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Broadband Internet Access: Background and Issues

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Broadband Internet Access: Background and Issues

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 (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. It is likely 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, fixed wireless (including "wi-fi" and "Wi-Max"), broadband over powerline (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. Currently, a number of competing telecommunications companies are developing, deploying, and marketing specific technologies and services that provide residential broadband access.

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.

While President Bush has set a goal of universal broadband availability by 2007, 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 109th Congress is examining the scope and effect of federal broadband financial assistance programs (including universal service), and the impact of telecommunications regulation and new technologies on broadband deployment.

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 needed investment in and deployment of broadband services. The regulatory debate focuses on 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 whether the emergence of municipal broadband networks constitute unfair competition with the private sector.

MOST RECENT DEVELOPMENTS

In the 109th Congress, legislation has been introduced to provide financial assistance to encourage broadband deployment (H.R. 144, H.R. 146, H.R. 1479, S. 14, S. 497, S. 502, S. 1147, S. 1583). The impact of existing laws and regulatory policies on broadband providers and ultimately broadband deployment also continues to be of Congressional interest (H.R. 214, H.R. 2726, H.R. 3146, S. 1294, S. 1349, S. 1504, S. 1583). The adoption, by the FCC, of newly crafted rules relating to unbundling, line sharing and broadband deregulation is expected to play a key role in the broadband debate. Meanwhile, on June 27, 2005, the Supreme Court ruled (*National Cable and Telecommunications Association v. Brand X Internet Services)* that the FCC should be given deference in its decision that cable broadband service should be classified as an "interstate information service."

BACKGROUND AND ANALYSIS

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.

What Is Broadband and Why Is It Important?

The majority of residential Internet users access 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 faster one can download files or hop from Web page to Web page. 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 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.

Many (though not all) offices and businesses now have Internet broadband access. A major challenge remaining (as well as an enormous business opportunity) is providing broadband over "the last mile" to consumers in their homes. The majority of residential Internet users today use "narrowband" access, that is, they connect via a modem through their telephone wire. However, the changeover to residential broadband has begun, as companies have started to offer different types of broadband service in selected locations. While the broadband *adoption* rate stands at approximately 30% of U.S. households, broadband *availability* is much higher. The FCC estimates that roughly 20 percent of consumers with access to advanced telecommunications capability actually subscribe. As of December 31, 2004, the FCC found at least one high-speed subscriber in 95% of all zip codes in the United States.[1]

Broadband Technologies

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 technology, 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 will likely compete with each other based on performance, price, quality of service, geography, user friendliness, and other factors. The following sections summarize cable, DSL, and other prospective broadband technologies.

Cable. The same cable network that currently provides television service to consumers is being modified to provide broadband access with maximum download speeds ranging frp, 200 thousand bits per second (kbps) to as much as 6 million bits per second (Mbps). 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

[1] FCC, *High-Speed Services for Internet Access: Status as of December 31, 2004,* July 2005. Available at [http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0705.pdf]

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. Data transmission speeds typically range up to 3 Mbps for downloading and 768 kbps for uploading. 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 ADSL 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 ADSL service goes down. Like cable broadband technology, an ADSL line is "always on" with no dial-up required. Unlike cable, however, ADSL 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 ADSL deployment is constrained by the distance between the subscriber and the central office. ADSL 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.

Satellite. Satellite broadband Internet service is currently being offered by two providers: Hughes Network Systems (DirecWay) and Starband. 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 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.

Other Technologies. Other technologies are being used or considered for broadband access. 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.[2] 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), digital television broadcasting, 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

[2] For further information, see CRS Report RS20993, *Wireless Technology and Spectrum Demand: Third Generation (3G) and Beyond,* by Linda K. Moore.

unlicensed wireless broadband technology (called "wiMax") has the capability to transmit signals over much larger areas.

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 up to 500 Mbps shared over a maximum of 16 subscribers. The high cost of installing optical fiber in users' homes is the major barrier to FTTH. Several telephone companies are exploring ways to provide FTTH at a reasonable cost. 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.[3]

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 July 7, 2005), as of December 31, 2004, there were 37.9 million high speed lines connecting homes and businesses to the Internet in the United States, a growth rate of 17% during the second half of 2004. Of the 37.9 million high speed lines reported by the FCC, 35.3 million serve homes and small businesses.[4]

According to the International Telecommunications Union, the U.S. ranks 16th worldwide in broadband penetration (subscriptions per 100 inhabitants as of December 2004).[5] Similarly, data from the Organization for Economic Cooperation and Development (OECD) found the U.S. ranking 12th among OECD nations in broadband access per 100 inhabitants as of December 2004.[6] By contrast, in 2001 an OECD study found the U.S. ranking 4th in broadband subscribership per 100 inhabitants (after Korea, Sweden, and Canada).[7]

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

[4] FCC, *High-Speed Services for Internet Access: Status as of December 31, 2004,* July 2005. Available at [http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0705.pdf]

[5] International Telecommunications Union, *Economies by broadband penetration, 2004.* Available at [http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2004.html]

[6] OECD, *Broadband Access in OECD Countries per 100 inhabitants*, December 2004. Available at [http://www.oecd.org/dataoecd/19/42/34082810.xls]

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

Policy Issues

The deployment of broadband to the American home is being financed and implemented by the private sector. The future of broadband is full of uncertainty, as competing companies and industries try to anticipate technological advances, market conditions, consumer preferences, and even cultural and societal trends. What seems clear is that industry believes that providing broadband services to the home offers the potential of financial return worthy of significant investment and some level of risk.

From a public policy perspective, the goals are to ensure that broadband deployment is timely, that industry competes fairly, and that service is available to all sectors and geographical locations of American society. Section 706 of the Telecommunications Act of 1996 (P.L. 104-104) 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."

On January 28, 1999, the FCC adopted a report (FCC 99-5) pursuant to Section 706. The report concluded that "the consumer broadband market is in the early stages of development, and that, while it is too early to reach definitive conclusions, aggregate data suggests that broadband is being deployed in a reasonable and timely fashion."[8] The FCC announced that it would continue to monitor closely the deployment of broadband capability in annual reports and that, where necessary, it would "not hesitate to reduce barriers to competition and infrastructure investment to ensure that market conditions are conducive to investment, innovation, and meeting the needs of all consumers." The Commission's second Section 706 report (FCC 00-290) was released on August 21, 2000. The report concluded that advanced telecommunications capability is being deployed in a reasonable and timely fashion overall, although certain groups of consumers were identified as being particularly vulnerable to not receiving service in a timely fashion. Those groups include rural, minority, low-income, and inner city consumers, as well as tribal areas and consumers in U.S. territories. The FCC acknowledged that more sophisticated data are still needed in order to portray a thoroughly accurate picture of broadband deployment. The FCC's third Section 706 report was adopted on February 6, 2002. Again, the FCC concluded that "the deployment of advanced telecommunications capability to all Americans is reasonable and timely,"[9] adding that "investment in infrastructure for most advanced services markets remains strong, even though the pace of investment trends has generally slowed."[10] On September 9, 2004, the FCC adopted and released its *Fourth Report* pursuant to Section 706. Like the previous three reports, the FCC concludes that "the overall goal of section 706 is

[8] FCC News Release, "FCC Issues Report on the Deployment of Advanced Telecommunications Capability to All Americans," January 28, 1999.

[9] Federal Communications Commission, *Third Report*, CC Docket 98-146, February 6, 2002, p. 5. See [http://www.fcc.gov/broadband/706.html]

[10] *Ibid.*, p. 5-6.

being met, and that advanced telecommunications capability is indeed being deployed on a reasonable and timely basis to all Americans."[11]

The FCC has also initiated a review to examine policies and rules that affect broadband deployment. Among those is an inquiry (CC 01-337), launched in December 2001, to examine the regulatory treatment of incumbent local exchange carriers in the provision of broadband telecommunications services. Comments have been sought regarding what, if any, changes should be made in how such carriers should be treated for the provision of such services. Action on this inquiry is still pending.

Meanwhile, the National Telecommunications and Information Administration (NTIA) at the Department of Commerce (DOC) was tasked with developing the Bush Administration's broadband policy.[12] Statements from Administration officials indicated that much of the policy would focus on removing regulatory roadblocks to investment in broadband deployment.[13] 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, President Bush endorsed the goal of universal broadband access by 2007.[14] 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 broadband over power lines, and simplifying rights-of-way processes on federal lands for broadband providers.[15]

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*,[16] 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 Advisers on Science & Technology (PCAST) was tasked with studying "demand-side" broadband issues and suggesting policies to stimulate

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

[12] 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]

[13] 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]

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

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

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

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.[17]

Easing Restrictions and Requirements on Incumbent Telephone Companies. The debate over access to broadband services has prompted policymakers to examine a range of issues to ensure that broadband will be available on a timely and equal basis to all U.S. citizens. One issue under examination is whether present laws and subsequent regulatory policies as they are applied to the ILECs (incumbent local exchange [telephone] companies such as SBC or Verizon, are thwarting the deployment of such services. Whether such requirements are necessary to ensure the development of competition and its subsequent consumer benefits, or are overly burdensome and only discourage needed investment in and deployment of broadband services has been the focus of the policy debate. A related issue, whether and to what degree similar or competing services offered by different providers should be regulated is also under review.

Unbundling and Resale. Present law requires all ILECs to open up their networks to enable competitors to lease out parts of the incumbent's network. These unbundling and resale requirements, which are detailed in Section 251 of the Telecommunications Act of 1996, were enacted in an attempt to open up the local telephone network to competitors. Under these provisions ILECS are required to grant competitors access to individual pieces, or elements, of their networks (e.g., a line or a switch) and to sell them at below retail prices. The specifics on how this unbundling should be implemented are detailed by the FCC in its triennial review order.

Triennial Review Order. The FCC, in a February 2003 split decision, modified the regulatory framework regarding how ILECs and competitors interact in the telecommunications marketplace. The "triennial review"order (TRO) (CC Docket 01-338), which was released in August 2003, established new guidelines regarding how ILECs must make their networks available to competitors. Included in the FCC's decision were provisions which: no longer required, over a transition period, that line sharing be an unbundled network element and during each year of the transition increased incrementally the price for the high frequency portion of the loop; eliminated unbundling for switching for business customers using high capacity loops, but gave state utility commissions 90 days to rebut the national finding; gives state commissions nine months to make geographic specific determinations regarding the availability of unbundled elements and the unbundled network element platform (UNE-P); removed unbundling requirements on newly deployed hybrid (fiber-copper) loops but ensured continued access to existing copper and removes unbundling requirements on all newly deployed fiber to the home. (A summary of this order can be found at *Federal Register* Vol. 68, No. 169, September 2, 2003, p. 52276.)

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[17] 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]

Court challenges to this order were consolidated (USTA v.FCC) in the U.S. Court of Appeals, D.C. Circuit. In a March 2, 2004 decision the court vacated a number of key provisions of the TRO, including those dealing with unbundling and delegation of state authority. Claiming that the FCC's conclusions were based on broad assumptions and "...do not support a non-provisional national impairment finding"and that the FCC's definition of impairment "is vague almost to the point of being empty," the Court vacated provisions that call for the unbundling of mass market switching. Similarly, the Court also vacated the FCC's nationwide impairment findings for dedicated transport(e.g. DS-1, DS-3 and dark fiber). Provisions in the TRO that delegate to the states the authority to make determinations regarding the presence of market impairment were also deemed unlawful. According to the court, Congress in the 1996 Act did not "... delegate to the FCC the authority to subdelegate to outside parties [the states]." The Court ruled that it was unlawful for the FCC to give to the states the authority to have such a major role in determining the range of network elements the CLECs should have access to and the use of the UNE-P. (However, the Court did uphold the authority given to the states to petition the FCC to waive, for specific markets, the general "no impairment" finding reached by the FCC over unbundled switching for the enterprise [large business] market.)

The Court, however, upheld the broadband provisions of the order including those that phase out line sharing and remove unbundling requirements for newly deployed hybrid loops and fiber- to-the-home. While the Court did concede that some impairment might exist, it found that "... the Commission [FCC] reasonably found that other considerations [e.g., the encouragement of facilities based competition, the need to give incumbents greater incentives to invest in their own infrastructure, and the overall policy goal of Section 706 of the 1996 Telecommunications Act to ensure the nationwide deployment of advanced services] outweighed any impairment." While the Court ordered a 60-day stay (until May 3, 2004) of the ruling pending appeal, the FCC requested and was granted a 45 day extension (until June 15, 2004) during which negotiation of commercial agreements on network access were undertaken. To date, some commercial agreements have been announced.

A decision by the Solicitor General and the FCC not to appeal the ruling to the US Supreme Court and a subsequent refusal by the Supreme Court to stay the Appeals Court ruling have resulted in the FCC's implementation, with exceptions, of interim rules freezing current interconnection rates (i.e., those in place as of June 15,2004) and agreements for six months effective September 13, 2004, or until permanent rules are adopted, if earlier. The interim order also calls for a second subsequent six month phase, absent the adoption of permanent rules, that calls for some increase in ILEC rates for existing agreements but calls for the addition of new agreements at market-based rates. (See *Federal Register*, Vol. 69, No. 176, September 13, 2004, p.55111.)

In a December 15, 2004 action the FCC adopted final unbundling rules in the TRO remand proceeding. In a 3-2 vote the FCC clarified the relationship between ILECs and competitor's access to the incumbents network elements. Included among these rules are those that eliminated, after a one-year phase out, unbundling for mass market (i.e., residential and small business market) local circuit switching (thereby eliminating the UNE-P); established a test to determine unbundling requirements for DS1 loops and transport; and dropped dark fiber loops from the list of elements the ILEC's must share with competitors. These rules took effect on March 11, 2005, replacing the interim rules released in August 2004. (See *Federal Register,* Vol. 70, No. 36, February 24, 2005, p.8940.).

The focus has now shifted to three forums: to the FCC as it attempts to implement the adopted, permanent rules; to the industry players as they continue to negotiate access agreements; and to the D.C. U.S. Appeals Court where petitions challenging the FCC established rules have been consolidated for judicial review.

Proponents' Views. Those supporting the lifting or modification of restrictions claim that action is needed to promote the deployment of broadband services, particularly in rural and under served areas. Such restrictions, they claim, are overly burdensome and discourage needed investment in broadband services. According to proponents, unbundling and resale requirements, when applied to advanced services, provide a disincentive for ILECs to upgrade their networks. ILECs, they state, are the only entities likely to provide these services in low volume rural and other under served areas. Therefore, proponents claim, until these regulations are removed the development and the pace of deployment of broadband technology and services, particularly in unserved areas, will be lacking. Furthermore they state, unbundling and resale discourages the development of facilities based competition, decreasing the economic growth in jobs and innovation that result from the deployment of new infrastructure. Proponents also cite the need for regulatory parity; cable companies who serve approximately 70 percent of the broadband market are not subject to these requirements.

Opponents' Views. Opponents claim that the lifting of restrictions and requirements will undermine the incentives needed to ensure that the BOCs and the other ILECs will open up their networks to competition. Present restrictions, opponents claim, were built into the 1996 Telecommunications Act to help ensure that competition would develop in the provision of telecommunications services. Modification of these regulations, critics claim, will remove the incentives needed to open up the "monopoly" in the provision of local services. Competitive safeguards such as unbundling and resale are necessary, opponents claim, to ensure that competitors will have access to the "monopoly bottleneck" last mile to the customer, particularly in markets, such as the residential market, that are less likely to attract competitive entry. Therefore, they state, modification of these provisions of the 1996 Telecommunications Act will all but stop the growth of competition in the provision of local telephone service. A major change in existing regulations, opponents claim, would not only remove the incentives needed to open up the local loop but could result in the financial ruin of providers attempting to offer competition to incumbent local exchange carriers. As a result, consumers will be hurt, critics claim, since the hoped-for benefits of competition such as increased consumer choice and lower rates will never emerge. Furthermore, they claim, the use of resale and unbundling allows CLECs to penetrate markets and develop their own customer base, subsequently providing the scale economics needed to justify the building of their own facilities.

Open Access. Legislation introduced into the 106th Congress (H.R. 1685 and H.R. 1686) sought to prohibit anticompetitive contracts and anticompetitive or discriminatory behavior by broadband access transport providers. The legislation would have had the effect of requiring cable companies who provide broadband access to give "open access" (also referred to as "forced access" by its opponents) to all Internet service providers. Currently, customers using cable broadband must sign up with an ISP affiliated or owned by their cable company. If customers want to access another ISP, they must pay extra — one monthly fee to the cable company's service (which includes the cable ISP) and another to their ISP of choice. In effect, the legislation would have enabled cable broadband customers to subscribe

to their ISP of choice without first going through their cable provider's ISP. At issue was whether cable networks should be required to share their lines with, and give equal treatment to, rival ISPs who wish to sell their services to consumers.[18] S. 2863 was the sole measure containing "open access" provisions that was introduced into the 107th Congress; no further action was taken on this measure.

Open access has been debated on the local level, as cities, counties, and states have taken up the issue of whether to mandate open access requirements on local cable franchises. In June 1999, a federal judge ruled that the city of Portland OR, had the right to require open access to the Tele-Communications Incorporated (TCI) broadband network as a condition for transferring its local cable television franchise to AT&T. AT&T appealed the ruling to the U.S. Court of Appeals for the Ninth Circuit. On June 22, 2000, the Court ruled in favor of AT&T, thereby reversing the earlier ruling. The court ruled that high-speed Internet access via a cable modem is defined as a "telecommunications service," and not subject to direct regulation by local franchising authorities.

The debate thus moved to the federal level, where many interpreted the Court's decision as giving the FCC authority to regulate broadband cable services as a "telecommunications service." On September 28, 2000, the FCC formally issued a Notice of Inquiry (NOI) to explore whether or not the Commission should require access to cable and other high- speed systems by Internet Service Providers (ISPs).[19] On March 14, 2002, the FCC adopted a Declaratory Ruling which classified cable modem service as an "interstate information service," subject to FCC jurisdiction and largely shielded from local regulation. However, on October 6, 2003, the 9th U.S. Appeals Court in San Francisco vacated the FCC's Declaratory Ruling that cable modem service is an exclusively "interstate information service." Subsequently on August 27, 2004, the FCC and the DOJ filed a joint petition with the US Supreme Court seeking to overturn the appeals court ruling; the Supreme Court has accepted the case (*National Cable and Telecommunications Association v. Brand X Internet Services*) and oral arguments were held on March 29, 2005. On June 27, 2005, the Supreme Court ruled that the FCC should be given deference in its decision that cable broadband service should be classified as an "interstate information service." While the classification of cable modem service as an "interstate information service" will result in FCC treatment under the less rigorous Title I of the 1934 Communications Act, what this decision means for the regulatory treatment of broadband services remains unclear. Furthermore, what response the Congress will have to this decision and subsequent FCC actions is yet to be determined. (For more information on the *Brand X* decision, see CRS Report RL32985, *Defining Cable Broadband Cable Internet Access Service: Background and Analysis of the Supreme Court's Brand X Decision*.)

Activities in the 108th and the 109th Congress

In the 109th Congress, legislation has been introduced to provide financial assistance to encourage broadband deployment (H.R. 144, H.R. 146, H.R. 1479, S. 14, S. 497, S. 502, S.

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[18] Cable companies have announced access agreements with unaffiliated ISPs either voluntarily (e.g. AT&T Broadband) or as part of merger approval conditions imposed by the FCC and FTC (e.g. AOL-Time Warner).

[19] See [http://www.fcc.gov/Bureaus/Miscellaneous/Notices/2000/fcc00355.pdf]

1147, S. 1583). The impact of existing laws and regulatory policies on broadband providers and ultimately broadband deployment continues to be of Congressional interest (H.R. 214, H.R. 2726, H.R. 3146, S. 1294, S. 1349, S. 1504, S. 1583). What impact the adopted FCC rules on unbundling, line sharing, and broadband deregulation will have on legislative activity in the 109th Congress remains to be seen.

Legislative proposals related to providing financial assistance for broadband deployment were considered by the 108th Congress. In the Jobs and Growth Tax Relief Reconciliation Act of 2003 (H.R. 2/P.L. 108-27), the Senate inserted a provision allowing the expensing of broadband Internet access expenditures. However, this provision was not retained during the House/Senate Conference. The broadband expensing provision was subsequently attached to S. 1637, the Jumpstart Our Business Strength (JOBS) Act. On May 11, 2004, S. 1637 was passed by the Senate as a substitute amendment to H.R. 4520. However, the broadband expensing provision was not retained in the final version of H.R. 4520, which subsequently became public law.

In January 2003, the Senate Commerce Committee held a hearing on telecommunications competition. The Committee also held three days of hearings in April and May 2004, on the Telecommunications Act of 1996 in anticipation of possible reform efforts to be undertaken in the next Congress. In February 2003, the House Energy & Commerce Committee held two hearings on the "Health of the Telecommunications Industry" — one from the perspective of investors and economists, the other from the perspective of all five FCC Commissioners and followed up with a May 19, 2004 hearing on technology convergence and implications for a future review of the 1996 Telecommunications Act. Broadband deployment and regulatory issues were prominent in all hearings.

Legislation in the 107th Congress

During the 107th Congress, H.R. 1542 (Tauzin-Dingell), a measure to ease certain legal restrictions and requirements on Bell operating companies and other incumbent local exchange companies (ILECs) providing broadband service, passed (273-157) the House, as amended, on February 27,2002. In response, three measures S. 2430, S. 2448, and S. 2863 addressing broadband deployment, were introduced in the Senate. S. 2430 sought to encourage deployment by establishing "regulatory parity" among the various providers of broadband, while S. 2863 called for market forces to regulate residential broadband services. S. 2448 provided for loans to spur broadband deployment in underserved areas. Two other measures, S. 1126 and S. 1127, dealing with broadband deregulation were previously introduced in the Senate on June 28, 2001. None of these measures were enacted.

The Farm Security and Rural Investment Act of 2002 — signed into law on May 13, 2002 as P.L. 107-171 — contains a provision authorizing the Secretary of Agriculture to make loans and loan guarantees to eligible entities for facilities and equipment providing broadband service in rural communities. Section 6103 makes available, from the funds of the Commodity Credit Corporation, a total of $100 million through FY2007 ($20 million for each of fiscal years 2002 through 2005, and $10 million for each of fiscal years 2006 and

2007). P.L. 107-171 also authorizes any other funds appropriated for the broadband loan program.[20]

LEGISLATION

H.R. 144 (McHugh)

Rural America Digital Accessibility Act. Provides for grants, loans, research, and tax credits to promote broadband deployment in underserved rural areas. Introduced January 4, 2005; referred to Committee on Energy and Commerce and the Committee on Ways and Means.

H.R. 146 (McHugh)

Establishes a grant program to support broadband-based economic development efforts. Introduced January 4, 2005; referred to Committee on Transportation and Infrastructure and to Committee on Financial Services.

H.R. 214 (Stearns)

Advanced Internet Communications Services Act of 2005. Seeks to promote investment in and deployment of advanced Internet communications services by placing limitations on FCC and state regulation of those services. Introduced January 14, 2005; referred to Committee on Energy and Commerce.

H.R. 1479 (Udall)

Rural Access to Broadband Service Act. Establishes a Rural Broadband Office within the Department of Commerce which would coordinate federal government resources with respect to expansion of broadband services in rural areas. Directs the National Science Foundation to conduct research in enhancing rural broadband. Expresses the Sense of Congress that the broadband loan program in the Rural Utilities Service should be fully funded. Provides for the expensing of broadband Internet access expenditures for rural communities. Introduced April 5, 2005; referred to Committees on Science and on Energy and Commerce.

H.R. 2418 (Gordon)

IP-Enabled Voice Communications and Public Safety Act of 2005. Encourages the rapid deployment of Internet Protocol (IP) enabled voice services for emergency services including 911 and E-911 calls. Introduced May 18, 2005; referred to Committee on Energy and Commerce.

H.R. 2726 (Sessions)

Preserving Innovation in Telecom Act of 2005. Prohibits municipal governments from offering telecommunications, information, or cable services except to remedy market failures

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[20] For a discussion on how the broadband provision of P.L. 107-171 has been funded in the 108th and the 109th Congress, see CRS Report RL30719, *Broadband Internet Access and the Digital Divide: Federal Assistance Programs,* by Lennard G. Kruger.

by private enterprises to provide such services. Introduced May 26, 2005; referred to Committee on Energy and Commerce.

H.R. 3146 (Blackburn)

Video Choice Act of 2005. Seeks to promote deployment of competitive video services and to eliminate redundant and unnecessary regulation. Introduced June 30, 2005; referred to Committee on Energy and Commerce.

S. 14 (Stabenow)

Fair Wage, Competition, and Investment Act of 2005. Allows the expensing of broadband Internet access expenditures. Introduced January 24, 2005; referred to Committee on Finance.

S. 497 (Salazar)

Broadband Rural Revitalization Act of 2005. Establishes a Rural Broadband Office within the Department of Commerce which would coordinate federal government resources with respect to expansion of broadband services in rural areas. Expresses the Sense of Congress that the broadband loan program in the Rural Utilities Service should be fully funded. Provides for the expensing of broadband Internet access expenditures for rural communities. Introduced March 2, 2005; referred to Committee on Finance.

S. 502 (Coleman)

Rural Renaissance Act. Creates a Rural Renaissance Corporation which would fund qualified projects including projects to expand broadband technology in rural areas. Introduced March 3, 2005; referred to Committee on Finance.

S. 1063 (Nelson)

IP-Enabled Voice Communications and Public Safety Act of 2005. Encourages the rapid deployment of Internet Protocol (IP) enabled voice services for emergency services including 911 and E-911 calls. Introduced May 18, 2005; referred to Committee on Commerce, Science and Transportation.

S. 1147 (Rockefeller)

Amends the Internal Revenue Code of 1986 to provide for the expensing of broadband Internet access expenditures. Introduced May 26, 2005; referred to Committee on Finance.

S. 1294 (Lautenberg)

Community Broadband Act of 2005. Amends the Telecommunications Act of 1996 to preserve and protect the ability of local governments to provide broadband capability and services. Introduced June 23, 2005; referred to Committee on Commerce, Science and Transportation.

S. 1349 (Smith)

Video Choice Act of 2005. Seeks to promote deployment of competitive video services, eliminate redundant and unnecessary regulation, and further the development of next generation broadband networks. Introduced June 30, 2005; referred to Committee on Commerce, Science and Transportation.

S. 1504 (Ensign)

Broadband Investment and Consumer Choice Act. Seeks to establish a market drive telecommunications marketplace, to eliminate government managed competition of existing communication service, and to provide parity between functionally equivalent services. Introduced July 27, 2005; referred to Committee on Commerce, Science and Transportation.

S. 1583 (Smith)

Universal Service for the 21st Century Act. Amends the Communications Act of 1934 to expand the contribution base for universal service and to establish a separate account within the universal service fund to support the deployment of broadband service in unserved areas of the United States. Introduced July 29, 2005; referred to Committee on Commerce, Science and Transportation.

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