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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, 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 the FCC's position is not to intervene at this time, some assert that legislation is necessary to ensure fair competition and timely broadband deployment.

A variety of legislative proposals were considered by the 107th Congress. H.R. 1542 sought to ease certain legal restrictions and requirements, imposed by the Telecommunications Act of 1996, on incumbent telephone companies who provide high speed data access. Proponents assert that restrictions must be lifted to give incumbent local exchange companies (ILECs) the incentive to build out their broadband networks. Opponents argue that lifting restrictions would allow the ILECs to monopolize voice and data markets. An alternative approach, establishing "new tools" to ensure that markets are open to competitors, was also considered.

Another proposal would compel cable companies to provide "open access" to competing Internet service providers. Supporters argue that open access is necessary to prevent cable companies from creating "closed networks" and stifling competition. Opponents of open access counter that healthy competition does and will exist in the form of alternate broadband technologies such as DSL and satellite.

Finally, legislation in the 108th Congress seeks to accelerate broadband deployment in rural and low income areas by providing loans, grants, or tax credits to entities deploying broadband technologies.

MOST RECENT DEVELOPMENTS

In the 108th Congress, legislation has again been introduced to provide financial assistance to encourage broadband deployment. In January and February 2003 the Senate Commerce and House Energy and Commerce Committees held hearings on "the health of" and competition in the telecommunications industry. Broadband deployment and regulatory issues were prominent topics in these hearings. What impact the March 2, 2004 vacatur, by the DC US Appeals Court, of key provisions of the FCC's February 2003 "triennial review"order on unbundling, line sharing, and broadband deregulation as well as the completion on December 3, 2003 of the BOC in-market long distance application process will have on legislative activity remains to be seen. The Senate Commerce Committee held three days of hearings, in April and May, on the 1996 Telecommunications Act in anticipation of possible reform efforts to be undertaken in the next session of Congress. House Energy and Commerce held hearings in May to examine technological convergence and its implications for revision of the 1996 Telecommunications Act. Meanwhile, on March 26, 2004, President Bush endorsed the goal of universal broadband access by 2007. This was followed, on April 26, by the release of an Administration broadband policy endorsing: a ban on broadband taxes, more spectrum for wireless broadband and standards for broadband over power lines, and rights-of-way on federal lands for broadband providers.

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?

According to a February 2004 telephone survey conducted by Nielson/NetRatings, 75% of Americans have some type of online access at home. 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. Currently, approximately 20-25% of U.S. households in the United States have broadband access. 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 20-25% of U.S. households, broadband *availability* is much higher. As of December 31, 2003, the FCC found at least one high-speed subscriber in 93% of all zip codes in the United States.

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 from 3-10 million bits per second (Mbps), and upload speeds from 128 thousand bits per second (Kbps) to 10 Mbps. In practice, transmission speeds range from several thousand Kbps to 1.5 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 on a neighbor's Internet connection.

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 via range up to 7 Mbps for downloading and 1 Mbps 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 and Starband. The service costs between $60 and $70 per month; there are roughly 200 thousand subscribers. 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 many Americans, 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 residential broadband access. Terrestrial or fixed wireless systems transmit data over the airwaves from towers or antennas. Though mostly used for businesses, fixed wireless Internet is beginning to be deployed for residential broadband service. Advantages are the flexibility and lower cost of deployment to the customer's home (as opposed to laying or upgrading cable or telephone lines). Disadvantages are line-of-sight restrictions (in some cases), the susceptibility of some technologies to adverse weather conditions, and the scarcity of available spectrum. 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. Additionally, 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.

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 rates in excess of one gigabit per second (1000 Mbps). 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.[1]

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 June 8, 2004), as of December 31, 2003 there were 28.2 million high speed lines connecting homes and businesses to the Internet in the United States, a growth rate of 20% during the second half of 2003. Of the 28.2 million high speed lines reported by the FCC, 26 million serve homes and small businesses.[2]

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

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

[2] FCC, *High-Speed Services for Internet Access: Status as of December 31, 2003,* June 8, 2004. Available at [http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0604.pdf]

suggests that broadband is being deployed in a reasonable and timely fashion."[3] 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,"[4] adding that "investment in infrastructure for most advanced services markets remains strong, even though the pace of investment trends has generally slowed."[5] On March 17, 2004, the FCC issued a Notice of Inquiry for its Fourth Report pursuant to Section 706. The Fourth Report is expected to be released in September 2004.

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.[6] Statements from Administration officials indicated that much of the policy would focus on removing regulatory roadblocks to investment in broadband deployment.[7] 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

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

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

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

[6] 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]

[7] 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]

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.[8] Then on April 26, 2004, citing that the U.S. now ranks 10th in the world in broadband deployment, President Bush announced a broadband initiative which includes promoting legislation which would permanently prohibit all broadband taxes, making spectrum available for wireless broadband and creating technical standards for broadband over power lines, and simplifying rights-of-way processes on federal lands for broadband providers.[9]

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*,[10] 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 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.[11]

Some assert that legislation is necessary to ensure fair competition and timely broadband deployment. The debate has centered on two specific proposals. Those are: 1) easing certain legal restrictions and requirements, imposed by the Telecommunications Act of 1996, on incumbent telephone companies that provide high-speed data (broadband) access, and 2)compelling cable companies to provide "open access" to competing Internet service providers. Each course of action is strongly advocated or opposed by competing telecommunications and/or Internet-related interests.

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

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

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

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

[11] 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]

services. Two such regulations are the restrictions placed on Bell operating company provision of long distance services within their service territories, and network unbundling and resale requirements imposed on all incumbent telephone companies. 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.

Provision of InterLATA Services. As a result of the 1984 AT&T divestiture, the Bell System service territory was broken up into service regions and assigned to regional Bell operating companies (BOCs). The geographic area in which a BOC may provide telephone services within its region was further divided into local access and transport areas, or LATAs. These LATAs total 164 and vary dramatically in size. LATAs generally contain one major metropolitan area and a BOC will have numerous LATAs within its designated service region.

Telephone traffic that crosses LATA boundaries is referred to as interLATA traffic. Restrictions contained in Section 271 of the Telecommunications Act of 1996 prohibit the BOCs from offering interLATA services within their service regions until certain conditions are met. BOCs seeking to provide such services must file an application with the FCC and the appropriate state regulatory authority that demonstrates compliance with a 14-point competitive checklist of market-opening requirements. The FCC, after consultation with the Justice Department and the relevant state regulatory commission, determines whether the BOC is in compliance and can be authorized to provide in-region interLATA services.[12]

As of December 3, 2003 all four BOCs, Verizon, SBC Communications, BellSouth and Qwest have received approval to enter the in-region interLATA market. Now that the approval process has been complete the FCC's role shifts to monitoring to ensure compliance. Under the terms and conditions of the 1996 Act the FCC is required to monitor the BOCs to ensure compliance with the terms agreed to when they were granted long distance approval. If the FCC determines that a BOC is not fulfilling those terms the FCC is required to order corrections, impose penalties, or suspend or revoke approval. The independent telephone companies, or non-BOC providers of local service, are not subject to these restrictions and were not required to file for approval to carry telephone traffic regardless of whether it crosses LATA boundaries.[13]

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.

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[12] However, the FCC, in a February 2002 decision, established a procedure whereby a BOC can request a limited modification of a LATA boundary to provide broadband services, particularly in unserved or underserved areas.

[13] For a more complete discussion of LATAs and BOC long distance entry see CRS Report RL30018, *Long Distance Telephony: Bell Operating Company Entry Into the Long-Distance Market*, by James R. Riehl.

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 are provisions which: no longer require, over a transition period, that line sharing be an unbundled network element and during each year of the transition increases incrementally the price for the high frequency portion of the loop; eliminate unbundling for switching for business customers using high capacity loops, but gives 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); removes unbundling requirements on newly deployed hybrid (fiber-copper) loops but ensures 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.)

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, a few 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 has resulted in the implementation of the ruling as of June 15, 2004. The focus has now shifted back to the FCC

as it attempts to establish new rules consistent with the Appeals Court ruling as well as the industry players as they continue to negotiate access agreements.

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 will 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 enable cable broadband customers to subscribe to their ISP of choice without first going through their cable provider's ISP. At issue is 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.[14] 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 moves to the federal level, where many interpret 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) which will explore whether or not the Commission should require access to cable and other high-speed systems by Internet Service Providers (ISPs).[15] 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." The FCC is expected to appeal this ruling. Meanwhile, a Notice of Proposed Rulemaking will continue to examine cable modem service issues.

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. However, 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. S. 2863 was the sole measure containing "open access"

[14] 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).

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

provisions that was introduced into the 107th Congress; no further action was taken on this measure.

H.R. 1542 (Tauzin-Dingell). During the 107th Congress, H.R. 1542 (Tauzin-Dingell) was passed by the House, but was not taken up by the Senate. The intent of the bill was to encourage the deployment of broadband services to rural and underserved areas by easing interLATA (local access and transport area) service restrictions imposed on the Bell operating companies (BOCs) and loosening unbundling and resale obligations imposed on incumbent local exchange carriers (ILECs). Specifically, H.R. 1542 sought to amend provisions contained in Sections 271 (BOC entry into interLATA services) and 251(interconnection) of the 1996 Telecommunications Act (P.L. 104-104). Under present law, Section 271 prohibits the BOCs from offering interLATA services within their service regions until certain conditions are met. H.R. 1542 sought to lift these restrictions for the provision of data traffic; restrictions on voice traffic would remain. The bill permits a BOC to offer high speed data service[16] and Internet backbone service[17] across LATAs within its service territory without having to meet Section 271 requirements. However in a concession to Judiciary Committee concerns the measure considered on the floor was a manager's amendment in the nature of a substitute that incorporated modifications to enhance DOJ oversight. The manager's amendment contained provisions that would require a BOC to notify the Department of Justice 30 days before it offered InterLATA high speed data or Internet backbone services in an in-region state where it had not received Sec. 271 approval. The manager's amendment also contained provisions to preserve antitrust oversight by clarifying that the antitrust laws are: "not repealed by, not precluded by, not diminished by, and not incompatible with, the Communications Act of 1934, this Act or any law amended by either such Act."

H.R. 1542 also sought to amend Section 251 of the 1996 Act by modifying regulations regarding unbundling (sharing) requirements and resale obligations. The bill would have preserved line sharing agreements, using unbundled network elements, for ILEC copper wires. Competitors may also purchase capacity on ILEC fiber facilities but the rates will be regulated by the FCC under rates, terms and conditions that are in accordance with the existing reasonable rate requirements contained in section 201(b) of the 1934 Communications Act. However, for such purposes such high speed data service will be deemed a nondominant service. ILECs will not be required to unbundle fiber loops when these loops are being used for the provisioning of high speed data services. An ILEC is not required to provide collocation at remote terminals but the ILEC must give access to its poles, conduits, and rights of way so competitors may build their own. The bill also prohibits the FCC and the states from expanding an ILEC's obligation relating to providing access to network elements for high speed data services, collocation for high speed data services, or unbundling for high speed data services but permits the FCC and the states to reduce the number of elements subject to unbundling.

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[16] H.R. 1542 defines high speed data services as "information at a rate that is generally not less than 384 kilobits per second in at least one direction."

[17] Internet backbone service is defined as "any interLATA service that consists of or includes the transmission by means of an Internet backbone of any packets, and shall include related local connectivity."

H.R. 1542 also contained provisions dealing with resale of advanced services. Under the bill ILECs are required to offer high speed data services for resale at wholesale rates for three years. After the three year period the ILEC is still obligated to offer these services to competitors but only on a "reasonable and nondiscriminatory basis."

While the states are specifically permitted to continue to regulate circuit-switched (voice) telephone services, the FCC and the states are generally precluded from regulating high speed data services or the Internet.

H.R. 1542 also contained provisions to provide Internet users with access to the Internet service provider (ISP) of their choice. The bill requires ILECs to: provide Internet users with the ability to subscribe to and have access to any ISP that is interconnected to the carrier's high speed data service; permit ISPs to acquire the facilities and services necessary to interconnect with the carrier's high speed data service for the provision of Internet access service; and permit equipment collocation to the extent necessary for the provision of Internet access service.

Additional provisions would: clarify that the BOC's may not bundle or offer long distance voice services with high-speed data offerings, even if the voice services were offered at no charge; prohibit subsidies on high-speed data services ensuring parity with non-local exchange companies regarding subsidies;[18] and prevent the FCC from imposing fees, taxes, charges, or tariffs on Internet services.

H.R. 1542 also requires the BOC's to meet the following broadband network build-out schedule: 20 percent of the company's central offices in a state must be capable of providing high speed data services within one year of enactment of the legislation; 40 percent within two years; 70 percent within three years; and 100 percent within five years. An additional provision ensures that none of the provisions contained in the bill would abrogate or modify any existing carrier interconnection agreements. Another provision prevents discriminatory treatment among ISPs with respect to special access. It requires ILECs to provide ISPs with special access within the same period of time it provides such access to itself or an affiliate.

The bill also contained a provision to increase the FCC's enforcement powers by increasing fines and investigatory powers. The maximum fines that the FCC may charge for a single offense is increased to $10 million up from the present $120,000 and $20 million for continuing violations. Furthermore the statute of limitations during which the FCC can investigate complaints against companies is increased from one to two years. Consumer protection rules on slamming, spamming, and cramming, among others, are also preserved.

P.L. 107-171 (Farm Bill). Much broadband legislation introduced into the 107th Congress sought to provide tax credits, grants, and/or loans for broadband deployment, primarily in rural and/or low income areas. The Farm Security and Rural Investment Act of 2002 (P.L. 107-171) authorized a loan and loan guarantee program 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

[18] It appears that further clarification may be needed regarding the specific intent of this amendment entitled "Prohibition Discriminatory Subsidies".

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.[19]

Activities in the 108th Congress

Many of the legislative proposals related to providing financial assistance for broadband deployment have been reintroduced into 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.

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.

What impact the court's remand of major portions of the FCC's February 2003 "triennial review"order on unbundling, line sharing, and broadband deregulation will have on legislative activity remains to be seen. Congressional reaction to the court remand has been mixed. House Energy and Commerce Committee Chairman Barton and several other Committee members came out against seeking an appeal. However, House Judiciary Committee Chairman Sensenbrenner and Representative Conyers along with several Senate Commerce Committee members came out in support of an appeal. Additional letters, signed by numerous members of Congress, were sent in favor or against appealing the decision to the Supreme Court. The decision by the Solicitor General and the FCC not to appeal the court remand has now shifted action to both the FCC as it seeks to write rules consistent with the Appeal court's guidelines and industry players as they continue to negotiate agreements.

LEGISLATION

H.R. 138 (McHugh)

Rural America Digital Accessibility Act. Provides for grants, loans, research, and tax credits to promote broadband deployment in underserved rural areas. Introduced January 7, 2003; referred to Committee on Energy and Commerce, Committee on Ways and Means, and Committee on Science.

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[19] For a discussion on how the broadband provision of P.L. 107-171 has been funded in the 108th Congress, see CRS Report RL30719, *Broadband Internet Access and the Digital Divide: Federal Assistance Programs,* by Lennard G. Kruger, pp. 10-12.

H.R. 340 (Issa)

Jumpstart Broadband Act. Requires the FCC to allocate additional spectrum for unlicensed use by wireless broadband devices. Introduced January 27, 2003; referred to Committee on Energy and Commerce.

H.R. 363 (Honda)

Jumpstart Broadband Act. Requires the FCC to allocate additional spectrum for unlicensed use by wireless broadband devices. Introduced January 27, 2003; referred to Committee on Energy and Commerce.

H.R. 768 (English)

Amends the Internal Revenue Code of 1986 to provide a broadband Internet access tax credit. Provides tax credits for five years to companies investing in broadband equipment. Provides a 10% tax credit for "current generation" broadband service (defined as download speeds of at least 1 million bits per second) for rural and low-income areas (both residential and business subscribers), and a 20% tax credit for "next generation" broadband service (defined as download speeds of at least 22 million bits per second) for all residential subscribers and business subscribers in rural and underserved areas. Introduced February 13, 2003; referred to Committee on Ways and Means.

H.R. 769 (English)

Amends the Internal Revenue Code of 1986 to allow the expensing of broadband Internet access expenditures. Introduced February 13, 2002; referred to Committee on Ways and Means.

H.R. 1396 (Markey)

Spectrum Commons and Digital Dividends Act of 2003. Uses proceeds of spectrum auctions to establish a Public Broadband Infrastructure Investments Program at the National Telecommunications and Information Administration. Introduced March 20, 2003; referred to Committee on Energy and Commerce.

H.R. 3089 (Andrews)

Greater Access to E-Governance Act. Directs the Secretary of Commerce to establish a grant program to provide funds to State and local governments to deploy broadband computer networks for the conduct of electric governance transactions by citizens in local schools and libraries. Introduced September 16, 2003; referred to Committee on Energy and Commerce.

S. 159 (Boxer)

Jumpstart Broadband Act. Requires the FCC to allocate additional spectrum for unlicensed use by wireless broadband devices. Introduced January 14, 2003; referred to Committee on Commerce, Science and Transportation.

S. 160 (Burns)

Amends the Internal Revenue Code of 1986 to allow the expensing of broadband Internet access expenditures. Introduced January 14, 2002; referred to Committee on Finance.

S. 305 (Kerry)

Amends the Internal Revenue Code of 1986 to include in the criteria for selecting any project for the low-income housing credit whether such project has high-speed Internet infrastructure. Introduced February 5, 2003; referred to Committee on Finance.

S. 414 (Daschle)

Economic Recovery Act of 2003. Provides a 10% tax credit for "current generation" broadband service (defined as download speeds of at least 1.0 million bits per second) for rural and low-income areas, and a 20% tax credit for "next generation" broadband service (defined as download speeds of at least 22 million bits per second). Introduced February 14, 2003; placed on Senate Legislative Calendar.

S. 905 (Rockefeller)

Amends the Internal Revenue Code of 1986 to provide a broadband Internet access tax credit. Provides tax credits for five years to companies investing in broadband equipment. Provides a 10% tax credit for "current generation" broadband service (defined as download speeds of at least 1 million bits per second) for rural and low-income areas (both residential and business subscribers), and a 20% tax credit for "next generation" broadband service (defined as download speeds of at least 22 million bits per second) for all residential subscribers and business subscribers in rural and underserved areas. Introduced April 11, 2003; referred to Committee on Finance.

S. 1637 (Frist)

Jumpstart Our Business Strength Act. Allows the expensing of broadband Internet access expenditures. Introduced September 18, 2003; referred to Committee on Finance. Reported by Committee on Finance (S.Rept. 108-192) on November 7, 2003; placed on Senate Legislative Calendar.

S. 1796 (Coleman)

Rural Renaissance Act. Establishes a Rural Renaissance Corporation which would fund a variety of types of rural revitalization projects, including a project to expand broadband technology. Introduced October 29, 2003; referred to Committee on Finance.