities had invested substantially in laying fiber-optic networks since the late 1980s.[560] Another company also entered from the cable radio business by deploying 100 Mbps fiber wirelines along its already-existing nationwide electric-pole network.[561] By the end of 2005, approximately 44 percent of Japanese households had broadband access.[562]

Despite government subsidies for broadband deployment by approved service providers, as of 2003, it has been reported that all Japanese DSL providers were unprofitable, notwithstanding rapid growth in the market for Internet services.[563] Thus, some commentators have questioned whether there is sufficient demand for fiber speeds up to 100 Mbps to justify the Japanese government's industrial policy expenditures.[564]

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[556] *Id*. at 26.

[557] *Id*. at 26-27.

[558] *Japan Requires NTT to Provide Access for High-Speed Internet Network to Rivals*, ASIA PACIFIC TELECOM, Aug. 1, 2006, at 6.

[559] In particular, Softbank / Yahoo! created a price shock in the marketplace by setting its monthly subscription price at $22, the lowest in the world at that time. This prompted other DSL providers, including NTT regional companies, to lower their prices in response. *See* Kushida & OH, *supra* note 547, at 28.

[560] ITU JAPAN STUDY, *supra* note 549, at 14.

[561] *Id*.

[562] Kushida & OH, *supra* note 547, at 5.

[563] Hidenori Fuke, *The Spectacular Growth of DSL in Japan and Its Implications*, COMM. & STRATEGIES 4th Quarter 2003, at 175, 180, *available at* http://www.idate.fr/fic/revue_telech/22/C&S52_FUKE.pdf.

[564] According to one study, beyond service area coverage, "[t]he second and more insurmountable challenge has to do with content, such as: when will there be content attractive enough to the majority of users to migrate from ADSL to FTTH [(Fiber to the Home)]?" ITU JAPAN STUDY, *supra* note 549, at 15.

But a fall in the price of fiber-optic service to below $40 per month in 2003 apparently attracted significant demand.[565] Other commentators have suggested that while local loop unbundling may have spurred short-term price competition, it may also give rise to long-term disincentives to invest in new facilities infrastructure and develop new service offerings.[566]

Finally, Japan's population density is relatively high at 876 people per square mile. Seventy-nine percent of its 127 million people live in urban areas.[567] Thirty-eight percent of Japanese households live in apartment buildings. In Tokyo and Osaka, 66 percent and 52 percent of households, respectively, live in apartment buildings.[568] As in the case of South Korea, such demographics appear to facilitate the deployment of network infrastructure.

3. The Netherlands

The Netherlands has been cited as Europe's leader in broadband penetration.[569] This achievement is often credited to facilities-based competition between cable and DSL in a generally deregulated environment.[570] At the beginning of telecommunications liberalization in Europe during the 1990s, it was left largely to the national governments

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[565] *Id*. at 31. As of 2003, the monthly price for 100 Mbps service was approximately $36.00. Fuke, *supra* note 563, at 181, 186.

[566] In this view, "DSL services based on line-sharing demonstrate the problems with competition policy relying on the unbundling of network functions of incumbent carriers. . . . Other competitive carriers can enjoy this low wholesale price without taking the risk of . . . investing in an uncertain business." Fuke, *supra* note 563, at 180-81. As a result, "[h]ere we are caught in a dilemma between the short-term promotion of service-based competition and the long-term promotion of technological innovations." *Id*. at 186. Similarly, because "DSL services are offered on NTT local companies' metallic subscriber lines, it is virtually impossible for providers of DSL to differentiate their products. . . . This has led to a situation where competition is primarily based on marketing abilities, including price. Other DSL service providers were obliged to match these low prices." *Id*. at 179.

[567] POPULATION REFERENCE BUREAU, JAPAN (2006), *available at* http://www.prb.org/DataFind/datafinder7.htm.

[568] ITU JAPAN STUDY, *supra* note 549, at 34.

[569] *See generally* INFO. SOC'Y & MEDIA DIRECTORATE-GEN., EUROPEAN COMM'N, EU TELECOM RULES: WHERE ARE WE NOW? 2 (2007), *available at* http://ec.europa.eu/information_society/newsroom/cf/document.cfm?action=display&doc_id=266 ("The Netherlands is the leading country in the world in broadband penetration. Competition between networks and services has been increasing as cable operators cover almost the whole territory and offer, alongside several DSL providers, attractive and inexpensive packages to consumers.").

[570] *See id. See also generally* AGENCY FOR INT'L BUS. & COOPERATION, THE NETHERLANDS MINISTRY OF ECON. AFFAIRS, BROADBAND AND GRIDS TECHNOLOGY IN THE NETHERLANDS [hereinafter AGENCY FOR INT'L BUS. & COOPERATION], *available at* http://www.hightechconnections.org/2005/broadband.pdf (last visited June 14, 2007). By 2006, in addition to the deployment of copper wirelines, ninety-eight percent of Dutch houses were connected to a cable TV network, with almost all of these networks offering broadband Internet services. *Id*.

of individual European Union ("EU") member states to decide whether and how local loops should be unbundled.[571] During 1996 and 1997, Dutch government restrictions on offering telecommunications infrastructure were generally discontinued.[572] Previously, incumbent monopoly telecom provider KPN had almost unrestricted rights in these fields. Local unbundling was implemented in 1999, and, consistent with subsequent EU rules, firms with significant market power also have special obligations, such as mandated interconnection at cost-based rates.[573] The Dutch government also has subsidized Internet infrastructure projects and has provided tax breaks for computer purchases.[574] In addition, the Netherlands generally is considered the most densely populated country in Western Europe, with an average population density of 1,037 people per square mile and 65 percent of its population living in urban areas.[575] As a result, over 70 percent of the Dutch population lives in an apartment building, attached row house, or semi-detached house.[576]

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[571] *See generally Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions: Fifth Report on the Implementation of the Telecommunications Regulatory Package*, COM (1999) 537 final (Nov. 10, 2007), *available at* http://ec.europa.eu/comm/information_society/policy/telecom/5threport/pdf/5threp99_en.pdf.

[572] *See generally* Nico van Eijk, *Broadband Services and Local Loop Unbundling in the Netherlands*, IEEE COMM. MAG., Oct. 1999, at 2-3, *available at* http://www.ivir.nl/publications/vaneijk/broadband.pdf.

[573] *E.g.*, Regulation 2887/2000, Unbundled Access to the Local Loop, 2000 O.J. (L 336) 4. The EU has continued to take subsequent measures to harmonize the way in which member states regulate access to communications networks. *See generally Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: 12th Report on the Implementation of the Telecommunications Regulatory Package*, COM (2007) 155 final (Mar. 29, 2007) [hereinafter *EC 12th Report*], *available at* http://ec.europa.eu/information_society/policy/ecomm/doc/implementation_enforcement/annualreports/12threport/com_2007_155_en.pdf.

[574] For example, the Dutch government has spent 106 million Euros on various research projects such as the GigaPort Next Generation Network, which is claimed to be the fastest research and development network in the world. *See* AGENCY FOR INT'L BUS. & COOPERATION, *supra* note 570. *See also* Kevin J. O'Brien, *Dutch Found To Be the Most Computer Literate in World*, INT'L HERALD TRIB., Feb. 21, 2006, *available at* http://www.iht.com/articles/2006/02/21/business/pew.php (describing a 1997-2004 Dutch tax law that allowed workers to deduct from pretax wages the cost of personal computers if they were also used for business purposes); U.S. DEP'T OF STATE, 2006 INVESTMENT CLIMATE STATEMENT – THE NETHERLANDS (2006), *available at* http://www.state.gov/e/eeb/ifd/2006/62022.htm ("[T]he Netherlands ranks eighth in the world [in Internet deployment] thanks to continued rollout of broadband services, internet-related legislation and government broadband programs. In 2004, the government embarked on a broadband action program aimed at creating a regulatory framework that will stimulate and facilitate broadband development.").

[575] *See* FRANK SIDDIQUI, THE NETHERLANDS MINISTRY OF ECON. AFFAIRS, HEALTHY AND STRUCTURAL GROWTH OF DUTCH ECONOMY (2006), *available at* http://www.hollandtrade.com/vko/zoeken/showbouwsteen.asp?bstnum=1423; POPULATION REFERENCE BUREAU, NETHERLANDS (2006), *available at* http://www.prb.org/DataFind/datafinder7.htm.

[576] STATISTICS NETHERLANDS, NETHERLANDS OFFICIAL STATISTICS 2000-3 (Autumn 2000), *available at* http://www.cbs.nl/NR/rdonlyres/CB145B5F-068C-4086-B0D7-4BA74C3B6791/0/nos003.pdf.

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Because the socio-economic status of individual countries and the historical nature of their telecommunications regimes can vary widely, comparisons of broadband deployment and adoption rates across countries may not be meaningful.[577] It appears to be generally recognized that these measures can be affected by a number of factors.[578] Some observers suggest, therefore, that particular policies aimed at facilitating broadband deployment and adoption may have differential effects in different places, depending on the relevant circumstances.[579] For the United States, its larger geographic size and relatively dispersed population make it difficult to compare broadband experiences directly with many of the smaller and more densely populated countries that are sometimes cited as global Internet leaders.[580] As a result, although many commentators have urged U.S. policy makers to do more to facilitate the roll-out of broadband Internet services, at the same time, some observers have cautioned against trying to model U.S. policy decisions after those of other countries.[581]

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[577] *See generally* Robert M. McDowell, Commissioner, FCC, Address at Catholic University School of Law Symposium: Broadband Deployment in a Multi-Media World: Moving Beyond the Myths to Seize the Opportunities (Mar. 15, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-271555A1.pdf. *See also* FCC OECD ANALYSIS, *supra* note 538; CORREA, *supra* note 538.

[578] "Broadband transmission speeds vary across the EU, which on average still lag behind the US, Japan, and Korea. To some extent this can be explained by the high population density in South Korea and Japan, and the presence of more high capacity cable networks in the US compared to several major EU countries." *EC 12th Report*, *supra* note 573, at 12.

[579] One commentator suggests, for example, that "[w]hereas the Nordic region and the Benelux countries [Belgium, Netherlands, and Luxembourg] are in favor of open [unbundled] networks, southern countries with a less-developed cable infrastructure fear that this would discourage investments." Matthijs Leendertse, *Don't Stop at Local Loop*, INDUSTRY STANDARD EUROPE, Jan. 17, 2001, *available at* http://www.vandusseldorp.com/vdapinthepress/TheStandard%2017%20Jan%202001.htm.

[580] *See* McDowell, *supra* note 577, at 2 ("[When compiling statistics, the] OECD does not account for population density, which puts a country as a large as ours—with sizable rural areas—at a disadvantage. No other country above the U.S. on the OECD list occupies an entire continent like we do. No other country above on this list is 75 percent rural.").

[581] For example, one commentator has cautioned that, "[i]t is undeniable that [population density] accounts for much of the difference between broadband penetration in the United States and Korea. This suggests caution in adopting those elements of Korean industrial policy that are most different from the general regulatory presumptions in the United States." Speta, *supra* note 543, at 16. *See also* Seth Sacher & Scott Wallsten, *What U.S. Broadband Problem?*, CNET NEWS.COM, July 3, 2006, http://news.com.com/What+U.S.+broadband+problem/2010-1034_3-6090408.html (noting that OECD and other international statistics generally are self-reported and that the methodologies for compiling such statistics generally are not published).

VII. ANTITRUST ANALYSIS OF POTENTIAL BROADBAND PROVIDER CONDUCT

As explained in the preceding Chapter, an important issue raised in the debate over network neutrality regulation is whether the broadband market – however it may be defined – is competitive. The competitive issues raised in this debate, however, are not new to antitrust law, which is well-equipped to analyze potential conduct and business arrangements involving broadband Internet access. In conducting an antitrust analysis, the ultimate issue would be whether broadband Internet access providers engage in unilateral or joint conduct that is likely to harm competition and consumers in a relevant market.

Section A of this Chapter provides broad principles that underlie the antitrust laws and explains that any type of antitrust analysis involving such conduct would entail a case-by-case evaluation of the procompetitive and anticompetitive effects of the conduct to determine its overall impact on consumer welfare. Section B explores some of the most likely antitrust theories that would apply to potential conduct by broadband providers, including exclusive dealing, vertical integration, and unilateral conduct.

A. General Principles Underlying the Antitrust Laws

The antitrust laws are grounded in the principle that competition – "that state of affairs in which output is maximized, price is minimized, and consumers are entitled to make their own choices"[582] – serves to protect consumer welfare. This persistent focus on the consumer ensures that enforcement resources are directed at protecting consumers through the competitive process, not at protecting individual market players.

Vigorous competition on the merits by a single firm, such as the charging by such firm of a price that may be higher than would occur in a market with more competitors, does not by itself constitute anticompetitive conduct. As the Supreme Court noted recently in the *Trinko*[583] case, the charging of monopoly prices by a lawful monopolist by itself "is not only not unlawful; it is an important element of the free market system."[584] Thus, the antitrust laws do "not give judges *carte blanche* to insist that a monopolist alter its way of doing business whenever some other approach might yield greater competition."[585] Empirical evidence and our enforcement experience confirm that competition itself can force changes on a market and erode monopoly profits. Indeed, it is the purpose of the antitrust laws to protect that competitive process.

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[582] HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE § 5.6b, at 258 (3d ed. 2005) (citing FTC v. Ind. Fed'n of Dentists, 476 U.S. 447 (1986)).

[583] Verizon Communs. Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 407 (2004).

[584] *Id.* at 407.

[585] *Id.* at 415-16.

Conduct that has the potential to be both anticompetitive and harmful to consumers, under certain conditions, and procompetitive and capable of improving efficiency, under other conditions, is analyzed under the "rule of reason" to determine the net effect of such conduct on consumer welfare.[586] In contrast, conduct that is always or almost always harmful to consumers – such as collusion among horizontal competitors – generally is deemed per se illegal under the antitrust laws.[587] As discussed in the following section, these principles apply to Internet-related markets in the same manner as they do to other markets in our economy.

B. Potential Antitrust Theories

The potential for anticompetitive harm exists in the various Internet-related markets, as it does in all markets. The FTC's primary mission is to protect consumers by attacking unfair methods of competition and unfair or deceptive acts or practices,[588] and some have called for antitrust enforcement against potential anticompetitive conduct by broadband providers.[589] Antitrust enforcement – outside the merger review context – involves the *ex post* investigation and prosecution of anticompetitive practices, wherever they are found, rather than *ex ante* regulation to prevent or mitigate potential market failure.[590]

It appears that the competitive issues relating to last-mile access to consumers that have been raised in the network neutrality debate largely can be addressed through antitrust enforcement. Depending on the particulars, blocking access to the Internet by content or applications providers or discriminating in favor of a supplier with whom the broadband provider has an affiliated or contractual relationship would be analyzed, for example, under either Section 1 of the Sherman Act,[591] as an exclusive dealing relationship, or under Section 2 of the Sherman Act,[592] as a unilateral refusal to deal.[593]

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[586] *See, e.g., Ind. Fed'n of Dentists*, 476 U.S. at 459 (balancing of competitive effects under rule of reason is appropriate "where the economic impact of certain practices is not immediately obvious").

[587] *See, e.g.*, NCAA v. Board of Regents, 468 U.S. 85, 103-04 (1984) ("Per se rules are invoked when surrounding circumstances make the likelihood of anticompetitive conduct so great as to render unjustified further examination of the challenged conduct.").

[588] *See supra* Chapter II.A.

[589] *See, e.g.*, G. Sohn, Tr. I at 100-01 ("We believe the FTC should investigate and act on allegations of anticompetitive conduct by broadband Internet access providers filed by consumers[] [and] content[,] service, and applications providers."); Pepper, Tr. I at 132; Davidson, Tr. I at 232; Muris, Tr. II at 118.

[590] Current antitrust jurisprudence is cognizant of the costs of government intervention in cases where the conduct at issue may not actually harm – and indeed may benefit – competition. The error costs of such "false positives" are part of the antitrust enforcement calculus when enforcement authorities make a decision on intervention in any particular case.

[591] 15 U.S.C. § 1.

[592] *Id.* § 2.

Vertical integration into content or applications by acquisition would be analyzed under the merger laws.[594] In addition, unilateral conduct on the part of broadband providers – including, for example, the degradation of Internet access service to force buyers into paying more for higher-quality service – would be analyzed under Section 2 of the Sherman Act.[595]

While these types of conduct are possible, the allegations of anticompetitive conduct by proponents of net neutrality regulation have for the most part been prospective. That is, there is little evidence to date of consumer harm from anticompetitive practices by ISPs or any other network operators; the allegations of anticompetitive conduct focus mainly on effects that may occur if certain actions, such as exclusive agreements or vertical integration, are undertaken in the future.[596] The only discriminatory action that both sides of the debate have acknowledged occurred when, in 2005, a small local telephone company allegedly blocked its customers from accessing a competing VoIP provider. The FCC took quick action and entered into a consent decree with the telephone company, Madison River, prohibiting the blocking of ports for VoIP traffic. The company also made a voluntary payment of $15,000 to the U.S. Treasury.[597] The record in the case, however, is sparse and does not contain any analysis of the competitive effects of the actions taken by Madison River.

1. Exclusive Dealing

Exclusive dealing arrangements foreclose a seller's competitors from doing business with the buyer for the duration of the arrangement. In the broadband area, ISPs might sign contracts with content or applications providers to provide exclusive, or preferential, access to consumers. For example, an ISP might arrange to allow access

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[593] Section 5 of the FTC Act, *id.* § 45, which prohibits "unfair methods of competition," encompasses both Sherman Act standards. The Robinson-Patman Act, *id.* §§ 13-13b, 21a, which prohibits, among other things, a seller from discriminating in price between different buyers when the discrimination adversely affects competition, applies to sales involving "commodities"; it does not apply to sales of services or intangible items. *See* ABA SECTION OF ANTITRUST LAW, *supra* note 177, at 495 (collecting cases). As such, the Robinson-Patman Act would not apply to sales of broadband Internet access services or online content and applications. *Cf.* Metro Communs. Co. v. Ameritech Mobile Communs., Inc., 984 F.2d 739, 745 (6th Cir. 1993) (holding that Robinson-Patman Act does not apply to sale of cellular telephone service).

[594] Section 7 of the Clayton Act prohibits mergers or acquisitions, the effect of which "may be substantially to lessen competition, or tend to create a monopoly." 15 U.S.C. § 18.

[595] In addition, horizontal collusive conduct between or among broadband providers would be found to be illegal without an elaborate market analysis. However, we have seen no allegations of such conduct in the broadband area.

[596] *See, e.g.*, Muris, Tr. II at 119 ("This push for regulation is not based, however, on the current robust marketplace.").

[597] *In re* Madison River Communs., LLC, 20 FCC Rcd 4295 (2005) (consent decree).

only to a single VoIP provider. Other VoIP providers might then be denied last-mile access to that ISP's customers or end users.

Antitrust analysis is guided by the question of whether specific conduct ultimately is harmful to competition and consumers.[598] Under certain circumstances, exclusive dealing contracts can violate the antitrust laws.[599] The courts analyze exclusive dealing contracts under the "rule of reason," which balances the contracts' procompetitive and anticompetitive effects.[600] Thus, the net economic effect of the arrangement will determine whether it violates the antitrust laws. A detailed analysis of how an exclusive dealing arrangement affects competition is required, and – critically – that analysis goes beyond the number of foreclosed competitors.[601] The FTC has held that "a proper analysis of exclusive dealing arrangements should take into account market definition, the amount of foreclosure in the relevant market, the duration of the contracts, the extent to which entry is deterred, and the reasonable justifications, if any, for the exclusivity."[602]

Courts have decided exclusive dealing cases on a number of different factors. Although they have looked first at the amount of commerce foreclosed, there is no consensus on how much foreclosure will trigger liability. There appears to be a safe harbor for foreclosure of less than 30 to 40 percent of the relevant market,[603] and even higher shares have been allowed.[604] Other relevant factors in the foreclosure analysis

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[598] *See, e.g.*, Brunswick Corp. v. Pueblo Bowl-O-Mat, Inc., 429 U.S. 477, 488 (1977) (federal antitrust laws designed for "the protection of *competition*, not *competitors*") (quoting Brown Shoe Co. v. United States, 370 U.S. 294, 320 (1962)).

[599] *See, e.g.*, United States v. Dentsply Int'l, Inc., 399 F.3d 181 (3d Cir. 2005); United States v. Microsoft Corp., 253 F.3d 34 (D.C. Cir. 2001); Luria Bros. v. FTC, 389 F.2d 847 (3d Cir. 1968).

[600] Jefferson Parish Hosp. Dist. No. 2 v. Hyde, 466 U.S. 2, 44-47 (1984) (O'Connor, J., concurring); Tampa Elec. Co. v. Nashville Coal Co., 365 U.S. 320, 329 (1961).

[601] *See, e.g.*, Thompson Everett, Inc. v. Nat'l Cable Adver., L.P., 57 F.3d 1317, 1326 (4th Cir. 1995) (plaintiff must show substantial anticompetitive effect); Roland Mach. Co. v Dresser Indus., 749 F.2d 380, 394 (7th Cir. 1984) (plaintiff must show that the probable effect of the exclusion will be to raise prices above competitive levels or otherwise harm competition).

[602] Beltone Elecs. Corp., 100 F.T.C. 68, 204 (1982) (dismissal order).

[603] *See, e.g.*, Minn. Mining & Mfg. Co. v. Appleton Papers Inc., 35 F. Supp. 2d 1138, 1143 (D. Minn. 1999) (30-40% at minimum); Sewell Plastics, Inc. v. Coca-Cola Co., 720 F. Supp. 1196, 1212-14 (W.D.N.C. 1989) (even 40% would not enable defendant to raise prices above competitive level). *Cf. Microsoft*, 253 F.3d at 70 ("A monopolist's use of exclusive contracts, in certain circumstances, may give rise to a § 2 violation even though the contracts foreclose less than the roughly 40% or 50% share usually required in order to establish a §1 violation.").

[604] *See, e.g.*, Omega Envtl., Inc. v. Gilbarco, Inc., 127 F.3d 1157, 1162-65 (9th Cir. 1997) (upholding exclusive dealing contracts by firm with 55% market share that foreclosed 38% of the relevant market).

include the length of the exclusive dealing contract,[605] the presence of alternative distribution channels,[606] ease of entry,[607] and actual injury to competition.[608]

In the recent exclusive dealing case of *United States v. Dentsply International, Inc.*,[609] for example, the court held that a manufacturer of prefabricated artificial teeth violated Section 2 of the Sherman Act by means of its exclusivity arrangements with its several distributors.[610] After finding that the defendant enjoyed monopoly power in the relevant market, the court ruled that the defendant's exclusive dealing arrangements were an unlawful exercise of that power.[611] In reaching that conclusion, the court considered, among other things, the alternative distribution channels available to the defendant's competitors, finding that the use of such channels was not "practical or feasible in the market as it exists and functions."[612]

In the Internet access context, exclusive dealing cases would likely turn on market definition in the first instance. Such definition would involve both product and geographic dimensions. With respect to the product market, a court or agency would have to determine which online content and applications are substitutable or interchangeable by consumers by reason of the products' characteristics, prices, and intended uses.[613] A court or agency also would have to determine whether the geographic boundary of such market is local, regional, national, or, perhaps, global.[614] In

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[605] *See id.* at 1162 (one-year term held legal); *accord Thompson*, 57 F.3d at 1326. Longer terms may not survive challenge. *See* Twin City Sportservice, Inc. v. Charles O. Finley & Co., 676 F.2d 1291, 1307-08 (9th Cir. 1982) (greater than 10 years held illegal).

[606] *See* CDC Techs., Inc. v. Idexx Labs., Inc., 186 F.3d 74, 80-81 (2d Cir. 1999); Roy B. Taylor Sales, Inc. v. Hollymatic Corp., 28 F.3d 1379, 1384-85 (5th Cir. 1994).

[607] *See* Concord Boat Corp. v. Brunswick Corp., 207 F.3d 1039, 1059 (8th Cir. 2000).

[608] *See* Advanced Health-Care Servs., Inc. v. Radford Cmty. Hosp., 910 F.2d 139, 151 (4th Cir. 1990); Collins v. Associated Pathologists, Ltd., 844 F.2d 473, 478-79 (7th Cir. 1988).

[609] 399 F.3d 181 (3d Cir. 2005).

[610] *Id.* at 196.

[611] *Id.*

[612] *Id.* at 193.

[613] An antitrust plaintiff also could challenge an exclusive dealing arrangement as harming competition in a broadband Internet access product market.

[614] Some commentators have argued that the online content and applications market is global, *see, e.g.*, Verizon Communications Inc., Public Comment 60, at 23-24, or national, *see, e.g.*, Sidak, *supra* note 287, at 470; Yoo, *supra* note 276, at 72-73. Others, however, have characterized this market as regional. *See, e.g.*, Herman, *supra* note 267, at 134 ("The emphasis on national rather than regional market share is highly problematic. Not all Internet content providers care primarily about national market share. Several prominent regional Web sites exist within the boundaries of any given regional Bell or cable company . . . .").

sum, any exclusive dealing arrangement in the Internet content and applications market – like any such arrangement in any other market – would be subject to a market- and fact-specific antitrust analysis. Indeed, it is not possible, based on generalized data or predictions of future business arrangements, to conclude that the online content and applications market suffers or will suffer from anticompetitive conduct.

2. Vertical Integration

As discussed in Chapter IV, antitrust jurisprudence generally regards vertical integration as harmless or even beneficial to consumer welfare.[615] Such integration, however, may be anticompetitive under certain circumstances. A vertical merger, for example, could foreclose opportunities and thereby harm competition.[616] Such foreclosure might occur by either denying competitors access to essential inputs (for example, in the market for broadband Internet access) or denying access to downstream distribution outlets (for example, in the market for online content and applications).[617] In the Internet access context, for example, an ISP that merges with or acquires a VoIP provider may have the incentive to deny access to its network to competing VoIP providers.[618]

Earlier court cases found vertical mergers to be illegal based primarily on the foreclosure of a small market share.[619] More recent cases, however, have rejected a simplistic market share analysis and have insisted on a showing of anticompetitive effects.[620] The FTC has brought a number of cases alleging downstream foreclosure that would harm competition. In *CMS Energy Corp.*, for example, the FTC required an electric power company to divest certain generation assets before acquiring a utility with a monopoly natural gas pipeline due to concerns that the merged company would have an incentive to foreclose access to the pipeline to rival generation companies.[621] In *Ceridian*

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[615] Because vertical agreements can generate procompetitive efficiencies, they are less suspect than horizontal activity under long-accepted antitrust jurisprudence. *See* 11 HERBERT HOVENKAMP, ANTITRUST LAW ¶ 1902a, at 209 (2d ed. 2005) ("[H]orizontal agreements *as a class* deserve stricter scrutiny than (a) unilateral acts, (b) horizontal mergers, or (c) vertical agreements.").

[616] *See, e.g.*, Brown Shoe Co. v. United States, 370 U.S. 294 (1962).

[617] Vertical mergers also may have anticompetitive effects when they are used, for example, to facilitate horizontal collusion by competitors or by public utilities to avoid the impact of rate regulation. *See* HOVENKAMP, *supra* note 582, §§ 9.3d, 9.3e, at 385-86.

[618] See *supra* Chapter IV for a more detailed discussion of potential discrimination by vertically integrated ISPs.

[619] *See, e.g.*, *Brown Shoe Co.*, 370 U.S. 294; United States v. E.I. du Pont de Nemours & Co., 353 U.S. 586 (1957).

[620] *See, e.g.*, Alberta Gas Chems. Ltd. v. E.I. du Pont de Nemours & Co., 826 F.2d 1235 (3d Cir. 1987); Reazin v. Blue Cross & Blue Shield, Inc., 663 F. Supp. 1360, 1489 (D. Kan. 1987), *aff'd in part, remanded in part*, 899 F.2d 951 (10th Cir. 1990).

[621] CMS Energy Corp., 127 F.T.C. 827 (1999) (consent order).

Corp., a marketer of trucking-fleet credit cards acquired the owner of the dominant point-of-sale system for fleet cards.[622] The potential anticompetitive effect of the acquisition was the foreclosure of rival fleet-card owners from access to the only fleet-card processing system. The consent order settling this case required Ceridian to grant licenses to other fleet-card issuers to use the processing system.

The merger between AOL and Time Warner raised many of the same issues that concern some proponents of net neutrality regulation today. At the time of the merger, AOL was the nation's largest ISP and Time Warner owned cable television systems serving approximately 20 percent of U.S. cable households. One concern was that the merger would lessen competition in the residential broadband Internet access market and reduce AOL's incentive to promote DSL broadband service as an emerging alternative to cable broadband, and that foreclosure of, or discrimination against, competitors of AOL by Time Warner could have harmed competition. The terms of the consent order settling the case required the merged company to provide non-discriminatory access in a number of markets. For example, the order required Time Warner to open its cable system to competitor ISPs and prohibited it from interfering with content passed along the bandwidth contracted for by non-affiliated ISPs. The order also required the company to make available at least one non-affiliated cable broadband ISP service before AOL began offering service and at least two other such services within 90 days to certain subscribers. The consent order also prevented the merged company from discriminating on the basis of affiliation in the transmission of content or from entering into exclusive arrangements with other cable companies with respect to ISP services.[623]

The AOL/Time Warner matter highlights the FTC's ability to protect consumers in Internet markets from vertical integration that may have anticompetitive effects. However, internal expansion by a broadband provider into content or applications would not be covered by the merger laws. Discriminatory conduct by an integrated firm instead would be analyzed as unilateral conduct under Section 2 of the Sherman Act.

3. Unilateral Conduct

Unilateral conduct by firms with sufficient market power can violate the antitrust laws if that conduct is deemed exclusionary or predatory.[624] A court assessing such conduct under Section 2 of the Sherman Act, for example, will initially screen for monopoly power, which is "the power to control market prices or exclude

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[622] Ceridian Corp., FTC Dkt. No. C-3933 (Apr. 5, 2000) (consent order), *available at* http://www.ftc.gov/os/caselist/c3933.shtm.

[623] Am. Online, Inc. & Time Warner Inc., FTC Dkt. No. C-3989 (Apr. 17, 2001) (consent order), *available at* http://www.ftc.gov/os/caselist/c3989.shtm.

[624] The appropriate liability standard to apply under Section 2 to unilateral conduct, such as refusals to deal, tying, and bundling, recently has been the subject of considerable debate among antitrust practitioners, commentators, and the business community. The FTC and DOJ held hearings from June 2006 to May 2007 to explore the appropriate legal framework for analyzing unilateral conduct. Information relating to these hearings is available on the FTC's Web site at http://www.ftc.gov/os/sectiontwohearings/index.shtm.

competition"[625] in a relevant antitrust market.[626] Monopoly power can be shown by direct evidence of control over prices in the relevant market.[627] Where direct evidence is not available, indirect evidence, such as the defendant's share of the relevant market and the existence of barriers to entry, may be used.[628] There is no universally agreed upon market share that alone is sufficient to create an inference of monopoly power, but shares above 70 percent and below 50 percent are often predictive.[629]

If monopoly power can be shown, a plaintiff also must show exclusionary or predatory behavior: anticompetitive conduct that confers or protects, or otherwise extends, monopoly power.[630] The mere exercise of lawfully acquired monopoly power, including the charging of monopoly prices, is not a violation of Section 2.[631] Use of exclusive dealing contracts, or other vertical agreements, may support a monopolization claim.[632] However, an exclusivity arrangement will not be condemned unless it leads to anticompetitive effects; "[t]hat is, it must harm the competitive *process* and thereby harm consumers."[633]

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[625] United States v. E.I. du Pont de Nemours & Co., 351 U.S. 377, 391 (1956).

[626] A court must be able to determine which particular product (*e.g.*, broadband Internet access or online content and applications) and geographic markets a defendant is monopolizing or attempting to monopolize. *See, e.g.*, Spectrum Sports, Inc. v. McQuillan, 506 U.S. 447, 459 (1993); United States v. Microsoft Corp., 253 F.3d 34, 50 (D.C. Cir. 2001).

[627] Am. Tobacco Co. v. United States, 328 U.S. 781, 789 (1946) (exclusion of competitors is proof of market power); *Microsoft*, 253 F.3d at 51 (prices substantially above competitive level are proof of market power).

[628] *Microsoft*, 253 F.3d at 51.

[629] *See du Pont*, 351 U.S. at 404 (75% would constitute monopoly power); Echlin Mfg. Co., 105 F.T.C. 410, 478 (1985) (46.8% insufficient). *See also* ABA SECTION OF ANTITRUST LAW, *supra* note 177, at 231-32 ("A market share in excess of 70 percent generally establishes a prima facie case of monopoly power, at least with evidence of substantial barriers to entry and evidence that existing competitors could not expand output. In contrast, courts virtually never find monopoly power when market share is less than about 50 percent.") (footnotes omitted).

[630] United States v. Grinnell Corp., 384 U.S. 563, 570-71 (1966) (defining exclusionary conduct as "the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident").

[631] Berkey Photo, Inc. v. Eastman Kodak Co., 603 F.2d 263, 294 (2d Cir. 1979); HOVENKAMP, *supra* note 582, § 6.3, at 273 ("The sale of output at a monopoly price is itself not sufficient to brand someone an unlawful monopolist. . . . Eventually the high profits will attract other producers into the market. Collectively these producers will increase output and prices will be driven to the competitive level.").

[632] *Microsoft*, 253 F.3d at 70.

[633] *Id*. at 58.

As indicated above, refusals to deal can be the basis of a Section 2 claim. Generally, even a firm with monopoly power has no duty to deal with a competitor,[634] but that right is not "unqualified."[635] Under certain narrowly defined circumstances, a monopolist's physical plant, facility, or other asset may be considered sufficiently essential to competition in a relevant market that it must be shared with competitors.[636] It is unlikely, however, that the courts will extend any essential facility obligation to a duopoly, as some have characterized the Internet access industry.[637] Even in a monopoly context, the courts have not looked with favor on refusal to deal cases – particularly essential facilities cases – in recent years. In *Trinko*, for example, the Supreme Court rejected as a basis for antitrust liability an allegation that a local exchange carrier ("LEC") "had filled rivals' orders on a discriminatory basis as part of an anticompetitive scheme to discourage customers from becoming or remaining customers of competitive LECs,"[638] noting that the Court has been "very cautious in recognizing . . . exceptions"[639] to a monopolist's right to refuse to deal with competitors. In any event, an antitrust analysis of a refusal to deal claim or any other claim involving unilateral conduct on the part of a broadband provider would involve a fact-specific determination of whether the conduct at issue harms competition and consumers.

[634] Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585, 600 (1985).

[635] *Id.* at 601.

[636] *See, e.g.*, MCI Communs. Corp. v. AT&T, 708 F.2d 1081, 1132-33 (7th Cir. 1983) (setting forth test requiring showing of following elements: (1) control of the essential facility by a monopolist; (2) a competitor's inability practically or reasonably to duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of providing the facility). The Supreme Court recently has noted that it has never had occasion either to recognize or repudiate this "'essential facilities' doctrine crafted by some lower courts." Verizon Communs. Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 410-11 (2004).

[637] *See supra* Chapter VI.B.

[638] *Trinko*, 540 U.S. at 404.

[639] *Id.* at 409.

VIII. CONSUMER PROTECTION ISSUES

This Chapter analyzes the Federal Trade Commission Act's prohibition against unfair and deceptive acts and practices as a framework for ensuring that consumers are adequately protected when purchasing and using broadband Internet access services. Consumer protection issues relating to broadband Internet access often are treated as secondary in the network neutrality debate. Having well-informed consumers of broadband Internet access, however, is crucial to fostering competition, and consumer protection issues will remain important with or without enactment of some form of network neutrality regulation. This Chapter offers a broad overview of basic consumer protection law in Section A; discusses the applicability of consumer protection laws to broadband Internet access services in Section B; and explores additional methods that can be used to protect the interests of consumers in the broadband services marketplace in Section C.

A. An Overview of Section 5 of the FTC Act

As discussed in Chapter II, Section 5 of the FTC Act prohibits entities from engaging in unfair or deceptive acts or practices in interstate commerce.[640] An act or practice is deceptive if it involves a representation, omission, or practice that is likely to mislead consumers acting reasonably under the circumstances, and the representation, omission, or practice is material.[641] Thus, an advertisement is deceptive if it includes material information that is false or that is likely to mislead a consumer acting reasonably under the circumstances. Likewise, an advertisement is deceptive if it omits material information, and that omission is likely to mislead a consumer acting reasonably under the circumstances.[642] Requiring accurate disclosure of material terms allows consumers to compare similar services offered by one or multiple providers and weigh the different terms being offered in making decisions about what services to purchase.

An act or practice is unfair, also in violation of the FTC Act, if it causes injury to consumers that: (1) is substantial; (2) is not outweighed by countervailing benefits to consumers and competition; and (3) consumers themselves could not reasonably have avoided.[643] The Commission has used its unfairness jurisdiction in a broad array of cases. For example, the Commission has taken the position that cramming unauthorized charges for information services onto consumers' telephone bills is an unfair practice.[644] In the data security context, the Commission has challenged the failure to implement

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[640] 5 U.S.C. § 45(a).

[641] Cliffdale Assocs., Inc., 103 F.T.C. 110, 164-65 (1984). *See also* FTC v. Pantron I Corp., 33 F.3d 1088, 1095 (9th Cir. 1994); FTC v. Minuteman Press, 53 F. Supp. 2d 248, 258 (E.D.N.Y. 1998).

[642] *Cliffdale Assocs.*, 103 F.T.C. at 175 (appending FTC Policy Statement on Deception).

[643] 15 U.S.C. § 45(n); *see also* Orkin Exterminating Co. v. FTC, 849 F.2d 1354, 1363-66 (11th Cir. 1988).

[644] *See, e.g.*, FTC v. Verity Int'l Ltd., 443 F.3d 48 (2d Cir. 2006). See also *supra* Chapter II.A for a discussion of this case.

reasonable safeguards to protect the privacy of consumer information, where the failure causes substantial injury without offsetting benefits, as an unfair practice.[645] The Commission also has taken the position that a unilateral change of contract may be an unfair practice. For example, in the context of lifetime service contracts used by an exterminator, the Commission challenged unilateral changes of material terms of the contract by the company as unfair trade practices.[646]

B. Applicability of Consumer Protection Laws to Broadband Internet Access Services

Participants at the FTC's Broadband Connectivity Competition Policy Workshop primarily addressed two broad areas of consumer protection: (1) clear and conspicuous disclosure of material terms; and (2) security and privacy issues created by broadband Internet access services. Current federal consumer protection law can address both sets of concerns. Consideration of the first area suggests that consumers of broadband Internet access would benefit from an industry-initiated effort to: (1) more clearly identify those terms that are material to consumers' decisions to purchase broadband Internet access services; and (2) devise methods to effectively disclose those terms. In the second area, the discussion at the Workshop indicated that further study of the privacy and security practices in the broadband Internet access industry is needed to address concerns that policy makers and others have expressed about those practices.

However the current network neutrality debate is resolved, effective consumer protection in the broadband marketplace will be essential to robust competition in that market. Without truthful marketing and clear disclosure of material terms, consumers will lack the information they need to make informed decisions in the broadband Internet access marketplace. Likewise, inadequate protection of privacy of personal information and data security in the provision of broadband Internet access could hamper consumer confidence in the industry.

1. Clear and Conspicuous Disclosure of Material Terms

In analyzing which acts or practices in the offering of broadband Internet access services are likely to be deceptive, Workshop participants discussed terms that could be considered material to consumers purchasing broadband Internet access services. "A

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[645] *See, e.g.*, CardSystems Solutions, Inc., FTC Dkt. No. C-4168 (Sept. 5, 2006) (decision and order), *available at* http://www.ftc.gov/os/caselist/0523148/0523148CardSystemsdo.pdf; DSW, Inc., FTC Dkt. No. C-4157 (Mar. 7, 2006) (decision and order), *available at* http://www.ftc.gov/os/caselist/0523096/0523096c4157DSWDecisionandOrder.pdf; United States v. ChoicePoint, Inc., No. 106-CV-0198 (N.D. Ga.) (settlement entered on Feb. 15, 2006), *available at* http://www.ftc.gov/os/caselist/choicepoint/0523069stip.pdf; BJ's Wholesale Club, Inc., FTC Dkt. No. C-4148 (Sept. 20, 2005) (decision and order), *available at* http://www.ftc.gov/os/caselist/0423160/092305do0423160.pdf.

[646] *See* Orkin Exterminating, 849 F.2d at 1363-66. *See also* FTC v. Certified Merch. Servs., Inc., No. 4:02:cv44 (E.D. Tex. Dec. 30, 2002) (final judgment and order), *available at* http://www.ftc.gov/os/2003/01/cms.pdf.

claim is considered material if it 'involves information important to consumers and, hence, [is] likely to affect their choice of, or conduct regarding a product.'"[647] Express claims are presumed to be material, that is, likely to affect a consumer's choice or conduct regarding a product.[648] Existing case law easily would support determinations that certain types of terms common to most or all Internet service contracts, such as price and duration, are "material."

Identifying and reaching agreement on what other terms are material to consumers of broadband Internet access and how to provide those consumers with meaningful disclosure is more difficult. Among the terms and conditions that could be considered material, participants and commentators have focused most of their attention on connection speed, limitations on use, and broader network management policies.

Speed was a particular focus of the participants. As a number of them discussed, the connection speed or speeds that a broadband provider offers to its customers, including both upload and download speeds, are terms that likely are material to broadband consumers.[649] Indeed, speed is one of the primary qualitative features on which broadband providers are competing. Consumers can use online "speed test" tools to attempt to determine the actual transmission speeds that they are experiencing through their broadband connections. However, as one Workshop participant noted, the speed of a connection is not completely within the control of the customer's last-mile broadband provider.[650] Myriad factors beyond the control of the provider can affect the download speed that a customer experiences at any particular time, including, among others, the nature of the content or application that the customer is trying to access and the number of other users seeking to access the same content or application at the same time.

Moreover, the type of information about access speeds that should be conveyed is a difficult question. One issue raised by the participants was whether a disclosure that the provider will give the consumer connection speeds of "up to" a certain speed is sufficient. That is, should the provider be required to make more detailed disclosures of average speeds or a range of minimum and maximum speeds? One participant argued that advertisements that tout "theoretical" bandwidth speeds that, in practice, are available only at limited times are likely to mislead consumers. He maintained that more effective disclosures would tell consumers the "effective" or typical bandwidth speed they could expect to receive.[651] In response, another participant argued that, because the bandwidth speeds that consumers will receive at any given time may vary widely due to a number of conditions, disclosure of average bandwidth speeds would be more likely to mislead

[647] Kraft, Inc. v. FTC, 970 F.2d 311, 322 (7th Cir. 1992) (quoting *Cliffdale Assocs.*, 103 F.T.C. at 165). *See also* FTC v. Pantron I Corp., 33 F.3d 1088, 1095-96 (9th Cir. 1994).

[648] *Kraft*, 970 F.2d at 322.

[649] Weiser, Tr. II at 87-88; Brenner, Tr. II at 97-98.

[650] Brenner, Tr. II at 97-98.

[651] Weiser, Tr. II at 87.

consumers than disclosure of maximum, "up to" bandwidth speeds.[652] He explained that the reason that such claims are effective is that consumers understand that "up to" claims are not the same as "average" claims and, thus, will discount the claims accordingly.[653]

Several of the Workshop participants also discussed disclosure of limitations on use imposed by broadband providers, an issue often raised in the network neutrality debate. As previously discussed, material omissions that are likely to mislead consumers acting reasonably under the circumstances are deceptive in violation of Section 5 of the FTC Act. Some have argued, for example, that if a broadband provider intends to prohibit its customers from using their broadband connections to access specific content or applications, such as VoIP telephone calls or streaming video, the provider should disclose those limitations clearly and conspicuously before the transaction is completed.[654] Similarly, it can be argued that usage limitations, such as a limitation on bandwidth usage or connection times, also should be disclosed.[655]

Other commentators have suggested that network management practices, such as traffic discrimination and traffic shaping, are material terms that must be disclosed to consumers.[656] Where a broadband provider gives priority to traffic coming to or from a particular content provider pursuant to a commercial relationship, the prioritization may enhance the performance of traffic to or from the favored content provider and degrade the performance of traffic to or from other content providers, including the favored provider's competitors. This implicates the question of whether such commercial relationships are material terms that must be disclosed to potential customers. One commentator has argued that offers of broadband Internet access that do not disclose such relationships and their effects are likely to mislead consumers because consumers traditionally expect "that Internet access entails the ability of users to communicate with

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[652] Muris, Tr. II at 132.

[653] *Id.*

[654] *See, e.g.*, G. Sohn, Tr. I at 101; Putala, Tr. II at 32; Tim Wu, *Wireless Net Neutrality: Cellular Carterfone on Mobile Networks* 22-23 (New America Foundation Wireless Future Program, Working Paper No. 17, 2007), *available at* http://www.newamerica.net/files/WorkingPaper17_WirelessNetNeutrality_Wu.pdf.

[655] *See* Weiser, Tr. II at 88-89; Brenner, Tr. II at 94-95; Atkinson & Weiser, *supra* note 255.

[656] *See, e.g.*, Center for Democracy & Technology, Public Comment 7, at 8 ("Public disclosure of prioritization arrangements could enable consumers to exert pressure against any policies they perceive as excessive ISP meddling in their choices among competing Internet content, services, and applications."); Bancroft, Public Comment 3, at 1 ("[V]oluntary disclosure of the existing packet management practices on a residential user's high-speed Internet access arrangement is the logical and necessary first step."); van Gelder, Public Comment 59, at 26 ("Truth in advertising with full disclosure of [an ISP's] intention to discriminate based on content provider would allow consumers to make informed choices about what they are paying for and from whom they wish to obtain Internet service."). *Cf.* OECD Report, *supra* note 382, at 30 ("Other safeguards that policy makers could consider include encouraging or requiring ISPs to clearly state their broadband packet shaping policies to consumers before they sign up for broadband and keeping existing subscribers aware of any changes.").

any and all other Internet users without interference from one's own ISP."[657] If broadband providers begin entering into pay-for-priority arrangements with content and applications providers, issues about the degree to which those arrangements must be disclosed no doubt will arise. Whether particular network management practices will be material to consumers (and therefore must be disclosed), however, cannot be determined in the abstract, but will require an examination of specific practices and consumer expectations.

There is, further, the question of how these types of information can be disclosed clearly and conspicuously so that it is meaningful to consumers. One Workshop participant argued that the disclosures currently used by many broadband providers are inadequate to meaningfully inform consumers of the terms and conditions of their service plans.[658] Meaningful disclosure may prove particularly challenging in this high-tech arena. Some studies of consumer behavior indicate that many pre-purchase disclosures for high-tech products and services, such as end user licensing agreements ("EULAs") for computer software, are not written in language that laypeople can easily understand or are too lengthy.[659] If consumers either do not read disclosures or do not understand them, the purpose of the disclosures is frustrated. The challenge of disclosures in the broadband access area, therefore, is to make such disclosures in a way that will enable consumers to understand both the services at issue and the ISPs' descriptions of how those services are provided. This will allow consumers to make meaningful comparisons of the offerings of competing providers and to know whether they are receiving the promised services.

The bundling of broadband Internet access with other services by many providers may raise special challenges regarding disclosure of material terms in the broadband Internet access area. In some instances, bundling may offer benefits to consumers and competition, but, in all instances, consumers must, of course, receive truthful and non-misleading disclosure of material information.[660] Prime examples of such bundling are the "triple play" packages offered by some telephone and cable television companies, in which broadband Internet access, telephone service, and video service are offered as a package with a single monthly price.[661] The practice of bundling can complicate the task

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[657] Center for Democracy & Technology, Public Comment 7, at 7.

[658] Kenney, Tr. II at 107.

[659] *See, e.g.*, NATHANIAL GOOD, ET AL., STOPPING SPYWARE AT THE GATE: A USER STUDY OF PRIVACY, NOTICE AND SPYWARE (2005), *available at* http://www.law.berkeley.edu/clinics/samuelson/papers/other/SamuelsonClinicSpyware.pdf.

[660] For a useful discussion on bundling see Patrick DeGraba, *The Loss Leader is a Turkey: Targeted Discounts from Multi-Product Competitors*, 24 INT'L J. INDUS. ORG. 613 (2006); Yannis Bakos & Erik Brynjolfsson, *Bundling and Competition on the Internet*, 19 MKTG. SCI. 63 (2000); and Yannis Bakos & Eric Brynjolfsson, *Bundling Information Goods: Pricing, Profits, and Efficiency*, 45 MGMT. SCI. 1613 (1999).

[661] Some providers have recently begun to offer "quadruple play" packages, which include mobile telephone services in addition to the other three services.

of comparing the price and quality of the bundled broadband access with the offerings of other providers. Additionally, bundled packages can increase the transactional costs to a consumer who decides to switch to another broadband provider that is offering service with better quality or at a better price.[662]

2. Unilateral Change of Contract

Some broadband providers offer consumers discounted prices for service contracts with durations of a year or more. Consumers who subscribe to such offerings are likely to expect a consistent level of service throughout the contract period, and, as noted above, the Commission and the courts have found that a unilateral change of contract can be an unfair practice.[663] This raises several important questions to consider as providers' practices change over time. What duties do providers owe to those customers in an industry as dynamic as the broadband industry? If a provider begins to differentiate traffic among various content and applications providers in the midst of such a contract, how will it notify and receive the consent of its subscriber to do so? If a subscriber does not consent to such a change, but the provider implements it anyway, might the change in service be considered an unfair unilateral change in contract if it materially affects the service that the subscriber receives?

3. Privacy and Data Security

A number of Workshop participants recognized the heightened privacy and data security concerns raised by the volume and sensitivity of the user information available to broadband providers.[664] The discussion and commentary on privacy and security concerns in the broadband industry has focused on two areas: (1) disclosure of privacy policies; and (2) data security. Further exploration of each area is justified. At the same time, it is worth noting that the FTC has used its full range of law enforcement authority to address privacy and data security concerns and will continue to do so, where appropriate, in the broadband arena.

An important privacy question raised in this and many other contexts is whether companies in practice live up to their privacy and security policies. For more than a decade, the Commission has encouraged companies to provide information about their privacy practices. At the same time, the Commission has taken the position that companies are obligated to provide the privacy and security protections they advertise and has brought approximately a dozen cases alleging that failure to comply with stated privacy and security practices is a deceptive practice in violation of Section 5 of the FTC

[662] Kenney, Tr. II at 106.

[663] *See, e.g.*, Orkin Exterminating Co. v. FTC, 849 F.2d 1354, 1363-66 (11th Cir. 1988).

[664] *See* Peha, Tr. I at 18-29; Kenney, Tr. II at 103, 129; Yokubaitis, Tr. II at 130-31.

Act.[665] We recommend that all companies, including broadband providers, closely review their privacy policies and actual practices to make sure that they are consistent.

Some privacy and security concerns, however, may be unique to the broadband industry. At the Workshop, a participant described a variety of techniques and commercially available tools that broadband providers can use to analyze data packet streams, including, most notably, flow classification and deep packet inspection.[666] Flow classification allows the provider to keep track of "things like packet size, and the time between packets, and stream duration."[667] Even if the packets are encrypted, such monitoring may allow a provider to harvest a significant amount of information about a user, including the kinds of applications the user is employing. Deep packet inspection allows the provider to identify not only the type of application being used, but also the content of the communication. Moreover, as the participant noted, a provider can cross-index the information it gets by monitoring a user's traffic with other information such as "billing information, or [the user's] credit card information."[668] While the participant focused on these tools as part of a discussion about how a provider can discriminate against or prioritize traffic, he also pointed out that these tools can be and are used to improve network security by identifying and protecting the network against viruses, spyware, and other dangers to the system.[669] Not surprisingly, some participants expressed concern that the use of deep packet inspection and other monitoring tools could impinge on user privacy and network security.[670]

The privacy and security implications of the practices of broadband Internet service providers warrant continued monitoring and review. The Commission recognizes that there is no one-size-fits-all data security plan. Rather, data security plans must be adapted to the size and nature of the business, the nature of the tools available, and the security risks the business is likely to face. Like other companies that have access to

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[665] *See, e.g.*, Gateway Learning Corp., FTC Dkt. No. C-4120 (Sept. 10, 2004), *available at* http://www.ftc.gov/os/caselist/0423047/040917do0423047.pdf; Petco Animal Supplies, Inc., FTC Dkt. No. C-4133 (Mar. 4, 2004), *available at* http://www.ftc.gov/os/caselist/0323221/050308do0323221.pdf; Microsoft Corp., FTC Dkt. No. C-4069 (Dec. 20, 2002), *available at* http://www.ftc.gov/os/caselist/0123240/microsoftdecision.pdf; FTC v. Toysmart.com, LLC, No. 00-11341-RGS (D. Mass. July 21, 2000), *available at* http://www.ftc.gov/os/2000/07/toysmartconsent.htm.

[666] Peha, Tr. I at 19. *See also supra* Chapter I.C.3.

[667] Peha, Tr. I at 19.

[668] *Id.*

[669] *Id.* at 21-22.

[670] *See, e.g.*, Kenney, Tr. II at 103; Yokubaitis, Tr. II at 130-31. As one participant noted, "the technology that broadband providers will use to facilitate tiering and network discrimination poses some substantial privacy issues." Kenney, Tr. II at 103. Another participant was even more pointed, noting in his written comments that, "deep packet inspection will yield and reveal some of the most personal and proprietary information customers have." Yokubaitis, Participant Presentation 1, at 5.

large amounts of sensitive personal data, broadband providers have a serious obligation to take reasonable steps to protect that data.

C. Additional Measures to Protect Consumers

As discussed above, it is not always a simple matter to apply the FTC Act's prohibitions against deceptive and unfair practices to broadband Internet access services. Moreover, both the telephone companies and the cable companies, which together provide the majority of broadband residential connections, have traditionally offered more highly regulated services. The move to a less regulated regime may require a significant conceptual shift for some in the industry to think about broad consumer protection standards that are applicable to broadband offerings. Commentators have proposed other measures – in addition to enforcement of the consumer protection laws – to ensure that the interests of consumers are adequately protected in this important industry. As discussed below, these measures include industry self-regulation and FTC guidance.

1. Self-Regulation by the Industry

One option for addressing consumer protection issues in the broadband industry is more active industry self-regulation. Self-regulation, for example, might take the form of voluntary industry-wide disclosure guidelines that would standardize the definitions of relevant terms and conditions of broadband access services to be disclosed to consumers.[671] A Workshop participant suggested that industry self-regulation could take the form of a dispute-resolution regime modeled along the lines of the Better Business Bureau's National Advertising Division and the National Advertising Review Board.[672] Such a mechanism could complement federal and state enforcement efforts by referring the most egregious or recalcitrant violators to law enforcement.

Although it has its limitations, as a general matter, the Commission applauds industry self-regulation. Self-regulation plans in several industries have protected and informed consumers and benefited honest businesses by taking action against competitors that use deceptive or unfair practices.[673] A more comprehensive approach to address the myriad consumer protection issues facing the industry, however, may be necessary. Moreover, any program of self-regulation is more effective when complemented by strong enforcement mechanisms.

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[671] *See, e.g.*, Bancroft, Public Comment 3, at 2.

[672] Weiser, Participant Presentation, at 9.

[673] *See* Deborah Platt Majoras, Chairman, FTC, Self Regulatory Organizations and the FTC, Address Before the Council of Better Business Bureaus (Apr. 11, 2005), *available at* http://www.ftc.gov/speeches/majoras/050411selfregorgs.pdf.

2. FTC Guidance Regarding Consumer Protection Issues

Some commentators have suggested that the FTC might effectively address some of the disclosure issues discussed above by developing guidance to industry regarding the critical information that broadband providers should disclose to their customers and potential customers.[674] With respect to disclosure, such standardized information could allow consumers to conduct a meaningful comparison of the available offerings of broadband providers. Such guidance could be combined with consumer education campaigns to help consumers understand what the information contained in such disclosures means.

FTC guidance may be useful should consumers encounter widespread difficulty obtaining or understanding material information about broadband offerings and service. In any case, we intend to continue to monitor industry practices, and, if appropriate, engage the industry in discussions of best practices. We note that the Commission already provides businesses with substantial information about how to provide non-deceptive disclosures to consumers. In particular, we recommend that broadband providers review the advice offered in the FTC's business education guide on "Dot Com Disclosures,"[675] which offers a comprehensive look at how to provide clear and conspicuous disclosure and focuses on adequate disclosure in online marketing.

Even more recently, the Commission published a business guide, "Protecting Personal Information: A Guide for Business."[676] This guide provides tips about basic practices all businesses should consider when it comes to protecting the privacy of their customers and the security of their data. The plain-language guide includes checklists to get businesses thinking about the kind of data they collect, whether they need it, how they manage and store it, and how to properly dispose of it. The guide also provides tips about the basics of creating a plan for dealing with a security breach, in the event one does occur. We recommend that broadband providers review the guide and consider its applicability. As in other industries, FTC guidance can complement enforcement of the consumer protection laws in the broadband Internet access industry.

[674] Weiser, Participant Presentation, at 8.

[675] This guide is available at http://www.ftc.gov/bcp/conline/pubs/buspubs/dotcom/index.shtm.

[676] This guide is available at http://www.ftc.gov/infosecurity/.

IX. PROPOSALS REGARDING BROADBAND CONNECTIVITY

This Chapter discusses the various legal, regulatory, and other proposals relating to broadband Internet access that have been put forth to date. Section A reiterates briefly existing federal agency oversight in the broadband area and then explores various views on such oversight. Section B discusses more specifically the FCC's recent broadband policy statement and the conditions imposed by the FCC in approving several recent mergers. Section C summarizes the relevant legislation that Congress has proposed. Finally, Section D reviews some of the other proposals offered by various interested parties.

A. Existing Agency Oversight

The central competition and consumer protection issues raised by broadband Internet access services are subject to the shared jurisdiction of the FCC, FTC, and DOJ. As discussed in Chapter II of this Report, FCC jurisdiction comes chiefly from the Communications Act, which establishes the FCC and provides for the regulation of telecommunications and information entities, services, and facilities.[677] The FTC's jurisdiction over broadband access comes chiefly from its statutory mandate to prevent "unfair methods of competition" and "unfair or deceptive acts or practices in or affecting commerce" under the FTC Act.[678] The FTC's authority to enforce the antitrust laws generally is shared with DOJ's Antitrust Division.[679]

As discussed in Chapter II, recent judicial and regulatory decisions have helped clarify the status of broadband Internet access services as information services not subject to the Communications Act's common carrier requirements.[680] Even proponents of imposing (or reimposing) some common carrier-type obligations,[681] however, generally support FTC oversight of broadband Internet access, as do other network neutrality proponents, as well as net neutrality opponents. For example, one Workshop participant, recognizing FTC jurisdiction and the absence of common carrier regulation, advocated the importance of traditional competition law concerns and, at the same time, regulatory "language along the lines of the AT&T merger condition[s]."[682] Another participant,

[677] 47 U.S.C. §§ 151 *et seq.* *See also supra* Chapter II.B (discussing FCC jurisdiction).

[678] 15 U.S.C. § 45(a)(1). *See also supra* Chapter II.A (discussing FTC jurisdiction).

[679] *See supra* note 154.

[680] *See supra* Chapter II.C.

[681] Under Title II common carrier regulation, broadband service providers would be required to, among other things, enable functional physical connections with competing carriers, 47 U.S.C. § 201(a), at "just and reasonable" rates, *id.* § 201(b), which the FCC would be empowered to prescribe, *id.* § 205, and would be prohibited from making "any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services. . . ." *Id.* § 202(a).

[682] Libertelli, Tr. I at 74, 79. Libertelli went on to distinguish between "net neutrality" and "251 or Title II-style non-discrimination requirements." *Id.* at 126. The AT&T/BellSouth merger conditions imposed by the FCC are discussed below in Chapter IX.B.

advocating further regulation, and apparently critical – as a policy matter but not a legal one – of the *Brand X* decision, argued that "[t]he FCC and FTC often have concurrent jurisdiction, and the public would be well served if that were the case here, as well."[683] Yet another participant, noting with caution that the FTC "has already testified twice before Congress, to oppose measures that would effectively extend the common carrier exemption to broadband," recognized FTC jurisdiction and the importance of the FTC's ability to protect the role of consumer information in competitive markets by enforcing existing FTC Act provisions.[684] Several participants were supportive of FTC jurisdiction, but opposed to further regulation, advocating, for example, a cautious, case-by-case application of current legal standards.[685]

Several participants highlighted the importance of FTC jurisdiction with regard to consumer protection concerns in particular.[686] One participant suggested that the classification of broadband services as information services provided not just FTC consumer protection authority, but, pursuant to that authority, an institutional capacity and experience in enforcing such provisions.[687] That participant argued that the FCC, in its enforcement of the Communications Act, has no substantial institutional history with consumer protection matters.[688] Another participant argued, similarly, for the importance of adequate consumer information and the authority, expertise, and experience of the FTC's "historical consumer protection mission," for enforcing consumer access to such information.[689] Yet another participant argued that, because transparency and disclosure

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[683] G. Sohn, Tr. I at 102. Sohn, however, did not advocate a return to Title II regulation: "I don't know anybody who is talking about going back to Title II. . . . [T]hat is not what this debate is about." *Id.* at 125.

[684] *See* Putala, Tr. II at 32 (the FTC "has jurisdiction over broadband connectivity, and everyone should be aware and watch very closely"); *id.* at 32-33 (regarding FTC Act enforcement). *See also* Center for Democracy & Technology, Public Comment 7, at 7 ("The FTC could send an important signal to the marketplace by publicly reiterating that . . . it will be on alert for signs of unfair competition in the broadband marketplace and will not hesitate to take enforcement action."); BT Americas Inc., Public Comment 5, at 2 ("Until such time as effective competition emerges, the Federal Trade Commission should adopt a policy of enhanced antitrust oversight and enforcement to deter abuse of market power.").

[685] *See, e.g.*, Pepper, Tr. I at 81 (advocating enforcement of the FTC Act against concrete violations, but against further regulation); Muris, Tr. II at 121 ("[Competition law enforcement] plays an important but limited role to supplement the common law. It acts as a check on conduct that interferes with the proper functioning of the market, particularly collusion and fraud."); Wolf, Tr. II at 144, 149 (arguing for sufficiency of existing agency oversight and antitrust law framework and that there is "no current demonstrated need for the proposed legislation or regulation").

[686] *See, e.g.*, Weiser, Tr. II at 86-87; *cf.* Putala, Tr. II at 32-33 (citing FTC Commissioner Leibowitz on importance of transparency and disclosure).

[687] Weiser, Tr. II at 86-87. *See also id.* at 123 ("There are serious collective action problems for consumers, and also expertise issues for regular common law courts. The FTC has an opportunity here to basically be an advocate for consumers, and to take cases that consumers would not prosecute on their own . . . .").

[688] *Id.* at 86-87. That participant also questioned the jurisdictional authority of state public utility commissions in the area of broadband Internet access. *See id.* at 86, 123.

[689] Pepper, Tr. I at 91.

were among "the most critical issues regarding the Internet," FTC enforcement actions aimed at material failures to disclose were of central importance.[690]

Several Workshop participants recognized the importance of promoting and protecting competition in the area of broadband Internet access, and several participants linked these goals to the question of FTC jurisdiction explicitly, sometimes linking consumer protection and competition law questions. For example, one participant argued that the FTC has broad jurisdiction to protect consumers through enforcement of both the competition and consumer protection provisions of the FTC Act, as well as its research, education, and advocacy tools on behalf of consumers.[691] At the same time, the participant argued for the maintenance of the current regulatory structure, in tandem with market forces and common law remedies, and cautioned that regulators and lawmakers be wary of the costs of regulation, especially as they might arise from "prospective" regulation undertaken prior to evidence of significant market failure.[692] Another participant advocated that "the FTC should play a leadership role in protecting consumers and competition, by exercising its authority, experience, resources, and expertise, on a case-by-case basis."[693]

As noted above, the question of whether existing law and agency oversight are adequate to address problems that may arise in broadband Internet access is a contentious one. One participant expressed concern regarding the potential adequacy of antitrust enforcement and endorsed the passage of proposed network neutrality legislation.[694] Other participants and commentators also have questioned the adequacy of antitrust enforcement to address concerns identified by network neutrality proponents.[695] Other

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[690] Putala, Tr. II at 32-33 (material failures to disclose should be regarded as "unfair, deceptive, and in violation of the FTC Act").

[691] Muris, Tr. II at 119-20; *cf.* Weiser, Tr. II at 86 (FTC "can do a great service" bringing competition law tools to bear on broadband services, but that tractable "low hanging fruit" issues were more in the realm of consumer protection).

[692] Muris, Tr. II at 119-22; *see also* Sidak, Tr. I at 110 ("[I]t's important to try to separate the purely hypothetical harms . . . from the problems that have been observed and remedied . . . ."); Wolf, Tr. II at 149 ("asserted fears . . . are hypothetical at best"). Some commentators also expressed the general notion that "regulation should not be introduced absent a finding that there is pervasive otherwise anticompetitive conduct that cannot be addressed by the antitrust laws." American Bar Association Section of Antitrust Law, Public Comment 2, at 1.

[693] Pepper, Tr. I at 81 (advocating enforcement of the FTC Act against concrete violations, but against further regulation).

[694] *See* Misener, Tr. II at 140 (advocating passage of the "Dorgan-Snowe bill"); *cf.* Bachula, Tr. II at 172 ("relying on after the fact enforcement through the anti-trust laws is not a practical remedy for universities").

[695] *See, e.g.*, Farrell, Tr. I at 158-59 ("It's often been suggested . . . that because these problems are, in a broad sense, competition problems, you could address them ex post with anti-trust. . . . I am not convinced that anti-trust, as currently enforced, is going to do a good job on those potential problems."); Herman, *supra* note 267, at 139 ("Especially in the rapidly evolving market of online content and services, antitrust enforcement is far too slow a remedy for anticompetitive behavior to save embattled products. . . . If it is to

participants argued that additional legal force should be given to existing FCC policy statements or certain transaction-specific merger conditions.[696]

In contrast, several participants argued that existing law and oversight were adequate and that further regulation was bound to be costly.[697] One participant argued that federal and state agencies, as well as the private bar, "are all empowered right now and have tools at their disposal that may be used if there is indeed anti-competitive or unfair tactics engaged in by broadband providers."[698] He concluded that "existing law provides sufficient oversight . . . especially in light of the adverse unanticipated consequences of proposed new regulation."[699] Another participant insisted that antitrust law "can and must be sufficient to handle" concerns that have been raised about broadband access and blocking.[700]

B. FCC Policy Statement and Merger Conditions

Several Workshop participants highlighted the importance of the FCC's recently issued broadband access principles,[701] and several suggested that particular merger conditions imposed by the FCC ought to be regarded as a model for future broadband regulation.[702]

As noted in Chapter II of this Report, then-FCC Chairman Michael Powell challenged the industry, in a 2004 address, to preserve the following four central "Internet Freedoms":

> (1) *The "Freedom to Access Content* . . . consumers should have access to their choice of legal content" (within "reasonable limits" imposed by legitimate network management needs);

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keep affected products from sliding into oblivion, any network neutrality regulation should go through the FCC.").

[696] *See, e.g.*, Libertelli, Tr. I at 79. The question of whether various FCC merger conditions or policy statements should serve as a model for future regulation is discussed in Section B of this Chapter, *infra*.

[697] *See, e.g.*, Muris, Tr. II at 122; *see also* Waz, Tr. II at 156-58.

[698] Wolf, Tr. II at 145; *see also* American Bar Association Section of Antitrust Law, Public Comment 2, at 1, 8.

[699] Wolf, Tr. II at 145; *see also* Small Business and Entrepreneurship Council, Public Comment 49, at 1 ("Such 'pre-regulation' without proof that anything harmful has been or will be done undoubtedly will have unintended consequences for the development of the Internet, and in turn for our nation's entrepreneurs.").

[700] Kahn, Tr. I at 190-91.

[701] *See, e.g.*, Pepper, Tr. I at 85.

[702] *See, e.g.*, Libertelli, Tr. I at 79; G. Sohn, Tr. I at 100.

(2) *The "Freedom to Use Applications* . . . consumers should be able to run the applications of their choice" (within service plan limits and provided the applications do not "harm the provider's network");
(3) *The "Freedom to Attach Personal Devices* . . . consumers should be permitted to attach any devices they choose to the connection in their homes" (within service plan limits, provided the devices do not "harm the provider's network or enable theft of service"); and
(4) *The "Freedom to Obtain Service Plan Information* . . . consumers should receive meaningful information regarding their service plans" (so that "broadband consumers can easily obtain the information they need to make rational choices.").[703]

Also discussed in Chapter II, an overlapping set of broadband connectivity principles were articulated by the FCC the next year in the Broadband Policy Statement that accompanied the Wireline Order. Those principles too were generally supportive of consumer access, as they recognized the importance of the following:

(1) The ability of consumers to "access the lawful Internet content of their choice";
(2) the ability of consumers to "run applications and use services of their choice, subject to the needs of law enforcement";
(3) the ability of consumers to "connect their choice of legal devices that do not harm the network"; and
(4) the existence of "competition among network providers, application and service providers, and content providers."[704]

Support for these principles has been broad,[705] indeed considerably broader than agreement on their implementation or sufficiency. First, there has been disagreement regarding the question of whether the principles should be codified, via regulation or statute.[706] This question is grounded in part in the belief – expressed by Workshop participants and other commentators – that the principles are not legally enforceable.[707]

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[703] *See supra* text accompanying notes 214-15 (regarding Remarks of Michael K. Powell, "Preserving Internet Freedom: Guiding Principles for the Industry").

[704] *See supra* text accompanying notes 216-17 (regarding FCC Broadband Policy Statement).

[705] *See, e.g.*, Pepper, Tr. I at 85 ("wide agreement that the connectivity principle should be followed"); Consumers for Cable Choice, Public Comment 10, at 2 ("The [FCC's] Broadband Policy Statement is an available and viable deterrent against unjustly discriminatory conduct."); National Association of Manufacturers, Public Comment 28, at 2 (opposing network neutrality regulation but stating: "[W]e embraced the 'four freedoms' later adopted by the [FCC] as official policy in 2005. The principles . . . are working.").

[706] *See, e.g.*, Pepper, Tr. I at 85 ("The debate is whether or not Congress should codify them . . . .").

[707] *See, e.g.*, Libertelli, Tr. I at 117 ("[W]e're talking about a policy statement; we're not necessarily talking about a binding rule of decision. And so, more work could be done to make those principles binding on the network owners."); Comstock House Testimony, *supra* note 265, at 23, 35.

Second, there has been disagreement regarding the question of whether the principles should be "a floor, or . . . a ceiling."[708] One participant favored "case-by-case enforcement of access principles," while arguing against codification of the principles and other significant additions to extant competition law, on the grounds that additional regulation was liable to suppress investment, and more generally, that the costs of additional regulation were likely to exceed its potential benefits.[709] As noted in the previous section, several participants echoed this concern about the costs of additional regulation more generally.[710] Others argued that "the four principles may be a good place to start," but that they represented "a necessary, but not sufficient, protection of openness on the Internet."[711] Yet another participant questioned why such principles should apply to network operators but not content and applications providers.[712]

While these abstract principles do not themselves specify the particulars of substantive regulatory implementation, FCC enforcement action in the *Madison River* matter[713] is instructive about the implications of the principles. In fact, *Madison River* has been used as a basis for: (1) arguments on behalf of additional regulation – on the basis that the underlying conduct in *Madison River* demonstrates very real market temptations to engage in harmful blocking that may warrant regulatory resolution;[714] (2) arguments against additional regulation – several participants observed that the underlying conduct alleged in *Madison River* appears to be rare, if not unique,[715] while

[708] Ohlhausen, Tr. I at 115.

[709] *See* Pepper, Tr. I at 90-91.

[710] *See supra* text accompanying notes 697-99.

[711] Libertelli, Tr. I at 117; *accord* G. Sohn, Tr. I at 116 (regarding the need for, among other things, a fifth "non-discrimination" principle).

[712] *See* Sidak, Tr. I at 117-18.

[713] *In re* Madison River Communs., LLC, 20 FCC Rcd 4295, 4297 (2005). See *supra* notes 217 and 233 for additional information regarding this matter.

[714] Various proponents of net neutrality have cited the matter as illustrating the threat to access that would be posed by market pressures in favor of discrimination, absent their favored regulations. *See, e.g.*, William D. Rahm, *Watching Over the Web: A Substantive Equality Regime for Broadband Applications*, 24 YALE J. ON REG. 1, 2, 6 (2007) (stating that "[t]hose who say the Internet has no gatekeeper have never heard of the Madison River case" and arguing for a "substantive equality" regime for broadband access).

[715] *See, e.g.*, Pepper, Tr. I at 89-90 ("[T]o date there has only been one case of anti-competitive conduct . . . that has been brought to the FCC. And this . . . was the Madison River case, which was quickly remedied by the Commission . . . ."); Kahn, Tr. I at 186 ("[T]he only case I know that has been cited as an argument for some sort of regulatory intervention is the one – the Madison River case."); Sidak, Tr. I at 104 ("The one instance in which [blocking content] occurred has been a rural telephone company, and that is not a set of facts from which we can extrapolate to the behavior that would be followed by network operators supplying service to the vast majority of Americans."); *see also* Verizon Communications Inc., Public Comment 60, at iii ("This isolated episode of a single rural company's action is a slim reed on which to base the monolith of broadband regulation.").

others observed that the conduct at issue was conspicuous and easily disciplined under existing authority;[716] (3) intermediate positions;[717] and (4) a suggestion that the alleged discrimination in that case was in fact the by-product of overly restrictive regulation.[718]

Participants in the broadband policy debate also have regarded FTC and FCC merger conditions – in particular, those attached to the AOL/Time Warner and the AT&T/BellSouth mergers – as significant. As discussed in Chapter II, the FTC challenged the proposed merger between AOL and Time Warner and entered into a consent order that required the merged entity to, among other things, open its cable system to competitor Internet service providers, including those offering broadband services, on a non-discriminatory basis, for all content.[719] The order also prevented the company from interfering with the content of non-affiliated ISPs.[720] Following the FTC's review, the FCC added conditions that would have pertained to AOL advanced instant-messaging ("IM") services, if AOL had developed them.[721]

As with the AOL/Time Warner merger, the parties to the AT&T/BellSouth merger entered into a voluntary, enforceable agreement regarding the terms of the merger and certain post-merger conduct.[722] These included, among other things, certain interconnectivity and related pricing conditions. Moreover, the agreement contains an express commitment to follow the four principles articulated in the FCC's Broadband Policy Statement, for a period of thirty months following the merger closing date.[723] In addition, the combined company committed to maintaining a "neutral network"; that is,

> not to provide or sell to Internet content, applications, or service providers, including those affiliated with AT&T/BellSouth, any service that privileges, degrades, or prioritizes any packet transmitted over

[716] *See, e.g.*, Kahn, Tr. I at 186 ("[A] more obvious case of an abuse of a vertical position I cannot imagine. And of course, it was properly treated, pre-emptorially, both in the United States and Canada."); Pepper, Tr. I at 89-90 ("[T]he Madison River case . . . was quickly remedied by the Commission . . . .").

[717] *See, e.g.*, Farrell, Tr. I at 156-60 (calling Madison River "arguably" a case of leveraging, and advocating "real" and "substantial" reasons for concern, but caution in seeking a "middle ground").

[718] *See* Ford, Tr. II at 235-36.

[719] Am. Online, Inc. & Time Warner, Inc., FTC Dkt. No. C-3989 (Apr. 17, 2001) (consent order), *available at* http://www.ftc.gov/os/2001/04/aoltwdo.pdf.

[720] *Id.*

[721] *In re* Applications for Consent to the Transfer of Control of Licenses & Section 214 Authorizations by Time Warner Inc. & Am. Online, Inc., Transferors, to AOL Time Warner Inc., Transferee, 18 FCC Rcd 20595 (2001) (memorandum opinion and order).

[722] *In re* AT&T Inc. & BellSouth Corp., Application for Transfer of Control, 22 FCC Rcd 5662 (2007) (memorandum opinion and order).

[723] Where not otherwise specified, the conditions of the merger were to hold for a period of 42 months following the merger closing date.

AT&T/BellSouth's wireline broadband Internet access services based on its source, ownership, or destination.[724]

As with the FCC broadband principles discussed above, commentators have cited these merger conditions for varied, if not contrary, propositions. One Workshop participant suggested that regulators adopt "language along the lines of the AT&T merger condition[s]."[725] Another participant recommended that the AT&T merger conditions represented a tractable definition of network neutrality, and a "good place to start" in discussing non-discrimination policy.[726] Not all have been as supportive of these conditions. Another participant argued that they would work to "prohibit pro-competitive, pro-consumer [improvements] in quality of service and prioritization . . . ."[727] Two FCC Commissioners generally approving of the merger – including Chairman Martin – suggested that certain conditions were "unnecessary and may actually deter broadband infrastructure investment."[728] In particular, their joint statement suggested that, "[t]he conditions regarding net-neutrality have very little to do with the merger at hand and very well may cause greater problems than the speculative problems they seek to address."[729]

C. Legislative Proposals

During the 109th Congress, telecommunications reform was a high priority and the focus of numerous congressional hearings in both the House and the Senate.[730] At many of those hearings, network neutrality played a significant role in the debate on the shape of telecommunications reform. The debate over the inclusion and nature of net neutrality provisions appears to have ultimately prevented comprehensive telecom reform

[724] *See AT&T Inc. & BellSouth Corp.*, 22 FCC Rcd at app. F.

[725] Libertelli, Tr. I at 78-79.

[726] G. Sohn, Tr. I at 100, 127-28.

[727] Pepper, Tr. I at 121.

[728] *AT&T Inc. & BellSouth Corp.*, 22 FCC Rcd at 5826 (Chairman Martin & Comm'r Tate, concurring).

[729] *Id.*

[730] Telecommunications reform was the subject of over twenty hearings in the Senate Commerce, Science, and Transportation Committee (*see* S. REP. 109-355, at 4 (2006)) and six in the House Committee on Energy and Commerce (*see* H.R. REP. 109-470, at 6-8 (2006)) in 2006.

from being enacted in the last Congress.[731] At least eight legislative proposals addressing net neutrality were introduced in the House and Senate.[732]

The House of Representatives was the first to pass comprehensive telecom legislation and sent H.R. 5252, the "Communications, Opportunity, Promotion and Enhancement Act (COPE Act)," to the Senate.[733] H.R. 5252 was amended in the Senate Commerce, Science, and Transportation Committee and then forwarded to the full Senate, where its consideration was blocked by Senators who insisted that the legislation include network neutrality provisions.[734]

The change in party control in the 110th Congress has resulted in two advocates for net neutrality principles becoming Chairmen of the House and Senate committees with primary jurisdiction over telecommunications. In the House of Representatives, Rep. Ed Markey (D-MA), the sponsor of a net neutrality measure during the previous Congress, is now Chairman of the House Energy and Commerce Subcommittee on Telecommunications and the Internet.[735] To date, this Committee has not introduced net neutrality legislation.

In the Senate, Senator Byron Dorgan (D-ND) is now Chairman of the Senate Commerce, Science, and Transportation Subcommittee on Interstate Commerce, Trade,

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[731] *See, e.g.*, Press Release, Office of Sen. Ron Wyden, Wyden Blocks Telecom Legislation Over Ineffective Net Neutrality Provision (June 28, 2006), *available at* http://wyden.senate.gov/media/2006/06282006_net_neutrality_holds_release.html.

[732] Of the bills introduced in the 109th Congress, one (S. 2917) would have amended the Communications Act of 1934 to establish certain net neutrality duties for broadband ISPs. A second bill (H.R. 5417) would have amended the Clayton Act to make certain non-neutral practices illegal. Five other bills (H.R. 5252, H.R. 5273, S. 2360, S. 2113, and S. 1504) would have given the FCC authority to enforce various types of neutrality rules. The eighth bill (S. 2686) would have required the FCC to report on developments regarding Internet access.

[733] H.R. 5252, sponsored by Rep. Joe Barton (R-TX), was passed on June 8, 2006, by a vote of 321-101. The bill would have given the FCC explicit authority to enforce its 2005 Broadband Policy Statement; authorized a maximum penalty of $500,000 for each violation of such statement, with the FCC having exclusive authority to adjudicate complaints; and required a study from the FCC on whether the objectives of the policy statement and principles were being achieved.

[734] The Senate Commerce, Science, and Transportation Committee held a three-day markup where a net neutrality amendment offered by Senators Dorgan and Snowe failed by one vote. H.R. 5252, as amended by the Senate Commerce Committee, included an "Internet Consumer Bill of Rights" that would, among other things: require that ISPs allow subscribers choice to access and post lawful content, and to access any Web page, application, software, and search engine; allow subscribers to connect any legal device that does not harm any ISP's network; allow subscribers to receive clear and conspicuous notice on price, speed, capabilities, and limitations of any Internet service offered to the public; require that ISPs offer stand-alone Internet service to their subscribers; authorize the FCC to impose fines of $500,000 per violation; and prohibit the FCC from promulgating any regulations beyond those specifically provided in the bill.

[735] Rep. Markey introduced H.R. 5273, the "Network Neutrality Act of 2006," which would have imposed certain non-discrimination and disclosure duties on broadband ISPs. The bill also would have required the FCC to create a complaint resolution system for addressing alleged violations of such duties.

and Tourism.[736] Senator Dorgan, along with Senator Olympia Snowe (R-ME), has introduced S. 215, the "Internet Freedom Preservation Act," which would amend the Communications Act of 1934 to establish certain Internet neutrality duties for broadband ISPs, including not interfering with or discriminating against the ability of any person to use broadband service in a lawful manner. The bill would allow ISPs to engage in certain activities to protect network security and to offer consumer protection services, such as parental controls on accessing content. At the same time, ISPs would be prohibited from requiring a subscriber to purchase a bundle of services as a condition on the purchase of broadband Internet access service. Additionally, the FCC would be required to give a report to specified congressional committees on ISPs' delivery of broadband content, applications, and services. The bill has been referred to the Senate Commerce Committee.[737]

D. Other Proposals Relating to Broadband Connectivity

In addition to the regulatory and legislative proposals discussed above in Sections A-C, various interested parties have developed both general principles and specific proposals relating to broadband connectivity. Following is a brief discussion of some of these proposals.

USC Annenberg Center. The University of Southern California Annenberg Center has articulated five "Principles for Network Neutrality."[738] First, network operators and customers "both should win." Network operators should be able to benefit from their investments, thereby encouraging infrastructure deployment. Customers should have the option of unrestricted access to the "global public Internet." Second, any regulation should be defined and administered "on a nationally uniform basis with a light touch." Any such regulation should be aimed primarily at markets where network operators have significant market power and should emphasize "prompt enforcement of general principles of competition policy, not detailed regulation of conduct in telecommunications markets." Third, network operators should provide a "Basic Access Broadband" service that offers a meaningful, neutral Internet connection. Beyond this basic service, network operators should be free to determine all service parameters, including performance, price, and prioritization of third-party data traffic. Fourth,

[736] In the Senate, the Commerce, Science, and Transportation Committee has primary jurisdiction over telecommunications issues, but there is no longer a telecommunications subcommittee. At the start of the 109th Congress, then-Chairman Ted Stevens (R-AK) ended the telecommunications subcommittee and moved jurisdiction over telecommunications to the full committee.

[737] S. 215 is identical to S. 2917, legislation introduced in the 109th Congress by Senators Snowe and Dorgan. *See also* Sens. Byron L. Dorgan & Olympia J. Snowe, Public Comment 14 (advocating need for network neutrality legislation, as well as FTC involvement in area of broadband Internet access).

[738] USC Annenberg Center, *supra* note 252. *See also* Wilkie, Tr. I at 169-70 (discussing the creation of these principles). According to Wilkie, these principles modify the FCC's "four Internet freedoms to say that, rather than enforcing non-discrimination, that, essentially, the gist of the proposal is that consumers should have the choice of a net neutral package being offered to them. That is, we should establish a floor, a baseline level." *Id*.

customers should be provided with clear, understandable terms and conditions of service that explain how any network operator, ISP, or content provider will use their personal information and prioritize or otherwise control content that reaches them. Fifth, government policy should encourage competitive entry and technological innovation in broadband access markets to help achieve effective network competition and make high-speed Internet access available to the largest number of customers.

Telecommunications Industry Association. The Telecommunications Industry Association ("TIA") has proposed a series of "Broadband Internet Access Connectivity Principles."[739] In their view, consumers should receive meaningful information regarding their broadband Internet access service plans. Broadband consumers should have access to their choice of legal Internet content within the bandwidth limits and quality of service specified in their service plans. They should be able to run applications of their choice, within the bandwidth limits and quality of service of their plans, as long as they do not harm the provider's network. Also, consumers should be permitted to attach any devices to their broadband Internet access connection, provided they operate within the bandwidth limits and quality of service of their service plans and do not harm the network or enable the theft of services.

The TIA principles further provide that broadband providers should remain free to engage in procompetitive network management techniques to alleviate congestion, ameliorate capacity constraints, and enable new services, consistent with the technical characteristics and requirements of the particular broadband platform. Broadband providers should remain free to offer additional services to supplement broadband Internet access, including speed tiers, quality-of-service tiers, security and spam services, and network management services, and should be free to enter into commercially negotiated agreements with unaffiliated parties for the provision of such additional services. In turn, network operators should be able to continue to optimize network efficiency, enable new services, and create incentives for continued buildout to meet increasing capacity demands. Also, broadband providers should remain free to innovate in the deployment of managed services, such as packaged video programming, which utilize the same networks but are distinct from public Internet access services.

Public Knowledge. Public Knowledge has outlined a set of five "Principles for an Open Broadband Future."[740] First, broadband networks must be open to competition from any entity, including municipalities. Specifically, every consumer should be able to choose among multiple, competing broadband networks, services, applications, and content providers, including municipalities. Also, government policies should be technology-neutral and should forbear from regulating broadband networks except where necessary to promote competition. Second, broadband networks must be open to the

[739] TELECOMMS. INDUS. ASS'N, BROADBAND INTERNET ACCESS CONNECTIVITY PRINCIPLES (2006), *available at* http://www.tiaonline.org/policy/publications/white_papers/documents/TIABroadbandInternetAccessConnectivityPrinciples.pdf. *See also* TIA, Public Comment 56.

[740] PUBLIC KNOWLEDGE, *supra* note 280.

attachment of any equipment the user chooses, as long as it does not harm the technical operation of the broadband network. Third, such networks must be open and accessible to consumers, applications developers, information service providers, and other networks, without restrictions or degradation, except for law enforcement or network management purposes. As corollaries, consumers have the right to access information and ideas from a diversity of sources and the right to disseminate their own ideas to the public in any manner they desire. Likewise, every broadband network should be able to interconnect with every other broadband network. Fourth, broadband networks should be open to the maximally efficient number of licensed and unlicensed wireless providers. Thus, to the maximum extent possible, spectrum should be allocated so as to promote private commercial and non-commercial uses. Similarly, to the maximum extent possible, spectrum licensees should be given flexible use of their spectrum to offer new services in response to consumer demand. In addition, unlicensed services should have the benefit of a presumption that they be authorized in any spectrum band as long as they do not cause interference with existing licensees. Fifth, broadband networks must be open, available, and affordable to all consumers, regardless of income, race, geographic location, or disability.

Center for Democracy and Technology. The Center for Democracy and Technology ("CDT") has submitted principles that call for any legislation in this area to preserve at least four "essential elements" that are perceived by CDT to currently characterize the Internet, including: (1) non-discriminatory routing without regard to the identities of senders and receivers, the content of packets, the services accessed, or the providers of such content or services; (2) the ability to create and use new content, applications, protocols, and devices without negotiating or even consulting with network operators; (3) the ability to connect to the Internet at different speeds and service levels, as chosen by end users; and (4) the interconnection of networks on an open basis, in the sense that no network operator may be denied the opportunity to interconnect.[741]

CDT has stated that such legislation generally should not prohibit the use of caching services, the blocking or filtering of harmful or illegal content, or notice-and-takedown procedures or other cooperative actions aimed at identifying and removing pirated material. Also, it should not preclude the prioritization of data packets based on traffic type, as long as such services are equally available for similar types of content and any charges are assessed to end users, not content and applications providers. Such legislation, however, should not entail full common carriage obligations or price regulation and should not apply to video or other so-called "non-Internet" networks, such as virtual private networks.[742]

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[741] CENTER FOR DEMOCRACY & TECHNOLOGY, *supra* note 419. *See also* Center for Democracy & Technology, Public Comment 7; D. Sohn, Tr. II at 223-31.

[742] According to David Sohn, Staff Counsel for the Center for Democracy and Technology, "[i]f you look at the AT&T merger commitment, it takes exactly this kind of approach, it excludes enterprise managed IP services. It excludes IP television services." D. Sohn, Tr. II at 230. In his view:

CDT has suggested that these principles be further refined and enacted into legislation that would be enforced by the FCC or FTC using a streamlined complaint process. In CDT's view, the mere advancement of generic principles and case-by-case adjudication without a broader legislative framework would allow too much discretion at the agency level. CDT also has suggested that legislation might bar any non-complying service from being marketed using the terms "Internet," "broadband," or other similar language.

Atkinson and Weiser. Robert D. Atkinson and Professor Philip J. Weiser have proposed a "Third Way" between what they view as overly aggressive network neutrality legislation that may inhibit new quality-of-service offerings and other bills that do not provide sufficient mechanisms for dealing with potential harms.[743] First, these commentators suggest Congress should require broadband providers to state clearly their bandwidth levels, latency, and any limitations on users' ability to access certain content or applications. They suggest that the FCC be charged with monitoring compliance with these requirements under a framework mirroring the FTC's approach to Internet privacy. Further, any firm selling "broadband Internet access" would be required to make available to users a basic level of open, unmanaged, best-efforts access to the broader Internet. Such access would be expected to increase in speed along with general improvements in the delivery of Internet services. Network operators with market power not meeting this FCC-defined parameter would be prohibited from describing their service as "broadband."[744]

Second, Atkinson and Weiser advocate charging the FCC with responsibility for monitoring the use of discriminatory access arrangements to ensure they are not anticompetitive. The FCC would take an "antitrust-like" approach to enforcement and would manage all proceedings on an expedited basis using a case-by-case adjudicative model, rather than a broad, before-the-fact legislative approach. Under this model, the FCC should use Chairman Powell's 2004 "Internet Freedoms" as a starting point for enforcement. All quality-of-service arrangements would have to be offered on a universal basis, unless a network operator could demonstrate a legitimate business

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> To use an analogy, I've sometimes heard in these debates people talk about the Postal Service and premium delivery services. Yes, by all means, a premium delivery service like FedEx should be allowed to exist. You shouldn't regulate that out of existence.
>
> At the same time, there may be a very important policy objective of maintaining ordinary Postal Service delivery at an acceptable level of service. That, I think, is really what the goal ought to be here, to keep this neutral open Internet at an acceptable level of service, to keep that in existence even as experimentation with other networks and private networks, as discussed in the previous panel, even if that kind of experimentation proceeds.

Id. at 226.

[743] Atkinson & Weiser, *supra* note 255, at 47.

[744] *Id*. at 55-56.

justification for offering such a service on a limited or exclusive basis. As in antitrust enforcement, the FCC could determine certain practices to be per se illegal, while evaluating other practices under a rule-of-reason approach. Alternatively, if Congress determines that imposing antitrust-style enforcement on the FCC is not practical, it could assign this function to the FTC.[745]

Third, Atkinson and Weiser suggest that Congress should provide investment incentives for additional broadband deployment because, in their view, broadband networks create positive externalities that generate economic and social benefits beyond those captured by a network operator itself. They suggest, therefore, that companies investing in broadband networks be allowed to expense new investments in the first year, instead of depreciating them over fifteen years. Additionally, the moratorium on federal, state, and local broadband taxes should be extended, but made contingent upon network operators providing a basic level of open, unmanaged, best-efforts access to the broader Internet, as described above.[746]

COMPTEL. COMPTEL has recommended several changes to existing antitrust law.[747] First, this group suggests that Congress consider enacting a limited exception to the *Illinois Brick*[748] line of precedent to grant standing for indirect-purchaser private litigants bringing cases against formerly regulated "dominant" firms. Second, COMPTEL suggests that Congress introduce legislation clarifying that dominant carriers for which the FCC has eliminated common carrier regulatory status no longer enjoy liability limitations based on the "filed rate doctrine," to the extent that this doctrine presumes lawfully filed tariffs to be reasonable. Rather, if de-regulated monopoly carriers are engaging in anticompetitive conduct that forecloses entry, unlawfully restricts output, or otherwise leads to supracompetitive pricing as a result of antitrust violations, then the damages – which are subject to trebling – must be based on the difference between the supracompetitive rate and the competitive rate the carrier has foreclosed. Third, the *Trinko*[749] precedent, which, in their view, tolerates aggressive exclusionary behavior, must be repudiated.

Peha. Professor Jon M. Peha has suggested a "balanced policy" that would allow the beneficial use of discrimination, while limiting harmful uses of discrimination if and only if the broadband market is not "highly competitive."[750] In his view, network

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[745] *Id*. at 56-58.

[746] *Id*. at 58-59.

[747] Comstock House Testimony, *supra* note 265, at 36-37.

[748] *See* Ill. Brick Co. v. Illinois, 431 U.S. 720 (1977) (holding that, with certain limited exceptions, only direct purchasers may recover overcharges in private antitrust actions under the Clayton Act).

[749] *See* Verizon Communs., Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398 (2004) (holding that plaintiff's complaint that Verizon breached a duty to share its network with competitors did not state a monopolization claim under Section 2 of the Sherman Act).

[750] Peha, *supra* note 36, at 17-18.

operators should be able to charge senders of data, recipients, or both, for services, thus allowing for two-sided market transactions. Network operators also should be allowed to provide different quality-of-service levels for different classes of traffic and to offer proprietary content and unique services to users, provided that they do not favor their own content and services over those of others.

Unless the broadband market is highly competitive, however, a network could not charge more for one data stream than another if the latter requires at least as many resources as the former. For example, a network operator could not charge more for a steady 50 Kbps VoIP data stream than it does for a steady 50 Kbps gaming application where the quality-of-service requirements are the same for both streams. A network would be prohibited from charging one user, whether a sender or a receiver, a price higher than that charged to another user for a comparable type of service, unless the operator could present a justification based on a cost difference. Similarly, a network could not offer content or services directly through an affiliate at a data rate or quality-of-service level that is not available to competitors at a comparable price. Likewise, a network could not make services available to itself or affiliates, but not to competitors. In addition, a network could not charge a higher price (or offer a lower quality of service) for data traffic that competes with a legacy, circuit-switched service than it charges for comparable traffic that does not compete with a legacy service.

Under this framework, networks should be allowed to block Internet traffic that they reasonably believe poses a threat to security, including traffic originating from an attached device that is reasonably believed to be harmful to the network or its users. But they could not block specific content or applications, absent a reasonable belief that the relevant data traffic presents a security threat. A network operator also could not block traffic from a properly functioning device while carrying traffic from other devices known to be technically equivalent. An operator could not degrade traffic based solely on the nature of the content or application.

Internet2. The Internet2 consortium has suggested that the best solution to the Internet connectivity debate is to upgrade network infrastructures to the point where they no longer suffer from capacity constraints or data congestion.[751] The model for this proposal is the not-for-profit 100-1,000 Mbps Internet2 network that connects 208 universities, 70 companies, and 51 affiliated organizations. This group wants to set a national goal for deploying 100 Mbps bandwidth connections (with symmetric speeds for uploading and downloading) to every home, business, and school in the country in five years and 1,000 Mbps connections in ten years. They suggest that the costs of deploying such high-speed lines, or upgrading existing ones, would be relatively low – once fiber wirelines are laid. In their view, the widespread deployment of such advanced, high-speed Internet services would obviate the need for any kind of prioritized data transmission.[752] In addition, they suggest that the FTC, the FCC, or both should issue

[751] *See* Bachula, Tr. II at 164-73.

[752] Bachula Senate Testimony, *supra* note 253. According to Internet2, once basic wiring is in place, it costs about $150 per end user to upgrade to a 100 Mbps connection, or $30 per user over a five-year period.

specific and enforceable guidelines that would require the maintenance of "open and non-discriminatory networks."[753]

DPS Project. The Dynamic Platform Standards Project for Real Network Neutrality ("DPS Project") has suggested a disclosure and definitional approach to the issue of Internet connectivity.[754] DPS Project proposes legislation that would define "Internet access" to mean the transmission of data packets across networks under the TCP/IP protocol suite in a way that is "agnostic" to the nature, source, or destination of any packet. Network operators advertising the provision of "Internet" service would have to provide such service in conformance with the above definition, regardless of whether other additional, non-conforming services are also provided along with that service. Additional, special features that analyze or identify particular applications could not be described as "Internet" services. Under the proposed legislation, any violation of such rules would be treated as a violation of the FTC Act's prohibition of unfair or deceptive acts or practices.

Sidak. Professor J. Gregory Sidak has proposed that network operators have at least six "fundamental rights" that should be protected.[755] First, a network operator should be allowed to innovate on its network. Second, network operators unilaterally should be able to price the use of their networks in any way that does not violate antitrust law. Third, a network operator should be able to refuse to carry content or applications that present a legitimate risk to the security or performance of its network or to attached devices. Fourth, network operators should be allowed to prioritize the delivery of data packets on their networks. Fifth, they should be able to reserve capacity on their networks. Sixth, network operators should be able to use capacity on their networks to vertically integrate into the provision of content or applications.

By their estimates, it would cost about $250 to upgrade to a 1,000 Mbps connection. *Id*. at 4. *See also* Thorne, Participant Presentation, at 1 (identifying Verizon Communications capital expenditures of approximately $45 billion during the 2004-06 period); T. Randolph Beard et al., *supra* note 283, at 430 (estimating the cost of fiber-optic wireline deployment in a metropolitan area at approximately $3 million per mile).

[753] Bachula, Tr. II at 172.

[754] *See* DYNAMIC PLATFORM STANDARDS PROJECT FOR REAL NETWORK NEUTRALITY, LEGISLATIVE PROPOSAL: THE INTERNET PLATFORM FOR INNOVATION, http://www.dpsproject.com/legislation.html (last visited June 7, 2007); Dynamic Platform Standards Project, Public Comment 15.

[755] *See* Sidak, *supra* note 287, at 373-85.

Felten. Finally, Professor Edward W. Felten and other commentators have suggested that taking a wait-and-see approach to the future development of the Internet might be the best option. In this view, there is not yet any simple policy solution that will not entail difficult line-drawing exercises or potentially create unintended consequences. Believing that "time is on our side," however, a cautious, incremental approach is seen as a potential best solution.[756]

[756] In Felten's view:

> Readers looking here for a simple policy prescription will be disappointed. The network neutrality issue is more complex and subtle than most of the advocates on either side would have you believe. Net neutrality advocates are right to worry that ISPs can discriminate – and have the means and motive to do so – in ways that might be difficult to stop. Opponents are right to say that enforcing neutrality rules may be difficult and error-prone. Both sides are right to say that making the wrong decision can lead to unintended side-effects and hamper the Internet's development.
>
> There is a good policy argument in favor of doing nothing and letting the situation develop further. The present situation, with the network neutrality issue on the table in Washington but no rules yet adopted, is in many ways ideal. ISPs, knowing that discriminating now would make regulation seem more necessary, are on their best behavior; and with no rules yet adopted we don't have to face the difficult issues of line-drawing and enforcement. Enacting strong regulation now would risk side-effects, and passing toothless regulation now would remove the threat of litigation. If it is possible to maintain the threat of regulation while leaving the issue unresolved, time will teach us more about what regulation, if any, is needed.

Felten, *supra* note 36, at 11-12.

X. SUGGESTED GUIDING PRINCIPLES

The FTC's statutory mission is to protect competition and consumers by safeguarding and encouraging the proper operation of the free market. The Federal Trade Commission's Internet Access Task Force has conducted a broad examination of the technical, legal, and economic issues underpinning the debate surrounding broadband connectivity competition policy. Based on this examination, as well as our experience with the operation of myriad markets throughout the economy, we identify guiding principles that policy makers should consider in evaluating options in the area of broadband Internet access. We have provided an explanation of the conduct that the antitrust and consumer protection laws already proscribe and a framework for analyzing which conduct may foster or impede competition in particular circumstances. In evaluating whether new proscriptions are necessary, we advise proceeding with caution before enacting broad, *ex ante* restrictions in an unsettled, dynamic environment.

Section A of this Chapter discusses the promotion of competition in broadband Internet access services. Although there is disagreement as to the competitiveness of the broadband industry, both proponents and opponents of network neutrality regulation agree that more competition in this industry would benefit consumers. In Section B, we suggest that policy makers proceed with caution in evaluating calls for network neutrality regulation, based on the indeterminate effects on consumer welfare of potential conduct by broadband providers and concerns with regulation in the area of broadband Internet access. No regulation, however well-intended, is cost-free, and it may be particularly difficult to avoid unintended consequences here, where the conduct at which regulation would be directed largely has not yet occurred. In Section C, we reiterate the important role that continued federal agency oversight will have in this area. The FTC, for its part, will continue to devote substantial resources to law enforcement, consumer education, industry guidance, and competition advocacy in the important area of Internet access.

A. Competition in Broadband Internet Access Services

Over time, competition produces the best results for consumers, providing them the lowest prices, the highest-quality products and services, and the most choices. Competition forces firms to lower their costs and prices and to improve quality, service, convenience, and other attributes that consumers value. Competition induces firms to produce the types and amounts of goods and services desired by consumers. Our free-market system fosters innovation, creativity, and entrepreneurship that are unmatched around the world.

While there is disagreement over the competitiveness of the broadband Internet access industry, there is evidence that it is moving in the right direction.[757] Specifically, there is evidence at least on a national scale that: (1) consumer demand for broadband is growing quickly; (2) access speeds are increasing; (3) prices (particularly speed-adjusted or quality-adjusted prices) are falling; and (4) new entrants, deploying Wi-Fi, Wi MAX,

[757] *See supra* Chapter VI.B.

and other broadband technologies, are poised to challenge the incumbent cable and telephone companies. Although this is merely a high-level snapshot of a dynamic, evolving marketplace, such evidence challenges the claims by many proponents of network neutrality regulation that the broadband Internet access market is a cable-telephone duopoly that will exist for the foreseeable future and that the two primary broadband platforms do not compete meaningfully.

We nonetheless recognize that what appear to be positive national trends do not necessarily signify vigorous competition in every local broadband market in the United States. In rural markets, in particular, consumers may have relatively limited options for obtaining broadband Internet access. This Report and the findings herein do not reflect a case-by-case analysis of the state of competition in each of the localities that may represent relevant markets under the antitrust laws.

In any case, there appears to be substantial agreement on the part of both proponents and opponents of network neutrality regulation that more competition in the broadband Internet access area would benefit consumers. Thus, to the extent that policy makers are not content to wait for the market to increase competition, they should consider various ways of increasing competition in the provision of broadband Internet access. For example, several commentators have urged government action to make more spectrum available or its use more efficient.[758] Others have identified reform of local franchising rules as a potential means of increasing competition.[759] Some have suggested municipal provision of broadband Internet access as a means of introducing more competitors.[760] Still others have proposed revisions to the federal tax laws to promote investment in the infrastructure necessary for broadband Internet access, including access at speeds considerably higher than those generally available today.[761] While we take no position on these particular proposals, policy makers should consider pursuing ways to increase competition in the broadband Internet access area. To the extent that calls for regulation are based on concerns that competition is not sufficiently vigorous to protect consumers' interests, then pursuing ways to increase that competition would seem to attack the potential problem directly at its source.

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[758] *See supra* Chapter VI.D.

[759] *See supra* Chapter VI.B.

[760] *See supra* Chapter VI.C. Government provision of Internet access can raise competitive concerns, however. As FTC Staff explained in its recent report, *Municipal Provision of Wireless Internet Access*, the benefits to consumers of municipal involvement in wireless Internet access may vary depending on a municipality's particular factual circumstances. Accordingly, that report provides an analytical framework for policy makers considering the question of whether, and to what extent, a municipality should involve itself in the provision of wireless Internet access. *See* FTC STAFF, *supra* note 499.

[761] *See supra* Chapter IX.D.

B. Grounds for Proceeding with Caution

To date, the primary policy proposals in the area of broadband Internet access include imposing some form of network neutrality regulation. In evaluating such proposals, we recommend proceeding very cautiously.

1. Indeterminate Consumer Welfare Effects of Potential Conduct by Broadband Providers

Policy makers should be wary of calls for network neutrality regulation simply because we do not know what the net effects of potential conduct by broadband providers will be on consumers, including, among other things, the prices that consumers may pay for Internet access, the quality of Internet access and other services that will be offered, and the choices of content and applications that may be available to consumers in the marketplace. Similarly, we do not know what net effects regulation to proscribe such conduct would have on consumers. This is the inherent difficulty in regulating based on concerns about conduct that has not occurred, especially in a dynamic marketplace.

Some proponents of network neutrality regulation have argued that vertically integrated broadband providers possessing market power in the provision of last-mile Internet access could leverage that power in ways ultimately harmful to consumers. For example, such providers could block competing services as the provider in the *Madison River*[762] matter allegedly did or discriminate against their competitors' content or applications by relegating them to the proverbial "winding dirt road." Yet, the primary assumption underlying this concern (and others raised by net neutrality proponents) – that broadband providers have market power in the provision of last-mile access – is the subject of considerable debate. Absent coordination or collusion among providers, as long as consumers have one or more alternatives to which they can turn, it is difficult to imagine them accepting the blockage or elimination of content that is important to them.

Further, broadband providers have conflicting incentives relating to blockage of and discrimination against data from non-affiliated providers of content and applications.[763] While a broadband provider with market power may have an incentive to limit its end-user customers' access to competing content and applications, the broadband provider also may have an incentive to maximize the value of its network to end users. Blocking or discriminating against content and applications desired by the provider's customers likely would diminish the value of that network. In the abstract, it is not possible to know which of these incentives would prove stronger. Even assuming discrimination against content or applications providers took place, moreover, there remains the question – also unanswerable in the abstract – whether such discrimination would be harmful, on balance, to consumer welfare. For example, such discrimination may facilitate product differentiation, such as the provision of Internet access services

[762] *See supra* notes 217 and 233.

[763] *See supra* Chapter IV.

designed specifically for certain population segments or other audiences with specialized preferences.

Data discrimination often is discussed in the context of vertical integration by broadband providers into the provision of content and applications. Such integration raises the various issues involving incentives to discriminate discussed above. Vertical integration, however, also provides potential benefits to competition and consumers. For example, the potential to earn additional profits from selling its content and applications to more customers likely would increase the vertically integrated firm's incentives to build out its network and invest in technology to increase the types and/or amount of content that it can offer.

Further, as is the case with data discrimination, it is impossible to determine in the abstract whether allowing content and applications providers (or even end users) to pay broadband providers for prioritized data transmission will be beneficial or harmful to consumers.[764] Such prioritization may provide benefits to broadband providers, content and applications providers, and end users. Prioritization may allocate resources to their highest-valued uses by, for example, allowing content and applications providers that value higher-quality transmission services, such as VoIP or online gaming providers, to pay broadband providers for such services. Prioritization may enable broadband providers to obtain income streams from content and applications providers and other users of broadband networks besides the broadband providers' own customers, resulting in increased investment and innovation in such networks. Prioritization may aid innovation in applications or content, such as streaming video and other real-time applications, that require higher-quality transmission to operate effectively. Prioritization may provide a dimension for both content and applications providers and broadband providers to differentiate their offerings, to the benefit of competition and consumers. Prioritization also may lower prices for less affluent end users, whose access fees could be partially subsidized by prioritization revenues, much like advertising-supported e-mail services now provide free e-mail accounts.

Nonetheless, proponents of network neutrality regulation have raised concerns regarding potential adverse effects of data prioritization. For example, it could create entry barriers for new or less affluent content and applications providers – that may not be able to afford prioritization services – to disseminate their offerings successfully, resulting in a diminution in innovation in content and applications. Prioritization could result in increased transaction costs resulting from the potential need for content and applications providers to negotiate with multiple broadband providers over prioritization arrangements. Thus, the frequently cited example of college students founding successful Web sites in their dorm rooms may become impossible if these students also would have to reach carriage arrangements with numerous broadband providers before they could reach end users. Prioritization also could lead to the intentional or passive degradation of non-prioritized data delivery over broadband networks. That is, the use of prioritization could create incentives for broadband providers to focus all or most of their

[764] *See supra* Chapter V.

investment and innovation in the priority portions of their networks, to the detriment of the non-priority portions of such networks. Prioritization could enable exclusive deals for priority that, if combined with inadequate delivery of non-priority data, would hinder the traditional ability of every end user to reach every content and applications provider through a single Internet access agreement. As with data discrimination, we are unable to determine in the abstract the net effect on consumer welfare of the various forms of data prioritization that may be pursued in the marketplace.

Further reason for policy makers to proceed with caution in the area of broadband Internet access is the existence of several open questions that likely will be answered by either the operation of the current marketplace or the evolution of complicated technologies. These questions include, but are not limited to, the following:

- What is the feasibility of broadband providers engaging in data discrimination, including the outright blockage of data from certain content and applications providers?
- Would consumers be able to detect such data discrimination?
- What would be the consumer response to such data discrimination?
- How much demand will there be on the part of content and applications providers for data prioritization?
- What is the feasibility of effective data prioritization throughout the many networks comprising the Internet?
- Would allowing broadband providers to practice data prioritization necessarily result in the degradation of non-prioritized data delivery?
- What Internet access speeds, including upload and download speeds, will consumers demand?
- When will the capacity limitations of the networks comprising the Internet result in unmanageable or unacceptable levels of congestion?
- If that point is reached, what will be the most efficient response thereto: data prioritization, capacity increases, a combination of these, or some as yet unknown technological innovation?

The eventual answers to these questions may give policy makers key information about the net effects on consumer welfare arising from the conduct and business arrangements that network neutrality regulation would prohibit or limit.

2. Concerns with Regulation

The other ground for proceeding with caution in evaluating calls for network neutrality regulation is the potentially adverse and unintended effects of regulation

generally – whether it is enacted in the area of broadband Internet access or any other area. Industry-wide regulatory schemes – particularly those imposing general, one-size-fits-all restraints on business conduct – may well have adverse effects on consumer welfare, despite the good intentions of their proponents. Even if regulation does not have adverse effects on consumer welfare in the short term, it may nonetheless be welfare-reducing in the long term, particularly in terms of product and service innovation. For example, prohibitions of certain business conduct, such as vertical integration into content and applications or the offering of prioritization services by broadband providers, may not have immediate effects on consumer welfare, but could result in a long-term decline in investment and innovation in broadband networks. Broadband providers that cannot differentiate their products or gain new revenue streams may have reduced incentives to upgrade their infrastructure.

Further, broad regulatory schemes almost certainly will have unintended consequences, some of which may not be known until far into the future. After all, even the most carefully considered legislation is likely to have unforeseen effects. In the broadband Internet context, regulation that nominally seeks to protect innovation in content and applications by prohibiting broadband providers from charging for prioritized delivery over their networks actually could erect barriers to new content and applications that require higher-quality data transmission. A new entrant in the streaming video market, for example, might prefer to purchase a certain quality of service from broadband providers, rather than investing in the server capacity and other resources necessary to provide that level of service on its own. Once a regulatory regime is in place, moreover, it may be difficult or impossible to undo its effects.

Two aspects of the broadband Internet access industry heighten the concerns raised by regulation generally. First, the broadband industry is a relatively young and evolving one. As discussed above, there are indications that it is moving in the direction of more – not less – competition.[765] In particular, there is evidence that new entrants employing wireless and other technologies are beginning to challenge the incumbent wireline providers (*i.e.*, the cable and telephone companies). Second, to date we are unaware of any significant market failure or demonstrated consumer harm from conduct by broadband providers. Policy makers should be wary of enacting regulation solely to prevent prospective harm to consumer welfare, particularly given the indeterminate effects on such welfare of potential conduct by broadband providers and the law enforcement structures that already exist.

Policy makers also should consider the feasibility of undoing the effects of data discrimination, prioritization, and other conduct and business arrangements, about which network neutrality proponents raise concerns, if it is later determined that enforcement under current law has been inadequate and the effects on consumer welfare of such conduct and arrangements turn out to be on balance (or even primarily) harmful. That is, policy makers considering a wait-and-see approach also should consider whether legislative or regulatory action could effectively counteract business arrangements and

[765] *See supra* Chapter VI.B.

network design decisions if the consumer harms from a non-neutral network are later deemed clearly to outweigh the consumer benefits. Although we take no position regarding the technical, operational, or commercial feasibility of reversing or changing course in some manner at a later date, this is a relevant consideration for policy makers evaluating calls for network neutrality regulation.

C. Continued Agency Oversight

The federal antitrust agencies, the FTC and the Department of Justice, and the Federal Communications Commission have jurisdiction to address broadband Internet access, with each playing an important role in protecting competition and consumers in this area.[766] These federal agencies are prepared to address issues that may arise in the broadband area.

Further, as a byproduct of the ongoing debate over network neutrality, the agencies have a heightened awareness of the potential consumer harms from certain conduct by, and business arrangements involving, broadband providers. Perhaps equally important is the fact that many consumers are now aware of such issues. Consumers – particularly online consumers – have a powerful collective voice that should not be ignored by businesses. In the area of broadband Internet access, consumers have revealed a strong preference for the current open access to Internet content and applications.

The FTC has been involved in the Internet access area for over a decade and will continue to be involved in the evolving area of broadband access. The FTC Act is sufficiently flexible to allow the FTC to enforce the antitrust and consumer protection laws in most industries, including those, such as broadband Internet access, involving new and ever-changing technologies. The fundamental principles of antitrust and consumer protection law and economics that we have applied for years are as relevant to the broadband industry as they are to other industries in our economy. Another significant feature of the FTC Act is its grounding in *ex post*, fact- and market-specific analysis of conduct and business arrangements, rather than *ex ante*, industry-wide regulation. In other words, in enforcing the antitrust and consumer protection laws, the FTC generally conducts detailed, after-the-fact analyses of conduct and business arrangements to determine if they harm consumer welfare, rather than issuing broad regulatory directives.

The FTC will continue to devote substantial resources to maintaining competition and protecting consumers from deceptive or unfair acts or practices in the area of broadband Internet access, using a variety of tools. The FTC, for example, will continue to enforce the antitrust laws in evaluating conduct and business arrangements involving broadband access. As explained above,[767] because the various conduct and business arrangements at issue in the broadband area have both procompetitive and

[766] *See supra* Chapters II and IX.A.

[767] *See supra* Chapter VII.

anticompetitive potential, the FTC would carefully analyze the net effect of particular conduct or arrangements on consumer welfare, rather than challenge them as per se illegal.

The FTC also will continue to enforce the consumer protection laws in the area of broadband Internet access. Such enforcement will remain crucial to fostering competition in the broadband area – with or without the enactment of some form of network neutrality regulation. Important questions involving the clear and conspicuous disclosure of material terms of broadband Internet access remain, particularly in the event that broadband providers engage in data discrimination, prioritization, or other traffic-shaping practices discussed above.[768]

Finally, the FTC's Broadband Connectivity Competition Policy Workshop and this Report exemplify some of the diverse resources the agency may bring to bear on Internet access issues, in addition to specific law enforcement actions. The Workshop and Report reflect the agency's interest in and commitment to developing competition and consumer protection policy. The agency also expends and will continue to expend considerable efforts at consumer education,[769] industry guidance,[770] and competition advocacy[771] in the important area of Internet access.

[768] *See supra* Chapters IV, V, and VIII.

[769] *See, e.g.*, FTC, HIDE AND GO SEEK: FINDING THE DISCLOSURES IN "FREE" INTERNET SERVICE OFFERS (2001), *available at* http://www.ftc.gov/bcp/conline/pubs/alerts/freeispalrt.shtm.

[770] *See, e.g.*, FTC, DOT COM DISCLOSURES: INFORMATION ABOUT ONLINE ADVERTISING (2000), *available at* http://www.ftc.gov/bcp/conline/pubs/buspubs/dotcom/index.shtm.

[771] *See, e.g.*, FTC STAFF, *supra* note 499.

APPENDIX 1 – BROADBAND CONNECTIVITY COMPETITION POLICY WORKSHOP PARTICIPANTS

Michael Altschul	Senior Vice President and General Counsel, CTIA – The Wireless Association
Gary Bachula	Vice President for External Relations, Internet2
Daniel Brenner	Senior Vice President, Law and Regulatory Policy, National Cable & Telecommunications Association
Tod Cohen	Vice President and Deputy General Counsel, Government Relations, eBay
Alan Davidson	Washington Policy Counsel, Google
Joseph Farrell	Professor, University of California, Berkeley
Harold Feld	Senior Vice President, Media Access Project
George S. Ford	Chief Economist, Phoenix Center for Advanced Legal & Economic Public Policy Studies
Alfred E. Kahn	Professor Emeritus, Cornell University
Jeannine Kenney	Senior Policy Analyst, Consumers Union
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Thomas M. Lenard	Senior Fellow and Senior Vice President for Research, The Progress & Freedom Foundation
Christopher Libertelli	Senior Director of Governmental and Regulatory Affairs, Skype Limited
Walter B. McCormick, Jr.	President & CEO, United States Telecom Association
Paul Misener	Vice President for Global Public Policy, Amazon.com
Timothy J. Muris	Professor, George Mason University School of Law
Jon M. Peha	Professor, Carnegie Mellon University

Robert Pepper	Senior Managing Director, Global Advanced Technology, Cisco Systems
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Gregory L. Rosston	Deputy Director, Stanford Institute for Economic Policy Research
John Ryan	Senior Vice President and Assistant General Counsel for Commercial and Public Policy, Level 3 Communications
Marius Schwartz	Professor, Georgetown University
J. Gregory Sidak	Visiting Professor, Georgetown University Law Center; Criterion Economics
David Sohn	Staff Counsel, Center for Democracy & Technology
Gigi B. Sohn	President, Public Knowledge
John Thorne	Senior Vice President and Deputy General Counsel, Verizon Communications
Barbara Tulipane	President & CEO, Electronic Retailing Association
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Timothy Wu	Professor, Columbia University Law School
Ronald B. Yokubaitis	Chairman, Data Foundry
Christopher S. Yoo	Professor, Vanderbilt University Law School

APPENDIX 2 – GLOSSARY OF FREQUENTLY USED ACRONYMS

3G	Third-Generation Wireless Communications Technology
AOL	America Online
ARPANET	Advanced Research Projects Agency Network
BPL	Broadband over Powerlines
DARPA	Defense Advanced Research Projects Agency
DOJ	Department of Justice
DSL	Digital Subscriber Line
EU	European Union
FCC	Federal Communications Commission
FTC	Federal Trade Commission
FTP	File Transfer Protocol
HTTP	Hypertext Transfer Protocol
IPTV	Internet Protocol Television
ISP	Internet Service Provider
Kbps	Kilobits Per Second
Mbps	Megabits Per Second
NSF	National Science Foundation
NSFNET	National Science Foundation Network
NTIA	National Telecommunications and Information Administration
OECD	Organization for Economic Co-operation and Development
P2P	Peer-to-Peer
QoS	Quality of Service
SMTP	Simple Mail Transfer Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol suite
TELNET	TELetype NETwork
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
The Web	The World Wide Web
Wi-Fi	Wireless Fidelity
Wi MAX	Worldwide Interoperability for Microwave Access

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