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Broadband Internet Regulation and Access: Background and Issues

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Summary

Broadband or high-speed Internet access is provided by a series of technologies that give users the ability to send and receive data at volumes and speeds far greater than current Internet access over traditional telephone lines. In addition to offering speed, broadband access provides a continuous, "always on" connection and the ability to both receive (download) and transmit (upload) data at high speeds. Broadband access, along with the content and services it might enable, has the potential to transform the Internet: both what it offers and how it is used. It is possible that many of the future applications that will best exploit the technological capabilities of broadband have yet to be developed. There are multiple transmission media or technologies that can be used to provide broadband access. These include cable, an enhanced telephone service called digital subscriber line (DSL), satellite, mobile wireless, fixed wireless (including "wi-fi" and "Wi-Max"), broadband over powerlines (BPL), fiber-to-the-home (FTTH), and others. While many (though not all) offices and businesses now have Internet broadband access, a remaining challenge is providing broadband over "the last mile" to consumers in their homes.

From a public policy perspective, the goals are to ensure that broadband deployment is timely and contributes to the nation's economic growth, that industry competes fairly, and that service is provided to all sectors and geographical locations of American society. The federal government — through Congress and the Federal Communications Commission (FCC) — is seeking to ensure fair competition among the players so that broadband will be available and affordable in a timely manner to all Americans who want it.

Some areas of the nation — particularly rural and low-income communities — continue to lack full access to high-speed broadband Internet service. In order to address this problem, the 110th Congress is examining a wide range of issues including the scope and effect of federal broadband financial assistance programs (including universal service and the broadband programs at the U.S. Department of Agriculture's Rural Utilities Service), and the impact of telecommunications regulation and new technologies on broadband deployment. To date, legislative measures to address the reform and expansion of scope of the universal service fund (S. 101, S. 609, S. 711, H.R. 42, H.R. 278, H.R. 2054), net neutrality (S. 215), and broadband financial assistance and data collection (H.R. 1818, H.R. 2035, H.R. 2174, H.R. 2272, H.R. 2419, H.R. 2569, H.R. 2764, H.R. 2953, H.R. 3246, H.R. 3281, H.R. 3428, H.R. 3627, H.R. 3893, H.R. 3919, S. 541, S. 761, S. 1032, S. 1190, S. 1264, S. 1439, S. 1492, S. 2242) have been introduced. One facet of the debate over broadband services focuses on whether present laws and subsequent regulatory policies are needed to ensure the development of competition and its subsequent consumer benefits, or conversely, whether such laws and regulations are overly burdensome and discourage investment in and deployment of broadband services.

This report which will be updated as events warrant.

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What Is Broadband and Why Is It Important?

Broadband or high-speed Internet access is provided by a series of technologies that give users the ability to send and receive data at volumes and speeds far greater than current Internet access over traditional telephone lines. Currently, a number of telecommunications companies are developing, installing, and marketing specific technologies and services to provide broadband access to the home. Meanwhile, the federal government — through Congress and the Federal Communications Commission (FCC) — is seeking to ensure fair competition among the players so that broadband will be available and affordable in a timely manner to all Americans who want it.

Traditionally, Internet users have accessed the Internet through the same telephone line that can be used for traditional voice communication. A personal computer equipped with a modem is used to hook into an Internet dial-up connection provided (for a fee) by an Internet service provider (ISP) of choice. The modem converts analog signals (voice) into digital signals that enable the transmission of "bits" of data.

The faster the data transmission rate, the easier one can download files, hop from Web page to Web page, or view video. The highest speed modem used with a traditional telephone line, known as a 56K modem, offers a maximum data transmission rate of about 45,000 bits per second (bps). However, as the content on the World Wide Web becomes more sophisticated, the limitations of relatively low data transmission rates (called "narrowband") such as 56K become apparent. For example, using a 56K modem connection to download a 10-minute video or a large software file can be a lengthy and frustrating exercise. By using a broadband high-speed Internet connection, with data transmission rates many times faster than a 56K modem, users can view video, make telephone calls, or download software and other data-rich files in a matter of seconds. In addition to offering speed, broadband access provides a continuous "always on" connection (no need to "dial-up") and a "two-way" capability — that is, the ability to both receive (download) and transmit (upload) data at high speeds.

Broadband access, along with the content and services it might enable, has the potential to transform the Internet — both what it offers and how it is used. For example, a two-way high speed connection could be used for interactive applications such as online classrooms, showrooms, or health clinics, where teacher and student (or customer and salesperson, doctor and patient) can see and hear each other through

their computers. An "always on" connection could be used to monitor home security, home automation, or even patient health remotely through the Web. The high speed and high volume that broadband offers could also be used for bundled service where, for example, cable television, video on demand, voice, data, and other services are all offered over a single line. In truth, it is possible that many of the applications that will best exploit the technological capabilities of broadband, while also capturing the imagination of consumers, have yet to be developed.

Broadband Technologies

There are multiple transmission media or technologies that can be used to provide broadband access. These include cable modem, an enhanced telephone service called digital subscriber line (DSL), satellite technology, fiber, terrestrial (or fixed) wireless technologies, and others. Cable and DSL are currently the most widely used technologies for providing broadband access. Both require the modification of an existing physical infrastructure that is already connected to the home (i.e., cable television and telephone lines). Each technology has its respective advantages and disadvantages, and competes with each other based on performance, price, quality of service, geography, user friendliness, and other factors. The following sections summarize cable, DSL, and other broadband technologies.

Cable

The same cable network that currently provides television service to consumers is being modified to provide broadband access. Because cable networks are shared by users, access speeds can decrease during peak usage hours, when bandwidth is being shared by many customers at the same time. Network sharing has also led to security concerns and fears that hackers might be able to eavesdrop on a neighbor's Internet connection. The cable industry is developing "next generation" technology which will significantly extend downloading and uploading speeds.

Digital Subscriber Line (DSL)

DSL is a modem technology that converts existing copper telephone lines into two-way high speed data conduits. Speeds can depend on the condition of the telephone wire and the distance between the home and the telephone company's central office (i.e., the building that houses telephone switching equipment). Because DSL uses frequencies much higher than those used for voice communication, both voice and data can be sent over the same telephone line. Thus, customers can talk on their telephone while they are online, and voice service will continue even if the DSL service goes down. Like cable broadband technology, a DSL line is "always on" with no dial-up required. Unlike cable, however, DSL has the advantage of being unshared between the customer and the central office. Thus, data transmission speeds will not necessarily decrease during periods of heavy local Internet use. A disadvantage relative to cable is that DSL deployment is constrained by the distance between the subscriber and the central office. DSL technology over a copper wire only works within 18,000 feet (about three miles) of a central office facility. However, DSL providers are deploying technology to further increase deployment

range. One option is to install "remote terminals" which can serve areas farther than three miles from the central office.

Wireless

Terrestrial or fixed wireless systems transmit data over the airwaves from towers or antennas to a receiver. Mobile wireless broadband services (also referred to as third generation or "3G") allow consumers to get broadband access over cell phones, PDAs, or wireless modem cards connected to a laptop.[1] The FCC is planning to auction frequencies currently occupied by broadcast channels 52-69. These and other frequencies in the 700 MHZ band are possible candidates for wireless broadband applications. A number of wireless technologies, corresponding to different parts of the electromagnetic spectrum, also have potential. These include the upperbands (above 24GHz), the lowerbands (multipoint distribution service or MDS, below 3 GHz), broadband personal communications services (PCS), wireless communications service (2.3 GHz), and unlicenced spectrum. Unlicensed spectrum is being increasingly used to provide high-speed short-distance wireless access (popularly called "wi-fi") to local area networks, particularly in urban areas where wired broadband connections already exist. A new and developing wireless broadband technology (called "WiMax") has the capability to transmit signals over much larger areas.

Fiber

Another broadband technology is optical fiber to the home (FTTH). Optical fiber cable, already used by businesses as high speed links for long distance voice and data traffic, has tremendous data capacity, with transmission speeds dramatically higher than what is offered by cable modem or DSL broadband technology. While the high cost of installing optical fiber in or near users' homes has been a major barrier to the deployment of FTTH, both Verizon and AT&T (formerly SBC) are rolling out fiber-based architectures that will offer consumers voice, video, and high-speed data (sometimes referred to as a "triple play"). Some public utilities are also exploring or beginning to offer broadband access via fiber inside their existing conduits. Additionally, some companies are investigating the feasibility of transmitting data over power lines, which are already ubiquitous in people's homes.[2]

Satellite

Satellite broadband Internet service is currently being offered by three providers: Hughes Network Systems (DirecWay), Starband (Spacenet Inc.) and WildBlue. Like cable, satellite is a shared medium, meaning that privacy may be compromised and performance speeds may vary depending upon the volume of simultaneous use. Another disadvantage of Internet -over-satellite is its susceptibility to disruption in

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[1] For further information, see CRS Report RS20993, *Wireless Technology and Spectrum Demand: Advanced Wireless Services,* by Linda K. Moore.

[2] For further information, see CRS Report RL32421, *Broadband Over Power Lines: Regulatory and Policy Issues,* by Patricia Moloney Figliola.

bad weather. On the other hand, the big advantage of satellite is its universal availability. Whereas cable or DSL is not available to some parts of the United States, satellite connections can be accessed by anyone with a satellite dish facing the southern sky. This makes satellite Internet access a possible solution for rural or remote areas not served by other technologies.

Status of Broadband Deployment

Broadband technologies are currently being deployed by the private sector throughout the United States. According to the latest FCC data on the deployment of high-speed Internet connections (released October 2007), as of December 31, 2006, there were 82.5 million high speed lines connecting homes and businesses to the Internet in the United States, a growth rate of 27% during the second half of 2006. Of the 82.5 million high speed lines reported by the FCC, 58.2 million serve residential users.[3] While the broadband *adoption* rate stands at roughly 53% of U.S. households,[4] broadband *availability* is much higher. As of December 31, 2006, the FCC found at least one high-speed subscriber in 99% of all zip codes in the United States. The FCC estimates that "roughly 20 percent of consumers with access to advanced telecommunications capability do subscribe to such services." According to the FCC, possible reasons for the gap between broadband availability and subscribership include the lack of computers in some homes, price of broadband service, lack of content, and the availability of broadband at work.[5]

According to the International Telecommunications Union, the U.S. ranks 18th worldwide in broadband penetration (subscriptions per 100 inhabitants as of December 2006).[6] Similarly, data from the Organization for Economic Cooperation and Development (OECD) found the U.S. ranking 15th among OECD nations in broadband access per 100 inhabitants as of June 2007.[7] By contrast, in 2001 an OECD study found the U.S. ranking 4th in broadband subscribership per 100 inhabitants (after Korea, Sweden, and Canada).[8]

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[3] FCC, *High-Speed Services for Internet Access: Status as of December 31, 2006,* October 2007. Available at [http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-277784A1.pdf]

[4] Percentage assumes one high speed line per household, 58 million residential high speed lines (per December 31, 2006 FCC data) and 110 million households in the U.S. (2006 Census data).

[5] Federal Communications Commission, *Fourth Report to Congress*, "Availability of Advanced Telecommunications Capability in the United States," GN Docket No. 04-54, FCC 04-208, September 9, 2004, p. 38. Available at [http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-208A1.pdf]

[6] International Telecommunications Union, *Economies by broadband penetration, 2006.* Available at [http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2006.html].

[7] OECD, *OECD Broadband Statistics, June 2007*. Available at [http://www.oecd.org/sti/ict/broadband].

[8] OECD, Directorate for Science, Technology and Industry, *The Development of Broadband Access in OECD Countries*, October 29, 2001, 63 pages. For a comparison of government

(continued...)

Access to Broadband and the "Digital Divide"[9]

While the number of new broadband subscribers continues to grow, the rate of broadband deployment in urban and high income areas appears to be outpacing deployment in rural and low-income areas. According to the latest FCC data on the deployment of high-speed Internet connections (released October 2007), high-speed subscribers were reported in 99% of the most densely populated zip codes, as opposed to 90% of zip codes with the lowest population densities. Similarly, for zip codes ranked by median family income, high-speed subscribers were reported present in 99% of the top one-tenth of zip codes, as compared to 91% of the bottom one-tenth of zip codes.[10]

2007 data from the Pew Internet & American Life Project indicate that while broadband adoption is growing in urban, suburban, and rural areas, broadband users make up larger percentages of urban and suburban users than rural users. Pew found that the percentage of all U.S. adults with broadband at home is 52% for urban areas, 49% for suburban areas, and 31% for rural areas.[11]

Some policymakers assert that disparities in broadband access across American society could have adverse consequences on those left behind. Many believe that advanced Internet applications — voice over the Internet protocol (VoIP) or high quality video, for example — and the resulting ability for businesses and consumers to engage in e-commerce, may increasingly depend on high speed broadband connections to the Internet. Thus, some say, communities and individuals without access to broadband could be at risk to the extent that e-commerce becomes a critical factor in determining future economic development and prosperity.

FCC Activities

The Telecommunications Act of 1996 (P.L. 104-104) addressed the issue of whether the federal government should intervene to prevent a "digital divide" in broadband access. Section 706 requires the FCC to determine whether "advanced telecommunications capability [i.e., broadband or high-speed access] is being deployed to all Americans in a reasonable and timely fashion." If this is not the case, the act directs the FCC to "take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market."

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[8] (...continued)
broadband policies, also see OECD, Directorate for Science, Technology and Industry, *Broadband Infrastructure Deployment: The Role of Government Assistance*, May 22, 2002, 42 pages.

[9] For more information on broadband and the digital divide, see CRS Report RL30719, *Broadband Internet Access and the Digital Divide: Federal Assistance Programs*, by Lennard G. Kruger and Angele A. Gilroy.

[10] FCC, *High-Speed Services for Internet Access: Status as of December 31, 2006*, p.4.

[11] Horrigan, John B., Pew Internet & American Life Project, *Home Broadband Adoption 2007*, June 2007. Available at [http://pewinternet.org/pdfs/PIP_Broadband%202007.pdf].

On September 9, 2004, the FCC adopted and released its *Fourth Report* pursuant to Section 706. Like the previous three reports, the FCC concluded that "the overall goal of section 706 is being met, and that advanced telecommunications capability is indeed being deployed on a reasonable and timely basis to all Americans."[12] While the FCC is currently implementing or actively considering some regulatory activities related to broadband,[13] no major regulatory intervention pursuant to Section 706 of the Telecommunications Act of 1996 has been deemed necessary by the FCC at this time.

The FCC noted the future promise of emerging multiple advanced broadband networks which can complement one another:

> For example, in urban and suburban areas, wireless broadband services may "fill in the gaps" in wireline broadband coverage, while wireless and satellite services may bring high-speed broadband to remote areas where wireline deployment may be costly. Having multiple advanced networks will also promote competition in price, features, and quality-of-service among broadband-access providers.[14]

Two FCC Commissioners (Michael Copps and Jonathan Adelstein) dissented from the *Fourth Report* conclusion that broadband deployment is reasonable and timely. They argued that the relatively poor world ranking of United States broadband penetration indicates that deployment is insufficient, that the FCC's continuing definition of broadband as 200 kilobits per second is outdated and is not comparable to the much higher speeds available to consumers in other countries, and that the use of zip code data (measuring the presence of at least one broadband subscriber within a zip code area) does not sufficiently characterize the availability of broadband across geographic areas.[15]

The Government Accountability Office (GAO) has also cited concerns about the FCC's zip code level data. Of particular concern is that the FCC will report broadband service in a zip code even if a company reports service to only one subscriber, which in turn can lead to some observers overstating of broadband deployment. According to GAO, "the data may not provide a highly accurate depiction of local deployment of broadband infrastructures for residential service, especially in rural areas."[16]

On April 16, 2007, the FCC announced a Notice of Proposed Rulemaking which seeks comment on a number of broadband data collection issues, including how to develop a more accurate picture of broadband deployment; gathering information on

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[12] *Fourth Report*, p. 8.

[13] See Appendix C of the *Fourth Report*, "List of Broadband-Related Proceedings at the Commission," pp. 54-56.

[14] Ibid., p. 9.

[15] Ibid., p. 5, 7.

[16] U.S. Government Accountability Office, *Broadband Deployment is Extensive throughout the United States, but It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas*, GAO-06-426, May 2006, p. 3.

price, other factors determining consumer uptake of broadband, and international comparisons; how to improve data on wireless broadband; how to collect information on subscribership to voice over Internet Protocol service (VoIP); and whether to modify collection of speed tier information.[17]

Also on April 16, 2007, the FCC announced a Notice of Inquiry beginning its fifth inquiry under Section706 of the Telecommunications Act of 1996. Under this inquiry, the FCC will collect information on various market, investment, and technological trends relevant to the question of whether advanced telecommunications services is being made available to all Americans.[18]

Administration Activities

The National Telecommunications and Information Administration (NTIA) at the Department of Commerce (DOC) has been tasked with developing the Bush Administration's broadband policy.[19] Statements from Administration officials indicated that much of the policy would focus on removing regulatory roadblocks to investment in broadband deployment.[20] On June 13, 2002, in a speech at the 21st Century High Tech Forum, President Bush declared that the nation must be aggressive about the expansion of broadband, and cited ongoing activities at the FCC as important in eliminating hurdles and barriers to get broadband implemented. President Bush made similar remarks citing the economic importance of broadband deployment at the August 13, 2002 economic forum in Waco, Texas. Subsequently, a more formal Administration broadband policy was unveiled in March and April of 2004. On March 26, 2004, President Bush endorsed the goal of universal broadband access by 2007.[21] Then on April 26, 2004, President Bush announced a broadband initiative which advocates permanently prohibiting all broadband taxes, making spectrum available for wireless broadband, creating technical standards for

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[17] Federal Communications Commission, *Notice Proposed Rulemaking*, "Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice Over Internet Protocol (VoIP) Subscribership," WC Docket No. 07-38, FCC 07-17, released April 16, 2007, 56 p.

[18] Federal Communications Commission, *Notice of Inquiry*, "Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996," GN Docket No. 07-45, FCC 07-21, released April 17, 2007, 21 p.

[19] See speech by Nancy Victory, Assistant Secretary for Communications and Information, before the National Summit on Broadband Deployment, October 25, 2001, [http://www.ntia.doc.gov/ntiahome/speeches/2001/broadband_102501.htm].

[20] Address by Nancy Victory, NTIA Administrator, before the Alliance for Public Technology Broadband Symposium, February 8, 2002, [http://www.ntia.doc.gov/ntiahome/speeches/2002/apt_020802.htm].

[21] Allen, Mike, "Bush Sets Internet Access Goal," *Washington Post*, March 27, 2004.

broadband over power lines, and simplifying rights-of-way processes on federal lands for broadband providers.[22]

The Bush Administration has also emphasized the importance of encouraging demand for broadband services. On September 23, 2002, the DOC's Office of Technology Policy released a report, *Understanding Broadband Demand: A Review of Critical Issues*,[23] which argues that national governments can accelerate broadband demand by taking a number of steps, including protecting intellectual property, supporting business investment, developing e-government applications, promoting efficient radio spectrum management, and others. Similarly, the President's Council of Advisors on Science & Technology (PCAST) was tasked with studying "demand-side" broadband issues and suggesting policies to stimulate broadband deployment and economic recovery. The PCAST report, *Building Out Broadband*, released in December 2002, concludes that while government should not intervene in the telecommunications marketplace, it should apply existing policies and work with the private sector to promote broadband applications and usage. Specific initiatives include increasing e-government broadband applications (including homeland security); promoting telework, distance learning, and telemedicine; pursuing broadband-friendly spectrum policies; and ensuring access to public rights of way for broadband infrastructure.[24]

Enacted Legislation

Some policymakers in Congress have asserted that the federal government should play a more active role to avoid a "digital divide" in broadband access, and that legislation is necessary to ensure fair competition and timely broadband deployment. The Farm Security and Rural Investment Act of 2002 — signed into law on May 13, 2002 as P.L. 107-171 — contained a provision (Section 6103) authorizing the Secretary of Agriculture to make loans and loan guarantees to eligible entities for facilities and equipment providing broadband service in rural communities. Authorization of the Rural Broadband Access Loan and Loan Guarantee Program runs through FY2007. The 110th Congress is considering reauthorization of the RUS broadband program as part of the farm bill.[25]

Congress has also enacted legislation intended to make radiofrequency spectrum available for wireless broadband applications. For example, the 108th Congress enacted The Commercial Spectrum Enhancement Act (Title II of P.L. 108-494), which seeks to make more spectrum available for wireless broadband and other

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[22] See White House, *A New Generation of American Innovation*, April 2004. Available at [http://www.whitehouse.gov/infocus/technology/economic_policy200404/innovation.pdf].

[23] Available at [http://www.technology.gov/reports/TechPolicy/Broadband_020921.pdf].

[24] President's Council of Advisors on Science and Technology, Office of Science and Technology Policy, *Building Out Broadband*, December 2002, 14 p. Available at [http://www.ostp.gov/PCAST/FINAL%20Broadband%20Report%20With%20Letters.pdf].

[25] For more information on the RUS broadband programs, see CRS Report RL33816, *Broadband Loan and Grant Programs in the USDA's Rural Utilities Service*, by Lennard G. Kruger.

services by facilitating the reallocation of spectrum from government to commercial users. In the 109th Congress, the Title III of the Deficit Reduction Act of 2005 (P.L. 109-171) set a hard deadline for the digital television transition, thereby reclaiming analog television spectrum to be auctioned for commercial applications such as wireless broadband.

Regulation and Broadband: Convergence and the Changing Marketplace

Rapid technological advances and the resulting convergence of telecommunications providers and markets has prompted the reexamination of the existing telecommunications industry regulatory framework. The "Telecommunications Act of 1996," (P.L.104-104) redefined and recast the 1934 Communications Act to address the emergence of competition in what were previously considered to be monopolistic markets. Despite its relatively recent enactment, however, a consensus has been growing that the modifications brought about by the implementation of the 1996 Act are not sufficient to address the Nation's changing telecommunications environment. Technological changes such as the advancement of Internet technology to supply data, voice, and video as well as the growing convergence in the telecommunications sector, have, according to many policymakers, made it necessary to consider another "rewrite" or revision of the laws governing these markets.

The regulatory debate focuses on a number of issues including the extent to which existing regulations should be applied to traditional providers as they enter new markets where they do not hold market power, the extent to which existing regulations should be imposed on new entrants as they compete with traditional providers in the same markets, and the appropriate regulatory framework to be imposed on new and/or converging technologies that are not easily classified under the present framework.[26]

The regulatory treatment of broadband technologies continues to hold a major focus in the policy debate. A major facet of the debate centers on whether present laws and regulations are needed to ensure the development of competition and its subsequent consumer benefits, or, conversely, whether such laws and policies are overly burdensome and discourage needed investment and deployment of such services. What if any role regulators should play to ensure the Internet remains open to all, often referred to as "open access" requirements or "net neutrality," is also a major and contentious part of the dialogue.[27] In addition to the debate over economic regulation, concern over how and to what extent "social regulations" such as emergency 911 access, disability access, and law enforcement regulations, should be applied to new and converging technologies continues to be debated. The continued

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[26] For further information see CRS Report RL32949, *Communications Act Revisions: Selected Issues for Consideration*, Angele A. Gilroy, coordinator.

[27] For further information on the net neutrality debate, see CRS Report RS22444, *Net Neutrality: Background and Issues*, by Angele A. Gilroy.

growth and expressed interest in municipal broadband networks has also focused debate on what the appropriate role of the government sector should be and whether it should be competing with the private sector.

How traditional policy goals, such as the advancement of universal service mandates, should be revised to accommodate the changing marketplace has also come under scrutiny. For example, issues such as who should receive and who should contribute to universal service funds and whether the definition of universal service objectives should be expanded to include new technologies such as broadband continue to be debated.[28]

Activities in the 109th Congress

In the 109th Congress, debate over broadband policy primarily centered on H.R. 5252 — the Communications Opportunity, Promotion, and Enhancement Act (COPE) in the House, and the Advanced Telecommunications and Opportunity Reform Act (ATOR) in the Senate. H.R. 5252 addressed a number of issues, including the extent to which legacy regulations should be applied to traditional providers as they enter new markets, the extent to which legacy regulations should be imposed on new entrants as they compete with traditional providers in their markets, the treatment of new and converging technologies, and the emergence of municipal broadband networks and Internet access. H.R. 5252, as amended, passed (321-101) the House, was significantly amended and passed (15-7) by the Senate Commerce Committee, but did not reach the Senate floor for consideration.

H.R. 5252 (COPE). House Commerce Committee Chairman Barton, on March 27, 2006, released a draft telecommunications reform proposal that was the subject of a Committee hearing on March 30, 2006. The then unnumbered measure, passed (27-4) the subcommittee, with amendment, on April 5, 2006, and passed (42-12) the full Committee with amendment, on April 26, 2006. The measure, titled "The Communications Opportunity, Promotion, and Enhancement Act of 2006" (COPE), was referred to the House Committee on Energy and Commerce and formally introduced as H.R. 5252. A sequential referral request, by House Judiciary Chairman Sensenbrenner, which was subsequently denied, delayed floor consideration. The House passed (321-101) an amended version of H.R. 5252 on June 8, 2006. In addition to a manager's amendment clarifying franchising provisions, five additional amendments were passed. The other amendments: established a complaint process to resolve fee disputes between a local franchise authority and a cable operator; increased the income discrimination penalty for a cable operator from $500,000 to $750,000; allowed a cable franchising authority to issue an order requiring compliance with FCC revised consumer protection rules; preserved FCC authority to require VOIP providers to contribute to the federal universal service fund, when they connect directly or indirectly to the public switched network and compensate network owners for use of their network; and clarified that language in HR5252 giving the FCC the exclusive authority to adjudicate network neutrality does not

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[28] For further information on the Universal Service Fund see CRS Report RL33979, *Universal Service Fund: Background and Options for Reform*, by Angele A. Gilroy.

remove antitrust authority over net neutrality complaints. Two amendments did not pass. The first, an amendment, sponsored by Representative Markey, to strengthen net neutrality provisions failed by a vote of 152-269. The second, to reduce, from 1 percent to 0.5 percent, the fee paid to local franchise authorities relating to PEG/iNet support by women-owned, small business and socially and economically disadvantaged firms was withdrawn.

H.R. 5252, as passed by the House, contained in its 6 titles, provisions that would establish a national cable franchising process; clarify the FCC's authority to enforce its network neutrality principles; address VoIP 911 interconnection and E911 requirements; and bar states from prohibiting municipalities from providing their own broadband networks. More specifically, Title I establishes a national process, through the FCC, for new entrants to offer pay TV services and opens it up to incumbent cable providers, once they face local competition. An operator of a national franchise is prohibited from discriminating in the provision of service to any group of residential subscribers based on the income of that group. National consumer protection rules are established with a local authority/FCC complaint procedure. Additional provisions in Title I preserve the local five percent franchise fee cap, preserve and support PEG channel and I-Nets or Institutional Networks (a one percent gross revenue fee is established to ensure financial support), and preserve rights-of-way requirements. The bill also contains provisions to assist small and rural carriers in the provision of video service by allowing video operators to share a headend transmission facility.

Title II clarifies the FCC's authority to enforce its August 2005 network neutrality principles in complaint proceedings, but prohibits the FCC from engaging in related-rulemaking. Fines up to $500,000 per violation are established and the FCC is required to resolve complaints within 90 days. The FCC is also directed to conduct and submit to the House Energy and Commerce and Senate Commerce Committees, within 180 days of enactment, a study, to evaluate ".... whether the objectives of the (FCC's) broadband policy statement and the principles incorporated therein are being achieved."

The remaining four titles dealt with a wide range of telecommunications issues. Title III of the bill contains provisions to establish 911 and E-911 requirements for VoIP services that connect to the public switched network and represent a replacement telephone service. Additional provisions provide access to the nation's 911 infrastructure and requires the FCC to appoint a 911 number administrator. Title IV contains provisions that bar states from prohibiting municipalities from providing their own broadband networks (that is telecommunications, information, or cable services), but also requires that they do not discriminate in favor of, or bestow any advantages to, such entities as compared with other providers of such services. The FCC is tasked with submitting within one year of enactment, a report to Congress, on the status of the provision of such services by municipalities. Titles V and VI contain provisions that ensue consumers can buy stand-alone broadband service; call for an FCC study to examine the possible interference associated with the deployment of broadband over power lines; and further the development of "seamless mobility."

S. 2686 (HR5252/ATOR). The Senate Commerce Committee held a series of hearings on a wide range of telecommunications issues in preparation for developing comprehensive telecommunications legislation. Senate Commerce Committee Chairman Stevens introduced, on May 1, 2006, a comprehensive (135 page) telecommunications bill, S. 2686. The major provisions of that measure dealt with a wide range of topics, including universal service reform; streamlining of the video franchising process; requiring the FCC to report annually to Congress on the net neutrality issue; interoperability of public safety communications systems; interconnection; and municipal broadband ownership. The bill also contains a number of provisions relating to broadcast issues such as the digital television transition, the reinstating of the FCC's "broadcast flag" rules, access to sports programming, and use of unlicensed "white space." Additional provisions relating to protecting children from child pornography and amending the FCC's "sunshine rules" are also included.

Although Senator Inouye, the ranking minority member of the Committee, signed on as a bill co-sponsor, he stated that S. 2686 needed considerable amendment to gain his support. He circulated a draft proposal containing provisions addressing video franchising, Internet access, broadband deployment, and universal service, for consideration that addressed his concerns. The lack of a strong net neutrality provision was one of the issues he specifically singled out for attention. S. 2686 provisions relating to streamlining the video franchising process, universal service fund reform, and net neutrality were the major focus of Commerce Committee hearing held on May 18, and May 25,2006. The Commerce Committee issued a revised draft of the bill which was the subject of a hearing held on June 13, 2006.

After a lengthy and intense markup the Senate Commerce Committee approved (15-7) on June 28, 2006 the newly titled "Advanced Telecommunications and Opportunity Reform Act," which technically is an amended version in the nature of a substitute for H.R. 5252. In addition to a new bill name and number the three-day markup led to the approval of a significant manager's amendment containing a new title and 70 amendments resulting in the passage of a 200-plus page omnibus telecommunications measure. S. 2686, which was referred to as "the Senate Committee passed version of H.R. 5252," contains 11 titles covering a wide range of telecommunications issues including video franchise reform, net neutrality, universal service reform, municipal broadband, broadcast flag, the digital television transition, interoperability, the illegal transmission of child pornography, and FCC reform. The issue of net neutrality proved to be major point of contention during the markup. Despite the addition of a new title (Title IX) establishing an "Internet Consumer Bill of Rights" net neutrality advocates continued to press for a net neutrality non-discrimination provision. A nondiscrimination amendment offered during markup was defeated by an 11-11 vote. The lack of a cable franchise build-out provision, federal preemption of state authority over wireless services, as well as provisions added during markup to exempt, for three years, wireless providers from"new and discriminatory" taxes and make permanent the Internet tax moratorium also resulted in concern. While Senator Steven's continued to express confidence that the Senate version of H.R. 5252 would come to the floor for a vote, the 109th Congress ended without full Senate consideration of the measure.

Both the Senate and House Judiciary Committees also examined issues related to telecommunications reform. The House Judiciary's Telecommunications and Antitrust Task Force held a hearing on April 25, 2006, to examine competition issues relating to Internet access and "net neutrality." House Judiciary Committee Chairman Sensenbrenner and Representative Conyers, the ranking minority member, stated, in a letter sent to then House Speaker Hastert, that the Judiciary Committee had oversight over market conditions, consolidations and antitrust protections in the telecommunications sector, and asked for a sequential referral of H.R. 5252. That request was denied. However, Chairman Sensenbrenner, Representative Conyers and others introduced a bipartisan bill (H.R. 5417) focusing on Internet access from an antitrust perspective, that passed (20-13) the Judiciary Committee, with amendment, on May 25, 2006. A request to the House Rules Committee to have the bill considered as an amendment during House floor action on H.R. 5252 was denied. The Senate Judiciary Committee held a June 14, 2006 hearing to examine communications laws in the context of ensuring competition and innovation.

Activities in the 110th Congress

In the 110th Congress, legislation has been introduced that would provide financial assistance for broadband deployment. Of particular note is the reauthorization of the Rural Utilities Service (RUS) broadband program, which is being considered as part of the 2007 farm bill (H.R. 2419). H.R. 2419 was passed by the House on July 27, 2007. The Senate version of the farm bill, as passed by the Senate on December 14, 2007, also contains provisions reauthorizing the RUS broadband loan program.[29] The Senate farm bill also contains provisions directing the Department of Commerce to award grants encouraging state initiatives to improve broadband service, amending the Internal Revenue Code of 1986 to provide for the expensing of broadband Internet access expenditures, and providing tax credits to holders of Rural Renaissance Bonds financing broadband projects in rural areas.

Legislation to reform universal service (H.R. 2054, S. 101, S. 711) — which could have a significant impact on the amount of financial assistance available for broadband deployment in rural and underserved areas — has also been introduced. Additionally, Congress is considering broadband data bills (S. 1492 as reported by the Senate Commerce, Science, and Transportation Committee, and H.R. 3919 as passed by the House) and municipal broadband bills (H.R. 3281 and S. 1853). The following provides a listing of broadband-related legislation introduced into the 110th Congress.

P.L. 110-161 (H.R. 2764)

Consolidated Appropriations Act, 2008. For Rural Utilities Service, U.S. Department of Agriculture, provides $6.45 million to support a loan level of $300 million for the broadband loan program, and $13.5 million for broadband community connect grants. Signed by President, December 26, 2007.

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[29] For further details, see CRS Report RL33816, *Broadband Loan and Grant Programs in the USDA's Rural Utilities Service, by* Lennard G. Kruger.

H.R. 42 (Velazquez)

Serving Everyone with Reliable, Vital Internet, Communications and Education Act of 2007. Directs the FCC to expand assistance provided by the Lifeline Assistance Program and the Link Up Program to include broadband service. Introduced January 4, 2007; referred to Committee on Energy and Commerce.

H.R. 278 (Cubin)

Amends Section 254 of the Communications Act of 1934 to provide that funds received as universal service contributions and the universal service support programs established pursuant to that section are not subject to certain provisions of title 31, United States Code, commonly known as the Antideficiency Act. Introduced January 5, 2007; referred to Committee on Energy and Commerce.

H.R. 1818 (Matsui)

Broadband Deployment Acceleration Act of 2007. Amends the Internal Revenue Code of 1986 to provide for the expensing of broadband Internet access expenditures. Introduced March 29, 2007; referred to Committee on Ways and Means.

H.R. 2035 (Herseth Sandlin)

Rural Broadband Improvement Act. Amends the Rural Electrification Act of 1936 to modify the broadband loan program at the Rural Utilities Service by narrowing the definition of "eligible rural community" and by limiting loans awarded to applicants proposing to serve areas that already have a broadband provider. Introduced April 25, 2007; referred to Committee on Agriculture and to Committee on Energy and Commerce.

H.R. 2054 (Boucher)

Universal Reform Act of 2007. Targets universal service support specifically to eligible telecommunications carriers in high-cost geographic areas to ensure that communications services and high-speed broadband services are made available throughout all of the States of the United States in a fair and equitable manner. Introduced April 26, 2007; referred to Committee on Energy and Commerce.

H.R. 2174 (Salazar)

Rural Broadband Initiative Act of 2007. Establishes an Office of Rural Broadband Initiatives within the Department of Agriculture which will administer all rural broadband grant and loan programs previously administered by the Rural Utilities Service. Also establishes a National Rural Broadband Innovation Fund which would fund experimental and pilot rural broadband projects and applications. Introduced May 3, 2007; referred to Committee on Agriculture and to Committee on Energy and Commerce.

H.R. 2272 (Gordon)

America COMPETES Act. Authorizes the National Science Foundation (NSF) to provide grants for basic research in advanced information and communications technologies. Areas of research include affordable broadband access, including wireless technologies. Also directs NSF to develop a plan that describes the current status of broadband access for scientific research purposes. Introduced May 10,

2007; referred to House Committee on Science and Technology. Passed House May 21, 2007. Passed Senate July 19, 2007.

H.R. 2419 (Peterson)

Farm, Nutrition and Bioenergy Act of 2007. Reauthorizes broadband program at the Rural Utilities Service through FY2012. Senate passed version contains "Connect the Nation Act," which directs the Department of Commerce to award grants encouraging state initiatives to improve broadband service. Senate passed version also would amend the Internal Revenue Code of 1986 to provide for the expensing of broadband Internet access expenditures, and would provide tax credits to holders of Rural Renaissance Bonds financing qualified projects, including projects to expand broadband technology in rural areas. Introduced May 22, 2007; referred to Committee on Agriculture, and in addition to Committee on Foreign Affairs. Passed House July 27, 2007. Passed Senate with an amendment, December 14, 2007.

H.R. 2569 (Graves)

Rural Broadband Deployment Act. Codifies certain changes proposed by USDA to the rules governing eligibility for the rural broadband access program. Specifically, would relax market survey requirements and eliminate the credit support requirement, including the cash-on-hand requirement. Introduced June 5, 2007; referred to Committee on Agriculture, and in addition to the Committee on Energy and Commerce.

H.R. 2829 (Serrano)

Financial Services and General Government Appropriations Act, 2008. The Senate Appropriations Committee-passed version of this 2008 appropriations bill includes language in Title V (sec. 501) to extend the FCC's universal service fund exemption for the Anti-deficiency Act until December 31, 2008, and includes language (sec. 502) to prohibit the FCC from implementing a single line restriction for universal service support. Passed by the Senate Appropriations Committee July 12, 2007, and reported out of Committee (S.Rept. 110-129) on July 13, 2007.

H.R. 2953 (Space)

Rural Broadband Access Enhancement Act. Seeks to redefine "eligible rural community," streamline application process and lower equity requirements, restrict loans to communities with existing broadband providers, eliminate limitation on eligibility based on number of subscriber lines, set 35-year maximum on term of loan repayment, and direct USDA/RUS to meet specific reporting requirements. Introduced July 10, 2007; referred to Committee on Agriculture and Committee on Energy and Commerce.

H.R. 3281 (Boucher)

Community Broadband Act of 2007. Sets forth that no state regulation or requirement shall prevent a public provider from offering broadband services, and prohibits a municipality from discriminating against competing private providers. Introduced August 1, 2007; referred to Committee on Energy and Commerce.

H.R. 3246 (Oberstar)

Regional Economic and Infrastructure Development Act of 2007. Designates five regional commissions throughout the U.S. which would provide economic and infrastructure development grants, including grants to develop the telecommunications infrastructure of the region. Introduced July 31, 2007; referred to Committee on Transportation and Infrastructure and to Committee on Financial Services. Reported by Committee on Transportation and Infrastructure, September 7, 2007 (H.Rept. 110-321, Part I). Passed by House, October 4, 2007.

H.R. 3428 (McHugh)

Rural America Digital Accessibility Act. Provides for grants, loan guarantees, research, and tax credits to promote broadband deployment in underserved rural areas. Introduced August 3, 2007; referred to Committee on Energy and Commerce and in addition to the Committee on Ways and Means and the Committee on Science and Technology.

H.R. 3627 (Space)

Connect the Nation Act. Establishes a State Broadband Data and Development Grant Program within the Department of Commerce to help states develop and implement statewide initiatives to identify and track the availability and adoption of broadband services within each state. Authorizes $40 million for each of fiscal years 2008 through 2012. Introduced September 20, 2007; referred to Committee on Energy and Commerce.

H.R. 3893 (Allen)

Connect America Now Act. Establishes a State Broadband Data and Development Grant Program within the Department of Commerce to help states develop and implement statewide initiatives to identify and track the availability and adoption of broadband services within each state. Authorizes $40 million for each of fiscal years 2008 through 2012. Introduced October 18, 2007; referred to Committee on Energy and Commerce.

H.R. 3919 (Markey)

Broadband Census of America Act of 2007. Provides for a comprehensive inventory of existing broadband service. Directs the FCC to conduct an annual assessment of broadband deployment, including information on bandwidth service tiers, types of technology, and international comparisons. Directs NTIA to develop and maintain a broadband inventory map of the United States that depicts broadband deployment at a nine digit zip code area level, census tract level, or functional equivalent. Directs NTIA to award grants to states for broadband map development and grants for demand-side broadband service identification and assessments. Directs the FCC to conduct periodic consumer surveys of broadband service capability. Authorizes $20 million for each of fiscal years 2008 through 2010, of which not less than $15 million would be available for the state broadband map grants. Authorizes $50 million in FY2008, $100 million in FY2009, and $125 million in FY2010 for the demand-side broadband service identification and assessment (local technology planning) grants. Introduced October 22, 2007; referred to Committee on Energy and Commerce. Reported by Committee on Energy and Commerce (H.Rept. 110-443), November 13, 2007. Passed House by voice vote, November 13, 2007.

S. 101 (Stevens)

Universal Service for Americans Act ("USA Act"). Directs the FCC to establish Broadband for Unserved Area Areas Program to be funded by the Universal Service Fund. Requires communications carriers to submit detailed broadband deployment data to the FCC. Introduced January 4, 2007; referred to Committee on Commerce, Science, and Transportation.

S. 215 (Dorgan)

Amend the Communications Act of 1934 to ensure net neutrality. Introduced January 9, 2007; referred to Committee on Commerce, Science, and Transportation.

S. 541 (Feingold)

Rural Opportunities Act of 2007. Directs the FCC to collect more detailed broadband deployment data and to periodically revise its definition of broadband above 200 kbps. Directs the Secretary of Agriculture to report on the adoption or planned adoption of the recommendations contained in the September 2005 audit report by the Inspector General of the United States Department of Agriculture. Introduced February 8, 2007; referred to Committee on Agriculture, Nutrition and Forestry.

S. 609 (Rockefeller)

A bill to amend Section 254 of the Communications Act of 1934 to provide that funds received as universal service contributions and the universal service support programs established pursuant to that section are not subject to certain provisions of Title 31, United States Code, commonly known as the Antideficiency Act. Introduced February 15, 2007; referred to the Committee on Commerce, Science, and Transportation.

S. 711 (Smith)

Universal Service for the 21st Century Act. Expands the contribution base for universal service and establishes a separate account within the universal service fund to support the deployment of broadband service in unserved areas. Introduced February 28, 2007; referred to Committee on Commerce, Science, and Transportation.

S. 761 (Reid)

America COMPETES Act. Authorizes the National Science Foundation (NSF) to provide grants for basic research in advanced information and communications technologies. Areas of research include affordable broadband access, including wireless technologies. Also directs NSF to develop a plan that describes the current status of broadband access for scientific research purposes. Introduced March 5, 2007; placed on Senate Legislative Calendar. Passed Senate April 25, 2007. Senate incorporated this measure in H.R. 2272 as an amendment July 19, 2007.

S. 1032 (Clinton)

Rural Broadband Initiative Act of 2007. Establishes an Office of Rural Broadband Initiatives within the Department of Agriculture which will administer all rural broadband grant and loan programs previously administered by the Rural Utilities Service. Also establishes a National Rural Broadband Innovation Fund which would fund experimental and pilot rural broadband projects and applications.

Introduced March 29, 2007; referred to Committee on Agriculture, Nutrition, and Forestry.

S. 1190 (Durbin)

Connect the Nation Act. Establishes a State Broadband Data and Development Grant Program within the Department of Commerce to help states develop and implement statewide initiatives to identify and track the availability and adoption of broadband services within each state. Authorizes $40 million for each of fiscal years 2008 through 2012. Introduced April 24, 2007; referred to Committee on Commerce, Science, and Transportation.

S.Res. 191 (Rockefeller)

Establishing a national goal for the universal deployment of next-generation broadband networks by 2015, and calling upon Congress and the President to develop a strategy, enact legislation, and adopt policies to accomplish this objective. Introduced May 8, 2007; referred to Committee on Commerce, Science, and Transportation.

S. 1264 (Coleman)

Rural Renaissance Act. Creates a Rural Renaissance Corporation which would fund qualified projects including projects to expand broadband technology in rural areas. Introduced May 2, 2007; referred to Committee on Finance.

S. 1439 (Roberts)

Rural Broadband Improvement Act of 2007. Reauthorizes the broadband and broadband loan guarantee program under Title VI of the Rural Electrification Acct of 1936. Introduced May 21, 2007; referred to Committee on Agriculture, Nutrition, and Forestry.

S. 1492 (Inouye)

Broadband Data Improvement Act. Seeks to improve the quality of federal broadband data collection and encourage state initiatives that promote broadband deployment. Directs the FCC to reevaluate its current 200 kbps broadband standard and to develop a new metric for "second generation broadband" capable of transmitting high definition video content. Directs broadband providers to report to the FCC connections within nine digit (zip+4) zip code areas. Directs the FCC to conduct its Section 706 inquiry into the status of broadband deployment on an annual basis. Directs the Census Bureau to collect residential broadband data. Directs GAO to develop broadband metrics involving connection cost and capability information that could be used to improve the process of comparing U.S. broadband deployment with other countries. Directs the Small Business Administration to conduct a study evaluating the impact of broadband speed and cost on small businesses. Authorizes $40 million for each of fiscal years 2008 through 2012 to establish a State Broadband Data and Development Grant Program within the Department of Commerce to help states develop and implement statewide initiatives to identify and track the availability and adoption of broadband services within each state. Introduced May 24, 2007; referred to Committee on Commerce, Science, and Transportation. Ordered to be reported July 19, 2007. Ordered to be reported July 19, 2007; reported by Committee (S.Rept. 110-204) and placed on Senate Legislative Calendar, October 24, 2007.

S. 1853 (Lautenberg)

Community Broadband Act of 2007. Sets forth that no state regulation or requirement shall prevent a public provider from offering broadband services, and prohibits a municipality from discriminating against competing private providers. Introduced July 23, 2007; referred to Committee on Commerce, Science, and Transportation. Ordered to be reported favorably with amendments by the Committee on Commerce, Science and Transportation, October 30, 2007.

S. 2242 (Baucus)

Heartland, Habitat, Harvest, and Horticulture Act of 2007. Introduced October 25, 2007; referred to Committee on Finance. Amends the Internal Revenue Code of 1986 to provide for the expensing of broadband Internet access expenditures. Creates a Rural Renaissance Corporation which would fund qualified projects including projects to expand broadband technology in rural areas. Reported to Senate (S.Rept. 110-206) and placed on Senate Legislative Calendar, October 25, 2007.

S. 2302 (Harkin)

Food and Energy Security Act of 2007. Reauthorizes broadband program at the Rural Utilities Service through FY2012. Introduced November 2, 2007. Senate Committee on Agriculture, Nutrition, and Forestry reported measure to Senate (S.Rept. 110-220) November 2, 2007; placed on Senate Legislative Calendar.