Building a Positive, Competitive Broadband Agenda

POSITIVELY BROADBAND

AN ITAA WHITE PAPER

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EXECUTIVE SUMMARY

Broadband Internet access is available to a majority of American households, yet consumers are hesitant to use it. Part of the problem is cost. Many people think broadband is just too expensive. Part of the problem is service. Stories of woe about customers attempting to add Digital Subscriber Line and other broadband services abound. The Information Technology Association of America (ITAA) believes most of the problem is really about content. Broadband content and applications are simply not rich and varied enough today to attract a mass market of consumers. To shift the public discourse about broadband from supply-side infrastructure build out to the steps necessary for demand-side broadband market development, ITAA has launched the Positively Broadband campaign.

This white paper is the campaign's first call to action—a call to create a positive, competitive broadband agenda. ITAA believes that stakeholders in this issue must work together to achieve widespread public awareness and acceptance of broadband technology. To this end, ITAA will work to build support for the Positively Broadband campaign and, in February 2002, key constituencies will come together to address these issues in a high-level policy forum. The purpose of this forum will be to create a substantive public policy roadmap and to foster broad, cross-sectoral agreement on the most effective route to mass market broadband in the U.S.

ITAA views broadband technology as the next important high tech "change agent" for U.S. economic growth and expansion. The U.S. embrace of the Internet for business-to-business and business-to-consumer commerce has been a model for the world to follow. Moreover, the Internet has played a major role in helping companies gain highly cost effective control over enterprise-wide legacy data and applications. This phenomenon has driven productivity, job growth, new business development, lower prices, greater convenience, supplier competition, choice and many other market and consumer benefits. In short, the Internet has been an incredible boon to the overall strength of the U.S. economy.

Many small and mid-sized companies as well as consumers, however, connect to the Internet with slow-speed, dial-up connections. This type of connection operates at speeds too low to take practical advantage of many online options. Even so, consumers seem willing to make do. A September 2001 ITAA survey of 1000 American voters found roughly half of Americans households with Internet access and a high-speed alternative stick to their dial-up modems.

If broadband services are widely available but not yet popular, one must ask why this is so. Broadband speeds make transmission of multiple communications signals available over a single circuit or frequency. The additional bandwidth means networks can deliver a wide array of digital services over the same lines, make data intensive applications not just possible but practical, provide this service on an "always on" basis, and all this while allowing multiple family members or business colleagues to operate from the same network connection at the same time.

The power of broadband will only be achieved by rich content and sector-by-sector innovations.

With broadband, the opportunity is now to move America's online community and the overall economy to the next level of economic growth. This will not be today's typical uses of broadband—most of which consist of zippier web surfing and faster e-mail. The power of broadband will be achieved by the rich content and sector-by-sector innovations that only high-speed networks make possible. A better balance of value and cost will no doubt move more consumers to purchase broadband service.

This white paper examines several areas where broadband applications seem best suited to solve the problems of average Americans. These applications fall in the areas of e-work, e-education, e-government, e-health, and e-entertainment. The advantages of each are discussed.

ITAA also recognizes that even with the demand issue solved, consumers may still hang back if they do not feel as safe and secure in cyberspace as they do in their every day lives. A positive, competitive broadband agenda must help build the privacy and security comfort zone around this new medium. Consumers often confuse online "privacy" with security issues. The differences between the two must be clarified and the risks of cyber crime put into appropriate perspective.

Following the September 11 attacks on America, the public also needs to understand that the Internet is a critical national infrastructure and must be hardened as part of overall homeland cyber defense. This white paper suggests practical steps for protecting both online privacy and security.

A positive, competitive broadband agenda must be built on a strong public policy foundation.

A positive, competitive broadband agenda must be built on a strong public policy foundation. A principled approach must guide the construction process. The building blocks of this agenda are:

- A market-driven, non-regulatory approach to mass market creation;

- A visionary approach that seeks to advance national interests while remaining technology neutral in broadband implementation;
- An allegiance to competition and the strength of innovation derived through multiple players in every market niche;
- An understanding that legal parity between online and offline realms must be preserved and discrimination avoided;
- A determination to balance the rights of legitimate intellectual property owners with society's right to knowledge and information.

Agenda building will also require the active engagement of stakeholders: government, industry and consumers. Roles for each must be well defined, balanced and appropriate.

Federal, state and local governments can serve as early adopters in the delivery of highly innovative services to the citizen. Lawmakers should consider demand-focused tax incentives in areas like e-work, e-health and e-education. Targeted tax credits and federal loan guarantees, along with pilot programs, could help build consumer demand within rural areas. Governments should continue support of public education and life long learning through the adaptation of broadband technology. Beyond direct financial support of specific initiatives, governments should also consider support for mechanisms that communicate the benefits of e-education. Government must help safeguard the nation's high tech supremacy through future investment. Making the R&D tax credit permanent would be an important step in this direction. Governments should also eliminate defunct regulatory regimes and special interest policy barriers to broadband adoption. These barriers exist in interstate commerce and reciprocity, copyrights, international treaties and radio frequency spectrum.

Governments must also play an active role in building the online comfort zone. Active enforcement of existing laws is an absolute must. Congress and state legislatures must consider whether cyber crime fighting organizations within government are adequately staffed and equipped to pursue criminal investigations effectively. Criminality is not the only hazard in cyberspace. Government must also help provide a level of consumer protection from questionable marketing practices and other excesses. Broadband must meet the requirements for accessibility by the physically disabled as do other technologies.

Shifting from a supply- to demand-side agenda represents many challenges but offers many rewards.

Roles for industry in a positive, competitive broadband agenda include the responsibility to use broadband to create innovative solutions and to evolve these solutions as needs and interests change. Companies must respond to competitive pressures for standards-based, interoperable approaches to broadband connectivity. The standards are not just for infrastructure and device interoperability but must also advance the delivery of customer benefits in specific application domains.

Efficiency and productivity define the online experience and drive consumer satisfaction. Companies must integrate gigabit speeds into ever more efficient business operations. This will require the investment of considerable intellectual and monetary capital to achieve. Companies must act to protect these investments by protecting the value of their intellectual property.

Consumers must participate in the development of a positive, competitive broadband agenda by articulating needs and pushing industry to fulfill those needs. Participation means a willingness to explore the benefits of broadband in multiple walks of life.

The Positively Broadband Campaign . . . moving beyond the current deployment impasse.

Shifting the public discourse from a supply- to demand-side agenda represents many challenges but offers consumers many rewards. The Positively Broadband campaign is intended to help stakeholders move beyond the current deployment impasse and accelerate market acceptance of this technology. To this end, the campaign issues the following call to action:

Think about broadband service in new ways. Consider its potential to transform how people live, work and play. Look at how broadband technology can be leveraged to support conventional business processes and practices. Work within companies, industry groups and other organizations to build a better value proposition for the American consumer;

Explore the Positively Broadband campaign's goals and objectives. This program is designed to move beyond narrowly focused deployment issues. Discuss the campaign with other stakeholders, constituents, colleagues and thought leaders. Decide whether a positive, competitive broadband agenda for the nation is the proper course to follow.

Consider participating in the Positively Broadband campaign. Participation could include posting campaign materials on a website, using its documents in meetings, working with others in industry, policy makers and elected officials to explain its goals and taking an active part in the February 2002 conference and roadmap development.

ITAA stands ready to work with any companies or organizations interested in building a positive, competitive broadband agenda.

INTRODUCTION

America stands at the threshold of a high-speed Internet revolution called broadband. Crossing the line from great expectations to practical realities has, however, proven elusive. The same American public that embraced the PC and the dial-up Internet seem slow to take this next step. Ironically, the country that has led the world in spending for computers, software, and telecommunications appears willing to explore cyberspace using a 56 kbps modem.

As the national economy passes through a slow growth, perhaps even no-growth cycle, many look to broadband as an important economic stimulus. This expectation is based on an impressive track record. The U.S. is the world leader in information and communications technology (ICT) products and services, representing almost 35 percent of global spending. U.S. spending on ICT has increased 70 percent since 1992, to almost $762 billion in 1999. Between 1992 and 1999, ICT in the U.S. has achieved a compound annual growth rate of 7.8 percent, compared to 7.5 percent for the rest of the world.[1]

This comparison understates U.S. growth, however, given that other countries began the decade of the 90s with a very small installed base of information technology. To put U.S. ICT spending into a more specific context, member nations of the G-8 experienced a compound annual growth rate of 5.2 percent for the same years. The U.S. is also one of the world's largest per capita ICT spending nations. The IT industry has contributed to U.S. economic growth in other important ways.

Can broadband deliver the next bounce for the U.S. economy?

According to the Department of Commerce, the IT industry accounts for a full third of all real economic growth and half of all productivity growth between 1995 and 1999. IT has helped the economy contain inflation with average annual computer price declines of 26 percent between 1995 and 1999.

The U.S. leads the world in Internet use. Widespread consumer embrace of broadband could make a huge economic benefit even bigger still. The Brookings Institution suggests that broadband could add $300 billion per year of consumer benefits and an additional $100 billion of producer benefits.[2]

Can broadband deliver the next bounce for the U.S. economy? Not at current spending levels. The situation may be confounding and perhaps even a bit vexing to policymakers and broadband service providers. But the best explanation for this hesitance may also be the most straightforward. Simply put, consumers lack a compelling reason to make a broadband connection. To date, the focus of public policy discussion has been on infrastructure deployment. The assumption: build it and they will come. This line of thinking has truly proven to be a field of dreams. In this scenario, unfortunately, Shoeless Joe becomes Clueless Joe and the fans stay away in droves.

Missing is a positive, competitive broadband agenda that will put broadband solutions "in the ballpark" for most Americans. The Positively Broadband agenda will shift debate from the limited interest politics of supply to the almost limitless possibilities of consumer demand.

This white paper lays the foundation for building such an agenda. Developed by the Information Technology Association of America (ITAA), an Arlington, Virginia-based trade group representing over 500 corporate members, this document moves beyond a builder's point of view. ITAA membership spans the information technology industry, drawing together leading companies from the computer hardware, software, services and telecommunications sectors as well as those specializing in low and high speed Internet connectivity, e-commerce, web hosting, mobile commerce and other areas. ITAA members recognize that even the best technology solves nothing if it is not used, and that every new high tech product or service must pass the same basic test: acceptance. Broadband has far to go to reach widespread consumer acceptance.

Moving beyond "field of dreams" approaches will require active engagement by stakeholders.

The arguments presented in this document are simple and straightforward. After establishing a working definition of broadband technology and its significance, the discussion moves to where the market for high speed Internet service stands today. Clearly, studies demonstrate that a gap exists in the mass market between broadband supply and demand. Results of a new ITAA national opinion survey reflecting consumer attitudes about broadband are also included here.

This paper explains why this demand gap exists and how it can be closed. Doing so—and moving beyond field of dreams approaches—will require active engagement of all stakeholders: industry, government and consumers. The rules of engagement must be based on a series of market-driven, pro-competitive principles. These are discussed. Finally, the current lack of progress will not change without action on the part of the players involved. The roles for stakeholders in achieving a positive, competitive broadband agenda are explained in the final section of this white paper.

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1 Digital Planet 2000, World Information and Technology Services Alliance and IDC, November, 2000.

2 Cyberatlas, "Growing Broadband Market Could Lift Economy," Michael Pastore, July 16, 2001.

WHAT IS BROADBAND?

At its most basic level, "broadband" refers to the capability of digital technology to combine and transport multiple forms of communications media, including audio, text, data, music, video and other formats. The physical pathway can use one or more transmission media, such as copper/coaxial wire, optical fiber or radio spectrum.

Speed is also an important part of the definition, and it is measured both coming and going. Downstream speeds of 1.54 Mbps or higher deliver broadband services like streaming video, interactive online games and downloads of high-resolution graphics, music and video shorts like move trailers. Because of the nature of these particular applications, the upstream transmission requirement for these services can be far less. On the other hand, 1.54 Mbps may be too slow to support high bandwidth applications like video on demand. Throughput speed is in the eye of the beholder, however, and some organizations are willing to include far slower rates in their definition.[3]

Broadband has become synonymous with high speed Internet connectivity. This service is provided in multiple ways, cable modem and Digital Subscriber Line (DSL) being most common. Other broadband delivery mechanisms include fiber optic, fixed wireless, digital broadcast, third generation wireless, and satellite.

HISTORY AND CURRENT STATUS OF BROADBAND

If deployment were the only measure, broadband would be a significant success story. Over 70 percent of U.S. households now have access to cable modem service and this percentage will grow to over 90 percent by 2005. DSL service is available to 45 percent of homes today and will grow to 74 percent by 2005. As these numbers suggest, a majority of U.S. households do have access to broadband today.[4]

These are impressive numbers, spurred on by marketplace competition and the pro-competitive provisions of the Telecommunications Act of 1996. Prior to 1996, telephone companies had experimented with, but dropped, DSL technology. The Act required incumbent telephone companies seeking long distance markets to open their facilities to Internet service providers, other local exchange providers, broadband companies and other telecommunications competitors. This access gave investors the certainty needed to invest in entrepreneurial broadband firms. New carriers quickly deployed DSL services, and this competitive pressure forced incumbent telephone companies to do likewise. At the same time, cable operators pumped over $50 billion to upgrade their systems to offer high speed video and data services, spurred by digital video programming competition from satellite providers.

Table 1: Internet Subscription Census [5]

July, 2001	Subscriber
2-Way Cable	4,935,542
DSL	3,117,000
Satellite	114,000
Dial Up	61,286,220
Internet TV	1,223,000

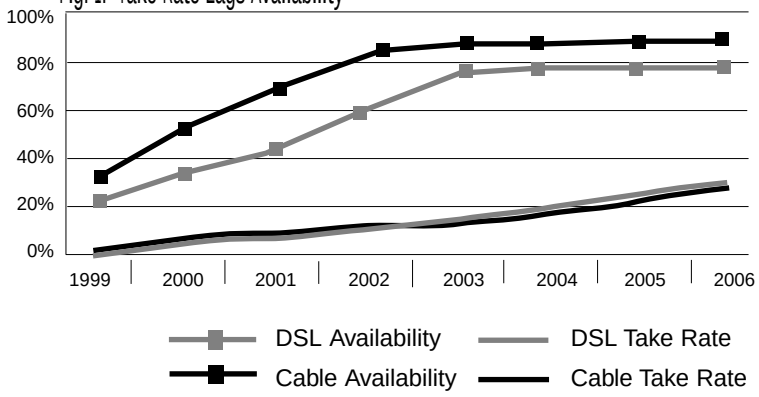
Infrastructure deployment, of course, is only part of the answer. For now, even if broadband alternatives are available, most Americans seem more than willing to stick to their dial up connections. Table 1 tells the story. Internet users in the U.S. are 12 times more likely to have dial up versus cable modem connections and 20 times more likely to have dial up than DSL. Across all formats, Americans are about seven times more likely to have a narrowband connection than a broadband connection.[6]

Americans are about seven times more likely to have a narrowband connection than broadband connection.

While high speed Internet service is available to approximately 86 million U.S. households, roughly 11.5 million homes (or 11 percent) will subscribe to any type of broadband service by year-end 2001.[7] The difference between availability and utilization is the present day demand gap. As Figure 1 makes clear, the "take rate" among consumers for either DSL or cable services substantially lags behind their mass market availability.

3 Emarketer, "The Broadband Revolution: You Say You Want a Definition," Ben Macklin, March 6, 2001.
4 McKinsey & Co. and JPMorgan H&Q, Broadband 2001 and International Data Corp., 2001.
5 "Number of U.S. Households Online Grows in Second Quarter," Michael Pastore, CyberAtlas, August 8, 2001; "U.S. Internet Audience Up 16 Percent in Past Year" by CyberAtlas staff, CyberAtlas, August 13, 2001.
6 CyberAtlas, August 2001.
7 The Yankee Group, E-Networks and Broadband Access, September 2001.

Fig. 1: Take Rate Lags Availability

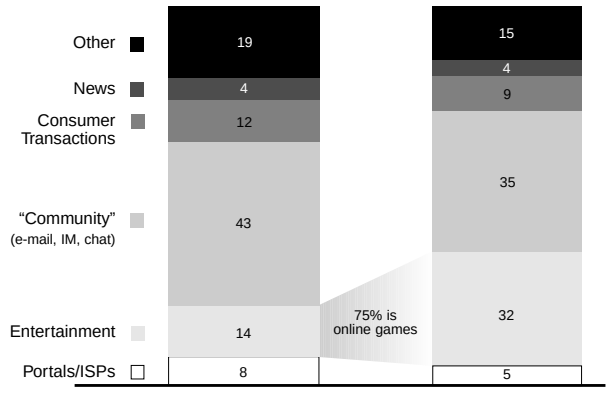


Source: Morgan Stanley Dean Witter, July 2001

An ITAA survey of 1000 Americans conducted in September 2001 similarly detected a broadband demand gap, albeit not as large.[8] Sixty-four percent of respondents said DSL or cable service is available in their home areas, but only 19 percent said they utilize a high speed Internet connection. The bottom line: almost half of American households with Internet access and a high-speed alternative continue to rely on a dial up modem.

A closer look at usage patterns may help explain the lag. People making dial up connections spend an average of 15.9 hours per month on the Internet. A majority of this time is spent in "community" activities: email, interactive messaging and chat (See Figure 2).

Fig. 2 Comparison of Dial-Up and Broadband On-Line Activities



Source: Media Matrix, Mar. and Sep. 2000, and McKinsey and JPMS analysis

Community usage is more popular than news, transactions and entertainment combined. The picture shifts slightly when users move to broadband service. Overall time spent online increases 35 percent, and use of entertainment websites and content more than double. Three-fourths of the increase in entertainment, however, is focused on online games.

For consumers using broadband today, speed is their motivation. Thirty-two percent found dial up connections just too slow; another 31 percent wanted faster access to high bandwidth content.

SHIFTING FROM SUPPLY TO DEMAND AGENDA

If broadband services are widely available but not yet popular, attention must shift to asking why this is so. Inevitably, this must lead to the demand side of the equation. History suggests that adoption periods for important technology products and services have dropped sharply over time. Electricity, for instance, took 48 years to reach 30 percent of Americans, the telephone 36 years, television 17 years and the Internet seven years.

What are consumer hang-ups with broadband? The ITAA survey indicates a substantial percentage of respondents consider high speed Internet too expensive (32 percent). An almost equal number either say they are not interested or lack a compelling reason to make the switch (29 percent). Zippier email and faster games are not enough. For most Americans, broadband service is either too expensive or too unimportant.

A better balance between cost and benefits will no doubt prove critical to generating broadband demand. Other factors will also come into play, including the availability of rich content and intuitively useful applications; improved installation and service delivery; creation of an online environment that preserves individual liberties while assuring safety and reliability; a principled policy approach on the part of government, industry and consumers; and the willingness of stakeholders to take the necessary steps forward. All are important; none obviate the essential truth of the current situation: broadband simply must deliver more bang for the buck.

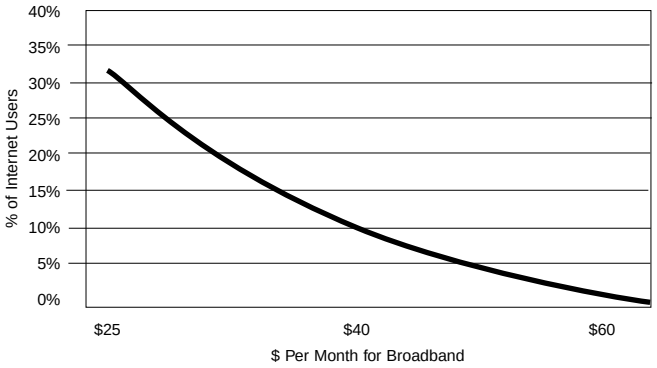
8 ITAA National Broadband Survey, a random sample telephone survey conducted by the Winston Group, September 2001. Results have an error margin of +/- 3.1 percent at the 95 percent confidence level.

AT WHAT PRICE BROADBAND?

While the potential of broadband to deliver a new range of digital products and services is compelling, the consumer's return on investment remains cloudy. According to the ITAA survey, 32 percent of respondents with dial up Internet connections called the upgrade to faster service too expensive. Broken down by income level, responses remained the same. Individuals making over $100,000 per year were just as likely to cite the price pinch as those making under $15,000 per year.[9]

This survey finding suggests that either or broadband prices must fall or the value proposition for mass market broadband service needs to be significantly enhanced. A separate survey conducted by the Strategis Group found just over one-third of online consumers willing to purchase broadband service at $25 per month, and only 12 percent willing to pay current rates of $40 or more a month. (See Figure 3). Price is a significant issue, particularly when additional cost simply means faster email or more responsive web surfing.

Fig. 3 Willingness to Pay for a Broadband Connection



Source: The Strategis Group

While cost for connection is clearly a factor, current market forces may argue against price chopping as an effective means of generating a mass market. Broadband providers face declining advertising revenues. Consolidation and bankruptcy have forced several competitors from the field, decreasing downward pressure on consumer prices. Faced with substantial upfront investment to build infrastructure and higher costs per broadband subscriber, service providers will be looking to recover their investment dollars and improve their margins by raising prices. Other competitors may determine upward pressure on prices. As prices increase for dial-up services, broadband providers may feel empowered to raise prices in order to maintain the cost differential between slow and fast speed services.

How can the value proposition be improved?
The answer lies not just in faster pipes—but fuller pipes.

With these factors suggesting that lower prices are unlikely, the upside for mass market broadband will be determined by a better value proposition. How can the value proposition for broadband be improved? The answer lies not just in faster pipes—but fuller pipes.

IT'S THE CONTENT, STUPID

If the market can shift gears from broadband supply to demand, communication will be the gearshift and content the high-octane fuel that powers this market forward. The ITAA survey suggests that consumers will look to broadband to provide a range of lifestyle enhancing content, but that a significant segment needs to be educated about the benefits of this medium.

Respondents who said they used regular phone dial-up Internet access were given a list of items that could be available if they had high-speed access, and then asked if this would cause them to purchase high-speed Internet services. The items listed were:

- Acquire new education or training for you or your children
- Work from home part time or full time
- Improve the range of healthcare information available to you or a family member
- High definition video – movies and other video over your PC
- CD quality Internet radio
- Online game play

Forty-four percent said they would purchase high-speed services after hearing this list, with 17 percent saying they definitely would. In contrast 41 percent said they would not purchase high-speed service, with 25 percent saying definitely not. Clearly, better content will motivate a major percentage of the marketplace; better awareness and education are needed to persuade an almost equally large percentage.

9 ITAA National Broadband Survey, September 2001.

Most observers agree that, at least for now, broadband lacks a so-called "killer app." Perhaps, but e-working may be a big step in this direction.

Get to Work

In the private sector, "e-work" is becoming either an alternative to traditional office work, an occasional opportunity for employees to meet business and personal demands, or a supplement to regular work hours at the office when the traditional nine-to-five day is just too short. E-work using information technology has made location irrelevant, and means that "work" need no longer be a place. E-work raises many issues, not the least of which involve corporate culture and management style. Even so, technology will prove decisive. Most e-workers (three of four) today connect from home to office with a dial-up modem. In the ITAA survey, 58 percent of respondents said faster Internet access at home would make telecommuting a better option; only 21 percent disagreed. To come at the question from the opposite perspective, a Parks Associates study produced this year found that 80 percent of broadband households have at least one telecommuter.

E-work using information technology has made location irrelevant.

These data suggest that telecommuters may be the most critical market for broadband success, at least in the early going.

Other e-work statistics are also compelling:

- Approximately 19 million people in the U.S. currently e-work, and this number is expected to grow to 32 million by 2004[10]
- In 1997, imports of petroleum products exceeded U.S. domestic production for the first time; by 2020, 64 percent of petroleum products will be imported[11]
- Federal, state and local governments will spend over $126 billion in 2001 on highway projects[12]
- Working from homes consumes three times less energy than commuting[13]
- E-workers save 52.9 minutes of commute time each workday[14]
- E-workers spend more time on the computer than any other activity
- An e-working option is a significant employee recruitment and retention option

One large telecommunications company found that a single pilot program in one year saved 110 million commuting miles and thereby avoided polluting the environment with the emission of 50,000 tons of CO2, 600 tons of CO and 250 tons of Nitrogen Oxide.[15]

The Infinite Classroom

Many of the people engaged in broadband-assisted e-work may also be prime candidates for e-learning. Faster Internet access in this application area covers homes, K-12 schools, colleges and universities, proprietary and vocational/technical schools and more. Market research firm IDC places the e-learning marketplace at $23 billion by 2004 and notes that 90 percent of colleges will offer this form of education by the end of 2004.[16] In addition, almost all public schools are now connected to the Internet, with classroom connections up 20-fold since 1994.[17]

The potential of e-learning originates in its flexibility. "Students" can be the traditional classroom variety, but they can also be life long learners; working men and women seeking after hours professional, technical or vocational training or certifications; individuals living in geographically remote areas; or others for whatever reason unable to be physically present in a conventional learning setting.

Demographics may make e-learning inevitable. High school seniors in 2008 will represent the largest graduating class in U.S. history.

Demographics may make e-learning inevitable. High school seniors in 2008 will represent the largest graduating class in U.S. history. Looking even farther ahead, the number of college age students in the U.S. will jump 4.3 million by 2015.[18] With a relatively finite set of colleges and universities, schools will either be forced to become more selective or seek alternative means to deliver education.

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10 Appendix II: ITAC Testimony to MD Senate, April 3, 2000 and Cahners In-Stat Group, Entering the Access Era: U.S. Telecommuter Demographics & the Impact of Fragmentation on IT Platforms, February, 2001, page 9.
11 Telework Promotion Act of 2001.
12 Ibid.
13 Statement for the Record, Rep. Scott McInnis, June 12, 2001.
14 International E-work Association and Council, 1999.
15 AT&T E-work Program.
16 CyberAtlas, "Companies, Universities Moving Toward E-Learning," Michael Pastore, April 2, 2001 and "eLearning is Burgeoning," Maximilian Flisi, eBusiness Trends, April 26, 2001.
17 CyberAtlas, "US Schools All But Wired," Michael Pastore, February 23, 2000.
18 Work America, "A Wake-Up Call for Higher Education," National Alliance of Business, June 2001.

Examples of e-learning are as close as the nearest Internet enabled computer:

- BrainPop (www.brainpop.com) offers an eye-popping assortment of educational content, including movies, quizzes, comic strips and more. Designed for the 9- to 12-year old set, Brain-Pop movies are watched by students and teachers one million times every month (The company distributes its content to AOL@School, McGraw-Hill Learning Network, National Geographic, Washingtonpost.com and other high traffic sites).

  BrainPop Executive Producer Chanan Kadmon says the Flash-driven website is designed primarily for users with a 56 kbps dial up modem. If broadband were widely available, Kadmon says Brain-Pop movies could add vibrancy, animation detail and motion, adopt higher quality sound, and play on a full rather than fractional screen.

- Sound is a key component of the Favorite Poem Project at Boston University (http://www.favoritepoem.org). This multimedia website, part of Poet Laureate Robert Pinsky's Favorite Poem Project, features videos of 50 everyday Americans reading their favorite poems. Says Project Director Maggie Dietz:

  "…the Favorite Poem Project website is rich with streaming video—most significant are the almost-fifty three-to-seven minute videos of regular Americans saying aloud and talking about the poems they love. These videos, which have been regular features on the NewsHour with Jim Lehrer, were created for television viewing—though, of course, we saw the necessity (in terms of broader, more lasting reach) of digitizing them and making them available via the Internet.

  "The pleasure of viewing them online, however, is limited—the small viewing box (enlargements distort the quality), the sometime-sputtering and stop-start of watching them with a dial-up modem. Certainly, those users with broadband connections can enjoy them more as they were intended. More broadband users would mean that more people could see the videos, share them, use them as teaching tools—another way to extend the project's reach. There are those now who cannot even get them to play on slow dial-up modems. 56K does work, but, as I mentioned, spottily."

- The FUTURES Channel (www.thefutureschannel.com) provides content to "educators in any setting." This multimedia site combines video, sound, image and print resources. FUTURES provides curriculum content on demand in formats that fit easily into teacher lesson plans.

- At the University of Michigan, the Electron Microbeam Analysis Laboratory uses high speed Internet connections to make time on its scanning electron microscope available to school children. At the University of Washington, the high-speed connections of the Neptune Project give students access to real-time images and data from the ocean floor.[19]

Even with resources like these available, many teachers are slow to make the Internet an important part of everyday classroom life. In a survey conducted this year by NetDay, an education technology nonprofit organization, eight out of ten teachers said computers and Internet access could improve education quality but most use it less than 30 minutes per day. The survey finds that to the extent the Internet is used, it is primarily a research tool; only 42 percent of teachers use the Internet to build a lesson plan and only 38 percent update lesson plan content with online materials. Up to 50 percent cited lack of equipment, support or access speed as barriers to their use of online resources.[20]

Singing the Body Politic Electric

Nineteenth century poet Walt Whitman tried to reflect the rhythms of his country in verse. Governments today have the opportunity to build the rhythms of national life into high-speed networks. E-Government presents government agencies with unprecedented options for round-the-clock, citizen-centric service delivery and the American people with the chance to interact with the democratic process and institutions in new and compelling ways. E-government promises more transparency, better efficiency, new services and greater confidence.

Governments today have the opportunity to build the rhythms of national life into high speed networks.

E-gov does not simply automate processes or on-line transactions. Moving to e-gov means changing the way public services are delivered and managed. E-gov transforms the relationship between government and citizens, businesses, employees, and other governmental entities. An e-government will have little resemblance to government today.

Many government interactions with citizens, for instance, are already being conducted on websites or portals, including www.firstgov.gov. E-gov will transform the procurement process and enable numerous transactions, including tax payments, issuance of licenses and permits, regulatory compliance filings, con-

19 "Kids, Academics Share Internet2," Katie Dean, Wired News, September 10, 2001.
20 CyberAtlas, "Teachers Say Internet Improves Quality of Education," Michael Pastore, April 5, 2001.

tractor payments, surplus inventory auctions and more. E-gov will also help government agencies communicate more effectively with employees, including information on benefits, retirement, skills development, schedules and news. Inter-government e-gov transactions could cover tighter integration of federally mandated entitlement programs, including bulk data and electronic fund transfers.

These concepts are well captured in the innovative portal developed by the state of North Carolina, NC@YourService (http://www.ncgov.com/). The citizens section gives visitors access to information on vehicle registration and drivers licenses, professional licenses, vital records, social services, relocation, jobs, bills in the state legislature, news and much more. Businesses can tap the portal for information on bids, taxes, licenses, regulations, road construction, complaints, building permits, labor rates, court opinions and much more critical information on state and local business requirements.

Innovative examples of e-gov include Neighborhood Knowledge Los Angeles (NKLA) (http://nkla.sppsr.ucla.edu/). A program that joins the creative resources of the Community Information Technology Center of the UCLA Advanced Policy Institute, the National Telecommunication Information Administration, FannieMae Foundation, the Los Angeles Housing Department and Microsoft Corporation, NKLA provides an online public policy tool and helps the city of Los Angeles ward off deterioration of neighborhood buildings. NKLA makes data about the city's building code enforcement efforts available on the web in a manner that is understandable to laymen. The system provides an early warning mechanism for building deterioration and, as the organization notes, allows residents to track inspections like Federal Express tracks packages.

The American people appear to be all for it. Seventy-three percent of those in a recent poll said e-gov should be a high priority.[21] Currently, less than one percent of transactions between government and citizens are handled online, but that is likely to change soon.[22] Market research firm Input estimates that the federal government is spending one out of every four dollars earmarked for IT products and services on e-government, or about $7.2 billion. This total is expected to grow 10 percent a year for the next five years.[23]

Healthy Returns

Broadband and other advanced information technologies present the American public with the opportunity to reduce overall health care expenses by lowering the costs of completing administrative and clinical transactions. Currently, the health care industry wastes money completing duplicative faxing, copying, and data entry efforts. Advanced information technologies have the potential to correct these inefficiencies by electronically storing and managing volumes of information that can be used to accomplish multiple tasks. Based upon previous studies, ITAA believes that an industry-wide investment in IT of $18.1 billion would yield gross savings of greater than $120 billion dollars for the health care industry over a six-year period—savings that could be passed along to the consumer in lower health care costs.

In addition to containing costs, advanced information technologies furnish health care providers with the opportunity to improve patient care by streamlining clinical processes and creating a seamless flow of information. Currently, health care providers use paper-based records to record a patient's receipt of health care services. Unfortunately, the use of such records leads to the inadequate documentation of the care-giving process, a severe disruption in the flow of patient related information, and a substantial delay in the delivery of health care services. Advanced information technologies—such as computer-based patient records, portable computers, and expert information systems—alter this situation by providing clinicians with real-time access to patient information at the point of care.

Broadband and other advanced information technologies provide physicians with the opportunity to extend the distance at which patient consultations may occur through the advent of information technologies such as telemedicine. Telemedicine is the use of information technology to deliver medical services and information from one location to another. The use of telemedicine offers both patients and physicians numerous economic and qualitative benefits. For example, telemedicine diminishes traveling expenses typically associated with physician visits; enables patients to engage in preventive medicine; and increases access to health care for traditionally under-served communities.

That's Entertainment?

No application area is more popularly associated with broadband than entertainment. As noted earlier, online gaming is one of the most popular uses among current consumers of fast Internet services. Entertainment is, however, both the boon and bane of broadband adherents. It is also one of the most daunting challenges stakeholders face in moving to a mass market, demand driven broadband marketplace. Here's why.

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21 Council for Excellence in Government poll, January 2001.
22 US News and World Report, February 26, 2001.
23 Federal Computer Week, "E-Gov Leads IT Spending Forecast," William Matthews, December 8, 2000.

Big entertainment companies need big audiences to recoup their investment in content development and distribution. Economies of scale work when a substantial initial cost (such as production of a full length feature movie) is offset by low cost per sale to a mass market audience (the marginal cost involved in filling one theater seat or 1000 theater seats). The prospect of viewers ordering up video on demand has attracted companies to the broadband marketplace like Sony Pictures, MGM, Paramount Pictures, Warner Brothers and Universal.

Entertainment is, however, both the boon and bane of broadband adherents.

The question yet to be answered is how well full-length videos play on the desktop, set top or any other home appliance. At present, entertainment companies can either stream the content or download it in a compressed format. The first method places the viewer at the mercy of what can be an uneven Internet connection; the second method can take three hours or more.

Unlike the motion picture business, software licensing, customer support, server farms and ISP fees cause producer costs for streaming video to increase as viewer ship grows. That's the bad news. Worse still, Jupiter Research says that serving 1000 streaming video viewers costs twice as much as advertisers are willing to pay to reach that audience.[24] The problems of downloaded video are simpler still: they take too long to transmit and can be pirated.

This marriage of signal to device is promising, but the mass market is reacting like a cautious parent.

These kind of economic realities have shuttered some Web-based entertainment companies, forced others to reinvent themselves as video content aggregators, pushed others into the infomercial and movie trailer business, and, for the most strategically oriented, turned the Internet into a farm system for those who one day hope to sell their content in traditional mass market channels. Meanwhile, big traditional entertainment companies will learn from the mistakes of the entrepreneurial class and, selectively, gobble them up if and when they fail.

Serving up the entertainment is one issue; where it will play out is another important broadband consideration. Many question the likelihood that consumers will be willing to spend hours watching videos on a computer display. Delivering the right type of content to the right type of platform (interactive TV, personal digital assistant, digital video recorder, PC, game box, automobile computer console) will doubtless help determine the success or failure of entertainment providers.

Indeed, broadband driven content may be the floodtide that ends the nation's fixation with the PC. Forrester Research says that by 2005 only one-third of the 191 million broadband capable devices will be personal computers.[25]

This marriage of signal to device is promising, but the mass market is reacting like a cautious parent, unwilling to give its blessing just yet. For instance, when consumers seek full-length video on demand, traditional cable may dominate this service far into the future. Particularly as consumers grow to realize that at least one major national video retail outlet is said to make 60 percent of its income from late fees.[26] But other platforms may be ideal for other types of broadband content, including interactive content, video clips, animations, games, music, text and video email, videoconferencing, and radio. If and when the marketplace does give its blessing, consumers could spend upwards of $200 billion a year on broadband entertainment.[27]

Building the Comfort Zone

Interactive television may deliver an unprecedented array of entertainment content to consumers; like other Internet technologies, it may also yield a rich vein of information about consumer preferences, interests and practices. Such data could be used to invade the privacy of the individual viewer for commercial purposes; if it is not adequately protected, the information could also be used in more sinister ways. A positive, competitive broadband agenda must include steps taken to make people feel as safe and secure in the online world as they do in the physical world.

People often say "privacy" but mean "security". Both concepts are important but they also are quite different.

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24 Technology Review, "Broadband's Coming Attractions," Claire Tristram, June 2001 and Broadband Brief, "Will Moviefly Fly?" Banc of America Securities, Douglas S. Shapiro, August 27, 2001.

25 Advisor Media, "PC No Longer the Star When Broadband Becomes More Entertainment-Oriented," November 2, 2000.

26 Streaming Media News, "Panel Holds Forth on Broadband-driven Home Entertainment," Clint Boulton, June 27, 2001.

27 Interactive Week, "Media Giants Get Behind Broadband," Richard Williamson, July 23, 2001.

People often say "privacy" but mean "security." Both concepts are important but they are also quite different. Much of popular concern is really about the latter. Cyber crime falls into several categories. Most incidents are intended to disrupt or annoy computer users in some fashion. Distributed denial of service (DoS) attacks crash servers and bring down websites through the concerted targeting of thousands of email messages to specific electronic mailboxes. Viruses and other malicious code introduce phantom computer software programs to computers, designed intentionally to corrupt files and data. Other online intrusions are conducted to deface websites, post political messages or taunt particular groups or institutions. Even though no one stands to profit, damages caused by such attacks can run from the trifling to the millions of dollars. What motivates these attackers? Hackers may view the attack as a technology challenge, may be seeking to strike a blow against the establishment, may be looking for group acceptance from fellow hackers, or may be just indulging themselves in a perverse thrill.

Other cyber criminals hope to profit from their intrusions by stealing valuable or sensitive information, including credit card numbers, social security numbers, even entire identities. Targets of opportunity also include trade secrets and proprietary information, medical records, and financial transactions.

For some cyber criminals, the Internet is a channel for the dissemination of child pornography and a tool used in the furtherance of other crimes against children and adults. These crimes include fraud, racketeering, gambling, drug trafficking, money laundering, child molesting, kidnapping and more.

Cyber terrorists may seek to use the Internet as a means of attacking elements of the physical infrastructure, like power stations or airports. In many regions of the world, for instance, cyber terrorists encouraging political strife and national conflict can quickly turn the Internet into a tool to set one group against another and to disrupt society generally.

Another class of cyber criminal and, unfortunately, the most common is the insider who breaks into systems to eavesdrop, to tamper, perhaps even to hijack corporate IT assets for personal use. These could be employees seeking revenge for perceived workplace slights, stalking fellow employees, looking for the esteem of peers by unauthorized "testing" of corporate security, or other misguided individuals.

Regardless of category, the threat is real. A recent study produced by Asta Networks and the University of California San Diego monitored a tiny fraction of the addressable Internet space and found almost 13,000 DoS attacks launched against over 5000 targets in just one week. While most targets were attacked only a few times, some were victimized 60 or more times during the test period. For many small companies, being knocked off the Internet for a week means being knocked out of business for good.[28]

The Computer Security Institute/FBI also documents the problem in a widely reported study on computer breaches. This year's survey of 538 respondents found 85 percent experiencing computer intrusions, with 64 percent serious enough to cause financial losses. Estimated losses from those willing to provide the information tallied $378 million, a 43 percent increase from the previous year.[29]

A nationwide public opinion poll released last year by ITAA and EDS showed that an overwhelming majority of Americans, 67 percent, feel threatened by or are concerned about cyber crime. In addition, 62 percent believe that not enough is being done to protect Internet consumers against cyber crime. Roughly the same number, 61 percent, say they are less likely to do business on the Internet as a result of cyber crime, while 33 percent say crime has no effect on their e-commerce activities. The poll of 1,000 Americans also revealed that 65 percent believe online criminals have less of a chance of being caught than criminals in the real world, while only 17 percent believe cyber criminals have a greater chance of being caught.[30]

Privacy is a more ambiguous issue because some people have very strong feelings and will go to great lengths to protect their privacy, while others take a more relaxed view. For instance, shoppers who use bonus cards at the grocery store are willing to share information about their purchases in return for price discounts, personalized coupons and other benefits. Others would rather skip the discounts and keep their purchases private. Consumers understand these choices and generally opt for the greater access, options and convenience of catalogues, credit cards, and 1-800 numbers.

Still, in the Internet space, consumer privacy concerns linger. Eighty-four percent of Americans say they are concerned about businesses or strangers gaining access to their personal information.[31] With this kind of anxiety afloat, broadband stakeholders have a strong incentive to address the issue. Portals, Internet Service Providers, e-commerce sales sites and other Web sites are

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28 "Inferring Internet Denial of Service Activity," David Moore, CAIDA, San Diego Supercomputer Center, University of California at San Diego et al.
29 Computer Security Institute, Press Release, March 12, 2001.
30 Information Technology Association of America, Press Release, June 19, 2000.
31 "Trust and Privacy Online: Why Americans Want to Rewrite the Rules," Pew Internet and American Life Project, August 20, 2000.

striving to earn consumer confidence. They need consumers just as comfortable doing transactions on the Internet as they are handing their credit card to a waiter in a restaurant or providing their credit card information to a ticket seller on the telephone.

Information tracking and collection through cookies, web bugs and other programs may be performed for many reasons and the use of this information could change over time. Tracking one's multiple visits to a prostate cancer website, for instance, could tell a pharmaceutical company about its potential customer but one day raise red flags at insurance companies or future employers. On-board automotive computers could generate data that helps insurance companies better understand how a policyholder is really using a car or perhaps even help a divorce attorney explore where an errant spouse has been spending the night.

These situations are not beyond the realm of possibility, and consumers, assisted by technology, will have to take greater ownership of their privacy preferences to avoid misuse of information and outright privacy invasion. For most commercial interactions, however, the issue is personalization, not some investigator peering through a digital keyhole.

What is personalization? Sophisticated retention of past buying patterns and other data can help a marketer personalize contact with a customer. Successful businesses in the bricks and mortar world do not try to sell just one pair of shoes or one suit; rather, they strive for repeat business. One important way they do so is by knowing their customers –tastes, styles, and preferences. This is no less true online. People value this personal attention in both business-to-business (B2B) and business-to-consumer (B2C) transactions.

The openness and communications power of the Internet provides strong incentives for e-commerce companies to keep their customers satisfied, including protecting their privacy. A company doing business on the Web which fails to meet consumer expectations can expect the word to spread quickly, much more quickly than in more traditional vendor/customer environments. An alternative online bookseller or sporting goods store is literally only a mouse click away. Internet companies must be strongly committed to providing their customers with an online environment that discourages privacy lapses and promotes pro-customer behavior.

The Internet industry has been meeting the challenge to address privacy concerns in "Internet time." The most recent Federal Trade Commission survey of Websites shows that the Internet industry continues to respond rapidly to the challenge of consumer privacy empowerment. When a FTC survey of commercial Websites was first conducted two years ago, they found that only 14 percent posted any disclosure regarding their information practices. By last year, that number stood at over 90 percent.[32]

High-speed Internet services merely increase the need to create this privacy and security comfort zone.

Beyond the restraint that consumers exercise in the use of personally identifiable information, there are numerous state and Federal laws that govern its use. This includes laws affecting financial, medical and children's information, which is widely agreed are three areas that merit special governmental attention. Too often during the discourse on consumer privacy, however, advocates for more laws lump basic consumer transactions, such as buying a book online, with providing information about one's medical condition. As one example in the financial services area, Fair Credit Reporting legislation already gives consumers access to those records that might result in adverse decisions. These processes also give consumers the opportunity to amend their records with clarifying information.

For children's privacy, the Children's Online Privacy Protection Act (COPPA) is already on the books to address the special needs of children.[33]

In many important ways, high-speed Internet services merely increase the need to create this privacy and security comfort zone. The "always on" nature of a cable modem or DSL connection raises the stakes for home users, organizations that may allow a stay-at-home workforce to interconnect with a corporate LAN, and companies seeking to establish a substantial web presence. Connection speed is one obvious difference. An intruder on an unprotected, broadband-enabled PC can be in and out of a company's information assets much faster than if forced to use a dial-up modem.

So how can this comfort zone be achieved? People are a big part of the solution. Whether a home user or an employee at a multinational organization, individuals must take responsibility and become active participants in information security and privacy practices. Better cyber hygiene is an absolute necessity. On the security side, this includes a commitment to:

- identify, adopt and deploy information security best practices;
- change login and screensaver passwords frequently using non-obvious numbers and text characters for desktop log-in;

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[32] Federal Trade Commission, Privacy Online: A Report to Congress, Washington DC June 1998; Wall Street Journal, "FTC finds e-commerce sites fail to guard consumer privacy", May 11, 2000. B12

[33] The Children's Online Privacy Protection Act (COPPA), Title XIII of Pub. L. No. 105-277 (Omnibus Consolidated and Emergency Supplemental Appropriations Act, 1999), 112 Stat. 2681 (Oct. 21, 1998), prohibits unfair and deceptive acts and practices in connection with the collection and use of personally identifiable information from and about children on the Internet.

- deploy strong authentication systems for network log-in;
- update anti-virus software frequently;
- protect sensitive data with directory level passwords, access privileges, and encryption;
- use a hardware or software firewall;
- use software filters to prevent under age access to objectionable content;
- run diagnostic tools and, as appropriate, check web and FTP server logs;
- turn off computers when not in use;
- read software publisher alerts and download security patches;
- talk to children and explain ethical online behavior; set ground rules for talking to strangers on instant messaging.

On the privacy side of the comfort zone, common sense measures include:

- making smart privacy choices;
- keeping an open mind about selective exchange of information in commercial transactions, but consider the consequences of sharing too much personal data, like social security or bank account numbers;
- using P3P or other tools to set privacy preferences and, as necessary, proxy servers to retain anonymity;
- consider setting browsers to block cookies;
- reading privacy notifications on websites and understand how information may be used, shared or sold;
- looking for compliance with best practice seal programs like TrustE on websites;
- selectively opting out of mailing lists;
- dumping Internet temp files periodically;
- encrypting sensitive email traffic;
- using spam filters in email programs.

Broadband connectivity will speed consumers to new levels of access, choice, convenience, and savings. These benefits, however, are accompanied by on-going responsibilities. Privacy and security are chief among these. Broadband stakeholders must work together to create a safe, secure online environment, which preserves the legitimate interests of commerce while keeping intrusions and disruptions at a minimum and raises the confidence of the average high speed Internet user.

A PRINCIPLED APPROACH TO BROADBAND

No less important than its technical underpinnings will be the public policy foundation supporting broadband service. So what are the issues behind a positive, competitive broadband policy agenda? The good news is that many of the pieces for such an agenda are already in place.

> In a free market economy, regulating broadband technology is the political equivalent of trying to hammer Jello to the wall.

Market-Driven

For instance, with few exceptions, a market-driven, non-regulatory approach to the creation and expansion of a new marketplace trumps attempts by policymakers to initiate commercial activity or buyer interest. Only markets can react with requisite speed and business acumen to changes in technology, business strategy, investment, economic conditions, and the like. In a free market economy, regulating broadband technology is the political equivalent of trying to hammer Jello to the wall. Messy and ineffective. Rather, an enlightened public policy on broadband must operate from the core conviction that this technology can deliver substantial economic benefits to all stakeholders and strive to remove regulatory barriers, streamline state and local laws, and harmonize international agreements.

Strategically Focused; Technology Neutral

A principled public policy agenda must be forward looking while not attempting to play technology favorites. Distinctions between content type, mode of transmission—even country of origin—blur quickly and render regulations meaningless. Any attempts by government officials to pick technology winners or losers are futile and, instead, could lead to unanticipated, undesirable consequences. Such consequences include distorting the marketplace, creating false expectations on the part of investors, and slowing the pace of innovation. Policy formulation should instead focus on advancing the national interest through the productive use of broadband. This visionary approach should consider what incentives are needed and what barriers must be removed to reap the benefits of broadband, whether that means bringing quality education to more Americans, conserving energy and lowering pollution levels through e-work, or bringing more citizens into the democratic process through electronic town meetings and other e-government applications.

Pro-competitive

A positive, competitive broadband agenda must in fact nurture competition. As noted earlier, the Telecommunications Act of 1996 created a firm foothold for the development of a competitive broadband marketplace. The Act establishes a competitive framework whereby incumbent local exchange carriers are only able to enter long distance telecommunications markets after having allowed competitors access to their local networks. The Act provides the certainty and predictability companies and investors need to fund high-risk research, develop new products and services, and move markets forward. Attempts to undermine the Act's provisions threaten to assure the 100-year monopoly position of telephone companies far into the future, dry up sources of investment capital for entrepreneurial firms, and ultimately reduce broadband competition. Attempts to expedite the deployment of broadband at any price will indeed exact a very high price on the marketplace, on technology innovation, and on the American consumer.

Non-discriminatory

The nation's broadband agenda must seek legal parity between the offline and online worlds. Numerous attempts already have been made to discriminate against the slow speed Internet. This discrimination takes the form of Internet-only legislation at the federal, state and local levels. Such attempts have been made in areas like taxation, pornography, and privacy. This is not to suggest that pornography should be condoned or new taxes blocked. But singling out the Internet for special laws or regulations will slow its use and discourage competitors. Sensible lawmaking for the Internet should also make sense in every day life.

Balanced Intellectual Property Protections

The Internet increases the natural tension between broad public access to knowledge and information and the private holder's rights in intellectual property. The conflict plays as loud and clear as an MP3 download. Internet users want to find and share their favorite music; artists and publishers want to be paid for their copyrighted works. Technology makes it possible to do both. But the temptation to make a free, high quality copy rather than pay for the music desired often keeps this from happening. So plaintiffs turn to courts and lawmakers for relief.

The Napster lawsuit and shared music brought the issue of intellectual property protection on the Internet to the attention of the American public. The larger issue will only grow as increases in bandwidth capacity make duplication of other works, like videos, more practical. At the same time, however, a reactive Congress could attempt a legislative solution that tips the delicate balance between stakeholders. Draconian laws and excessive penalties will create confusion in the marketplace and drive users from the Internet. Washington over-reaching in areas like patents and database compilations could cast a chill on innovation and dilute if not destroy the Founding Fathers' vision of an enlightened populace.

Technology both provides the tools to make infringement possible and the tools to stop it. Crypto lopes, digital watermarks and other tools can help content owners protect valuable intellectual property, track its usage and collect payments and fees. And in cases where the illegal copying cannot be stopped through these technologies, existing contract, copyright and misappropriation law provides an appropriate legal framework. New business models for distributing and protecting intellectual property are no doubt around the corner, including content offerings that impose strict calendar deadlines on product use.

ROLES FOR GOVERNMENT, INDUSTRY AND USERS

Shifting to a positive, competitive broadband agenda will require the active engagement of stakeholders. Roles for each must be well defined, balanced and appropriate. Over reaching by any of the parties may lead to severe and damaging marketplace distortions; not reaching far enough could leave the nation in its present day broadband impasse.

Roles for Government

Government must play a strategic role in this discussion. The challenge for policymakers here is not to advance the use of broadband technology per se but to improve the lives of the American people. From this perspective, the question for government is how broadband can be used to achieve this purpose. Several roles flow from this point of view.

- *Serve as Early Adopter*
  The federal government has been historically the largest consumer of IT products and services. With the advent of e-government, federal agencies have fallen behind state agency counterparts in fielding Internet-enabled services to the citizen. The federal government must act as a national role model in the adoption of sweeping new technologies. Through its embrace of broadband technology, government could send an important signal to the marketplace that it understands the relevance of high-speed Internet connections to the process of government and the importance of this technology to the overall economy. In addition to upgrading its own operations and services, the federal government should provide leadership and financial resources to state and local governments seeking to incorporate broadband into official operations.

State and local governments can also play an important role here. The City of Chicago, for instance, is using its CivicNet project to aggregate the business of all municipal agencies, including city schools, colleges, housing and transit authorities and park districts, and to thereby speed the development of broadband services. CivicNet will be open to both the public and private sectors. With $32 million in annual voice and data spending, the City is positioning itself as the "anchor" tenant.

- *Create Demand-Focused Incentives*

  Tax breaks are a powerful tool for motivating the American public. Bills now in Congress seek to grant an e-work tax credit. Such a credit would promote employees working from home offices and thereby reduce vehicular commuting. Even a small percentage decline in major metropolitan areas would eliminate billions of tons of pollutants, save energy, reduce stress, improve traffic flow through communities, and cut expenditures for road and bridge construction and maintenance. E-work tax credits would cover expenses associated with creating a home office, including the purchase of IT products and services as well as office furniture.

  Other important incentives could be offered in the form of a streamlined process for paying taxes and claiming tax credits. Many workers may choose not to telecommute simply because the bureaucratic barriers can be formidable. Such barriers include tax authority bias against the e-worker, tax jurisdiction conflicts, and capital gains tax hassles when e-workers decide to sell their homes.

  Similarly enlightened tax policy approaches should be considered in broadband application areas like telemedicine and e-education. Incentives that promote the use of telemedicine could push patients to receive more frequent medical consultations and, as a result, identify the onset of serious diseases in the early going. Savings would quickly flow to the bottom line in terms of reduced Medicare costs.

- *Reach Out to Rural and Under Served Areas*

  Equality of access to high speed Internet service may be as much a function of geography as affordability. Extending DSL and cable modem service to rural communities require substantial investment, while two-way direct satellite broadcast is only recently being introduced in many communities. Last year, a federal government report found less than 5 percent of towns with populations under 10,000 have access to broadband, compared to 65 percent in towns with populations over 250,000.[34] Again, targeted tax credits could help build consumer demand within rural areas. Federal loan guarantees might also play a beneficial role in this regard. Regulatory definitions in existing loan and grant programs should be reviewed to assure that they are not so specifically worded so as to exclude high-speed Internet services. Pilot programs for rural broadband take up should be encouraged and best practices collected.

  Creative thinking is also key to bringing broadband to geographies where sparse population or other factors make competitive provision of broadband unlikely. In the Pacific Northwest, the Bonneville Power Administration is leasing unlit portions of its fiber optic network to Northwest Open Access Network (NoaNet), a non-profit corporation of community owned water and power utilities. NoaNet will use its broadband network to perform utility service functions in remote areas and resell excess capacity to interconnect schools, hospitals, judicial systems, libraries, and emergency services.[35] Government can help bring broadband to under served and economically disadvantaged areas by making access available through libraries, small business centers and other public facilities.

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- *Fund and Support E-Education*

  Governments have an interest in an educated citizenry. This is accomplished through support of the public education system and, increasingly, through access to life long learning experiences. An educated workforce builds competitive advantage for U.S. companies, adds value to U.S. products and services exported abroad, raises the tax base, and expands the economy. Because broadband is an important educational tool, governments have an interest in seeing this technology integrated into the learning process. The Web-Based Education Commission, chaired by then Sen. Bob Kerrey, recognized the importance of broadband accessibility in its first call to action:

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34 Advanced Telecommunications in Rural America: The Challenge of Bringing Broadband. Service to All Americans, U.S. Departments of Commerce and Agriculture, April 2000

35 NoaNet Website, http://www.noanet.net/about/index.html.

36 The Power of the Internet for Learning: Moving from Promise to Practice. Report of the Web-based Education Commission to the President and Congress of the United States.

"Make powerful new Internet resources, especially broadband access, widely and equitably available and affordable for all learners. The promise of high quality web-based education is made possible by technological and communications trends that could lead to important educational applications over the next two to three years. These include greater bandwidth, expansion of broadband and wireless computing, opportunities provided by digital convergence, and lowering costs of connectivity."[36]

Many state and local governments have already heard the call. The Digital California Project, for instance, is a state-sponsored initiative to bring broadband connectivity to all K-12 schools in California. Numerous states, including Missouri, Michigan, Rhode Island, Oregon, Maryland and Oklahoma, have connected their statewide education networks to Abilene, an Internet2 backbone network. Beyond direct financial support of specific initiatives, governments should also consider support for mechanisms that communicate the benefits of e-education and life long learning to economically disadvantaged, geographically remote, older and other offline populations.

- *Invest in the Future*

  Government must support research and development into pre-competitive broadband technologies and applications. Funding of the Internet2 backbone network is an important step in this direction. The R&D tax credit is another investment in the future, allowing companies to mitigate the risks of research into advanced technologies areas. Making the R&D tax credit permanent would give the private sector the predictability needed to invest in sustained research programs.

- *Eliminate Policy Barriers*

  Governments can accelerate society's access to the benefits of broadband by removing public policy impediments to its deployment and use. In the coming months, ITAA will release a "roadmap" to achieving a positive, competitive broadband agenda. Such a public policy roadmap must advocate on variety of issues:

  INTERSTATE CONSISTENCY

  High speed Internet utilization will be hampered by a confusing and conflicting set of federal, state and local laws and regulations. To the maximum extent possible, governments must work to harmonize, streamline and impose consistency on laws and regulations impacting interstate electronic commerce, including the collection of Internet taxes;

  RECIPROCITY

  Reciprocity laws are a significant hurdle to the growth of the Internet generally and high speed Internet specifically. In California, for instance, a resident may receive by out of state shipment no more than two cases of wine per month, with no more than nine liters of wine in each case. Residents of Minnesota, Missouri and Washington, however, can receive no more than two cases per year. In Colorado, the wine customer must be present in person to order the wine, then have it shipped home. Some states require a reciprocal agreement to be on the books before shipment can take place; others do not. Other states forbid growers from advertising of wine, whether online or offline. This confusing thicket of federal, state and local laws and regulations extends far beyond the vineyard, to professional accreditation, licenses and permits. The ability of a physician in Delaware to provide diagnostic services via videoconference to a patient in Utah may be constrained if not completely blocked by state licensing laws.

  COPYRIGHTS

  Unauthorized duplication and retransmission of copyrighted material is wrong and cannot be permitted. At the same time, the Internet must not become so restrictive that usage dissipates and its content richness ebbs. Governments must help create legal frameworks that balance the rights of copyright holders, transmission providers and end users, as embodied in the Digital Millennium Copyright Act. Governments must also be prepared to enforce existing laws and, as necessary, adapt such laws to address the challenges of online media and copyrights more effectively. Examples here include laws to give ISPs reasonable liability protections for copyright infringements of third parties, avoidance of overly broad "sweat of the brow" protections extended to database collections; and the treatment of trademarks in ways that serve the expectations of all portions of the user community.

  INTERNATIONAL TREATIES

  Many potential barriers to broadband adoption have both a domestic and international dimension. Provisions of the Hague Convention, for instance, could hold an ISP liable for copyright, defamation or privacy related judgments by courts anywhere in the world. Such a circumstance could make copyright owners less willing to offer and ISPs less willing to post content, raises difficult to address questions about cultural and social norms, and strains jurisdictional boundaries. Government must work to assure that the interests of the U.S. Internet community are represented in international treaties, agreements, conventions and accords.

[36] The Power of the Internet for Learning: Moving from Promise to Practice. Report of the Web-based Education Commission to the President and Congress of the United States.

SPECTRUM

The future of 3G wireless networks depends on the commercial availability of usable spectrum. The federal government controls spectrum allocation and must work to assure that legacy rules and regulations do not obstruct the implementation of wireless services. Government should review and, as necessary, modify rules, which artificially cap access to higher bandwidth, fail to take into account technical innovations, or impose inflexible and unrealistic zoning restraints on device users.

■ *Build the Comfort Zone*

LAW ENFORCEMENT

Government must actively enforce existing laws as they affect behavior in the online environment. These laws include the Child Online Protection Act, the Computer Fraud and Abuse Act, the National Information Infrastructure Protection Act, and the No Electronic Theft Act. Existing state and federal code pertains to cyberstalking, email threats, credit card theft, racketeering, money laundering, espionage, counterfeiting and other crimes. Law enforcement agencies must have adequate financial, human and legal resources to investigate and prosecute such activity. Because of current shortages in trained and experienced information security professionals, government should create grants, scholarships, internships and loan programs that encourage students to enter this field.

CONSUMER PROTECTION

A move to enhance broadband content may also be accompanied by an onslaught of questionable products and services. As in the physical realm, government must play a role in managing marketplace excesses, including the pursuit of bogus claims and intentional misrepresentations, faulty or harmful products, non-existent accreditation or licensing, and other flagrant practices.

ACCESSIBILITY

Broadband services must meet the same requirements for reasonable access as other technologies in order to support users with physical disabilities and special needs.

Roles for Industry

■ *Innovate and Evolve*

A positive, competitive broadband agenda depends on the ability of the private sector to innovate continuously over time and assure that evolving public needs are met by high-speed Internet connections. This point is absolutely critical

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and underscores why "broadband at any price" policy solutions simply will not work. Monopoly is antithetical to innovation, just as inertia is antithetical to progress. Industry must be constantly striving to match new ideas and changing customer needs with the physical realities of science and technology. Broadband solutions must be both relevant to the problems of today's consumer and flexibly adapt to political, environmental, economic or social change.

■ *Implement Standards and Interoperability*

While competitive pressures have forced many companies to implement solutions and build market share in the broadband space as quickly as possible, competitive pressures will ultimately force companies to adopt standards-based, interoperable approaches to broadband connectivity. Standards support the scale up of the broadband infrastructure, whether that means two-way satellite, cable, cellular, fiber optic or xDSL. Greater scale will mean lower cost to consumers. Common standards in wireless broadband services, for instance, would allow devices to operate without interference at varying frequency bands. Internet Protocol version 6 (IPv6) will accommodate the explosion of Internet accessible hand-held devices and peer-to-peer computing models, but the development of this standard itself must converge with active buy-in of both device manufacturers and network operators. To remain relevant with marketplace changes, standards development must be industry led, not government imposed.

Standards are needed not just for infrastructure and device interoperability, but also within specific application domains. For instance, the diversity of participants in the health care industry and the complexity of their relationships with each other have frustrated the voluntary adoption of industry standards. Standards serve as a convention for the operation and behavior of specific computing functions, formats, and processes; and, therefore, play an important role in computer-to-computer transmissions of electronic information. Without general adoption of industry-wide standards, the ability to speed up transactions through automation is more difficult. More encouragingly, though, is that one of the Internet's appeals as a communications network has been its ability to reduce the need to agree on common communications protocols. It also permits the health care industry to draw on successful networking models in other industries.

- *Maximize Efficiency and Productivity*
  Companies must integrate gigabit speeds into ever more efficient business operations. To do otherwise is to sacrifice competitive position and market share. Enterprise solutions have already begun to include supply chain extranets and corporation-wide intranets. Fat pipes bring new understandings about the richness of information that can be captured, stored and presented, where and when it is needed. Efficiency and productivity define the online experience and drive consumer satisfaction.

- *Protect Private Property*
  Free enterprise is based on creating returns for investors. Companies unable to produce such returns are unlikely to be able to attract capital necessary for research and product development or to sustain the viability of ongoing business operations. Industry, therefore, has a significant role in protecting the value of intellectual property through copyrights and patents.

- *Invest*
  Much of the focus on broadband investment has been supply-side oriented, concentrating on build out of the infrastructure. While important, broadband investment is not exclusively a matter of network transmission. The shift to a demand-side, high speed Internet will require the investment of intellectual capital from multiple industries. This investment will require the transformation of current business processes, tools and technologies to exploit broadband capabilities. Commitment of extensive financial capital will be required to build out the network's last few inches—the intelligent devices, mechanisms, scientific instruments and other domain and application specific equipment that will originate and terminate broadband signals.

Role for Consumers

- *Participate*
  Consumers must participate in the positive, competitive broadband agenda by articulating needs and pushing industry to fulfill those needs. Participation means a willingness to explore the benefits of broadband in multiple walks of life, from telemedicine and e-education to entertainment and online shopping. It can also mean working together as a community to make broadband service feasible.

  The power of consumer demand is formidable. Cooperative purchasing, for instance, has a rich tradition in U.S. history, used in agriculture, insurance, utilities and other businesses. In the broadband realm, many communities may be providing right-of-way to common carrier companies, while failing to receive service because local demand is considered insufficient. Demand aggregation strategies could help introduce broadband service in low-density areas.

CONCLUSIONS

Shifting the public discourse from a supply- to demand-side agenda represents many challenges but offers consumers many rewards. Broadband services have the potential to transform daily commerce, from the elimination of late fees on video rentals to the early detection and prevention of cancer and other health threats. To reach this potential, stakeholders must refocus on the bigger picture—the possibilities made practical realities of high-speed network connections.

Since work began on this white paper in the summer of 2001, the concepts of every day commerce and normal routine for many Americans have been challenged by the terrorist attacks at the World Trade Center in New York and the Pentagon in Arlington, Virginia. The perturbations of these outrageous acts no doubt will be felt for years to come. Whether the specter of terrorism makes the public less likely to travel by airplanes or attend conference gatherings remains to be seen. One can, however, predict that demand for broadband enabled video conferencing and other multimedia services will climb sharply as the result of this horrific event.

In times of crisis or harmony, broadband will play an increasingly important role in the life of the nation.

In the aftermath of September 11, much attention will be concentrated on Internet security and the protection of this critical infrastructure. And rightly so. In the midst of this review, however, policy makers should realize that the nation's communications network took a tremendous hit and responded well. Several nationally recognized portals found themselves unable to manage enormous traffic spikes. Even so, the Internet provided millions of users with an alternative route around clogged or destroyed New York circuits, providing a frantic public with critical services for finding loved ones—services like email, instant messaging, and voice over the internet phone calls. Broadband will play an ever more prominent role in assuring adequacy of communications during national emergencies.

In times of crisis or harmony, broadband will play an increasingly important role in the life of the nation. Why not begin to enjoy the multiple benefits of this technology sooner rather than later? For many years, the Internet existed as a proof of concepta network for government agencies and universities. The advent of low cost personal computers, easy to use software browsers and other innovations brought the Internet to the attention of a global mass market. With the rollout of broadband technology, innovation is once again poised to unleash consumer demand. Now is the time to launch the next generation of Internet computing.

To this end, the campaign issues the following call to action:

- Think about broadband service in new ways. Consider its potential to transform how people live, work and play. Look at how broadband technology can be leveraged to support conventional business processes and practices. Work within companies, industry groups and other organizations to build a better value proposition for the American consumer;

- Explore the Positively Broadband campaign's goals and objectives. This program is designed to move beyond narrowly focused deployment issues. Discuss the campaign with other stakeholders, constituents, colleagues and thought leaders. Decide whether a positive, competitive broadband agenda for the nation is the proper course to follow.

- Consider participating in the Positively Broadband campaign. Participation could include posting campaign materials on a website, using its documents in meetings, working with others in industry, policy makers and elected officials to explain its goals and taking an active part in the February 2002 conference and roadmap development.

ITAA stands ready to work with any companies or organizations interested in building a positive, competitive broadband agenda.