

THE STATUS OF DEPLOYMENT OF DATA SERVICES

HEARING

BEFORE THE

SUBCOMMITTEE ON TELECOMMUNICATIONS,
TRADE, AND CONSUMER PROTECTION

OF THE

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HOUSE OF REPRESENTATIVES

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THE STATUS OF DEPLOYMENT OF DATA SERVICES

TUESDAY, APRIL 11, 2000

HOUSE OF REPRESENTATIVES,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON TELECOMMUNICATIONS,
TRADE, AND CONSUMER PROTECTION,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:10 a.m., in room 2123, Rayburn House Office Building, Hon. W.J. "Billy" Tauzin (chairman) presiding.

Members present: Representatives Tauzin, Stearns, Gillmor, Largent, Cubin, Shimkus, Fossella, Blunt, Markey, Gordon, Rush, Eshoo, Luther, Sawyer, Green, McCarthy, and Dingell (ex officio).

Staff present: Mike O'Rielly, professional staff; Cliff Riccio, legislative analyst; and Andy Levin, minority counsel.

Mr. TAUZIN. The hearing will please come to order. Good morning and welcome.

Today we embark upon a series of hearings on the Internet infrastructure and its impact on how Americans will participate in the new digital economy, both at work and at home. This is not the fireworks hearing. This is not the clash of the carriers. We term this hearing, the hearing on the need for speed. My staff pointed out that when we were growing up, the theme was that speed kills, and today we find out that the lack of speed may kill. So today we embark upon a series of hearings to discover what is broadband and what it means in our lives and what it could mean in our lives if, in fact, everyone has access to it.

There is no denying the fact that the Internet has become an integral part of everyday life for nearly two thirds of all Americans. We rely on it as a primary means of communications, as a convenient tool for doing business and as a rich source of content such as news, music and other important information.

Since the passage of the 1996 Telecom Act, however we have come to understand that the Internet uses an architecture that is, in a large part, separate from the telephone network. The FCC has determined that the Internet is operationally and technologically distinct from plain old telephone or cable service, even though data traffic can pass through some of these same infrastructures.

Most importantly, this new and distinct Internet architecture has facilitated the emergence of new broadband capacity networks, the likes of which we have never before witnessed. Broadband networks can carry much more voice, much more data traffic than narrow band systems can carry. They can also deliver such traffic at

much faster speeds than narrow band lines. This essentially means that digital convergence is a realistic possibility for some time in the near future. It will soon be technologically possible for residences and businesses to receive telephone service, ISP services, digital television service and streamed audio and visual content over one line with no service disruptions or delays. That is pretty exciting. Make no mistake about that.

However, before we get too carried away with all this, we in Congress have an obligation to ensure that all Americans will have access to these digitally converged high speed services via broadband networks. Such access is crucial for many rural and underserved areas of this country to develop in step with the thriving urban hubs that are driving this Internet economy.

In 1995 when we were crafting the Telecommunications Act, we all knew what that saying was, that speed kills. Today, it is clear that with the lack of access, the high speed networks may, in fact, kill, may destroy opportunity, may deny businesses and individuals success and prosperity in their lives. If businesses and residences don't have high speed connections to the Internet backbone, they are relegated to narrow band dirt road, and narrow band dirt roads are so incompatible with the rest of the high speed infrastructure that promises to significantly impede the flow of communications across our Nation's web-based infrastructures.

Let me explain. If certain regions of our country, are crawling at narrow band dial up access, if they are crawling at this slow speed while other areas of the country are utilizing high speed infrastructure, then everyone on the web will be forced at times to operate at narrow band slower speed. If I am connected to you, I am at high speed and you are at lower speed, I am at your speed. It is that simple. And under this scenario, the Internet cannot materialize into the fluid nationwide communications network that all of us are hoping it will be. Instead, ISP subscribers will continue to encounter service disruptions and data transfer delays in every instance where broadband-facilitated high speed traffic is thrust upon narrow band slower speed infrastructure.

Last October in an article published by the Associated Press, John Robbs, CEO of Nortel Networks, estimated that in 1998, 2.5 billion hours were wasted on line as people waited for Web pages to download. But this worldwide wait is only customary in certain parts of the country. Connections to the Internet backbone vary significantly between Houma, Louisiana, and Houston, Texas, Dodgeville and Detroit, Brockton and Boston, Wichita and Washington or Muleshoe and Miami.

Now in order to have speed, American consumers and small businesses must as well have connections to adequate broadband infrastructures. Otherwise, they will not be able to meaningfully participate in the converged digital economy.

As a result, I get worried when I see reports like the one interactive week on line released just this last February. I quote from it. Contrary to many previous predictions, experts now believe that there could be a global bandwidth shortage as the Internet continues to grow rapidly. Furthermore, increases in demand for bandwidth will outstrip increases in capacity by at least twice as much in the coming years. And as more and more subscribers purchase

DSL and cable modem access, public networks will come under increasing pressure. Some analysts say traffic could be 10 times the current level in just a few years. Time and demand for bandwidth could be up to 200 times today's demand by 2005.

If these figures are accurate, then a fear that deployment of advanced services and broadband infrastructure may not extend to many rural, western and underserved areas of this country, and that are no less important, trust me when I tell you this, that are no less important than any other part of this great country.

Just as proximity to railroad lines determined that communities prospered in the 19th century, I hate to think that proximity to POPs or Internet points of presence may ultimately determine which communities prosper in the 21st century. Under such a scenario, I can tell you that it will take too long for adequate broadband infrastructure to reach my own Louisiana's third congressional district.

As a result, my district and others like it will not be in a position to contribute to or to benefit from this new Internet economy.

And to prove it, Diane Press, Idaho, recently summed up what many small communities now face, caught between cumbersome Federal regulation and the hard facts of prudent business investment. Small town America is in danger of missing out on the economic benefits of modern telecommunications technologies. Echoing those sentiments, Nicholas Stegrafonti of MIT has stated that the absence of broadband and the absence of bandwidth would be more isolating, the densest forest of the largest desert.

With all that having been said, today's hearing is not about the regulation of the Internet. Rather, it is about, first and foremost, understanding just how beneficial broadband services are, can be and should be to all consumers in America. It is also about determining what types of broad brand infrastructure are necessary to deploy these advanced services to all Americans.

And finally, today's hearing is being held to discuss how best to avoid a digital divide rather than to be talk about how government can close one, to avoid a digital divide so that broadband tools and services are available to consumers across the country.

We have two panels of witnesses today. I want to welcome them and look forward to their testimony. I think this first panel will have some exciting and interesting demonstrations for us. We can see the potential in the exciting aspects of broadband delivered digital services, and I am confident that they will enlighten us and they will enlighten all Americans of this hearing today on how we will use the Internet in the 21st century.

The Chair yields back and will recognize Mr. Dingell, the ranking minority member of the full Commerce Committee for his opening statement.

Mr. DINGELL. Mr. Chairman, thank you. I ask unanimous consent to be permitted to insert my statement into the record.

Mr. TAUZIN. Without objection.

Mr. DINGELL. So I will try and summarize. Mr. Chairman, I commend you for having this hearing. I believe it is an important one. The issues are going to drive the debate over the telecommunications policy for many years to come. We will hear from witnesses about the critical role of broadband technology in building the Na-

tion's new economy, transforming our health care delivery systems, reinventing the way children are educated. The benefits to the American public are going to be staggering, and I am satisfied that what we are doing today will be the tip of the iceberg.

The question is not how we will benefit but how quickly. Frankly, we are in somewhat of a regulatory mire. We need to know what policies need to be adopted so that these new technologies can be rolled out to the public in the most expeditious manner.

Four years ago, we passed the Telecommunications Act. It is the most sweeping rewrite of telecommunications law since 1934. It was quite an achievement. We are still, however, debating on what we should do to make that legislation, in fact, realize the promise we felt it was going to deliver. To be sure, it has benefited consumers and the economy, but like all legislation, it is not without blemishes and all of our hopes have yet to be materialized. Like all legislation, it simply reflected Congress' best policy judgments based on the facts that we knew at that particular time, but in this information age, the facts change more rapidly than ever before, and those who operate on Internet time find that 4 years is more like an eternity.

With the benefit of 20/20 hindsight, perhaps the most glaring oversight of the Telecom Act was its failure to create with certainty a proper environment for the Internet, one that allows all companies the freedom to innovate and invest in new, more robust ways to carry the vast potential of digital communications to every American at home.

As a result, despite the explosive growth of the Internet, it is still grinding along in low gear. We hear a great deal about the benefits of the information superhighway, but the truth is that most Americans are relegated to the slow lane or even to back roads. Too many consumers remain stuck in low speed dial-up service. They await faster access at reasonable prices and quite frankly, the future growth of electronic commerce demands it.

Unfortunately the Telecom Act did little to create the proper environment for the deployment of broadband services. Worse, it created uncertainties with regard to how the different technologies are treated under law and how they compete to provide services to consumers.

Do we treat one broadband technology as a cable service if it happens to come over fiberoptic and coaxial wires or because it originates with a cable company? Do we create another technology like a telephone service simply because it travels over twisted wire pairs or because it comes from a telephone company? What if the Web pages are beamed on pizza-size dishes from a satellite orbiting above earth? Even though the information service delivered to the consumer is the same, each method of delivery falls under quite a different regulatory scheme in current law, resulting in unfairness to competitors and unfairness to consumers and indeed slows down the delivery of the service which is needed.

This problem has to be resolved. The promise of electronic commerce has catapulted any dot com stock into the stratosphere, but very few have yet to show a profit. The values are staggering, but they are surviving on vapor. The new economy will either sink or

swim, depending on the speed with which the broadband Internet services reach the public.

In my view, all broadband technology should be treated the same from a regulatory standpoint, regardless of the historical mission of the company offering service, and I believe any different view is irresponsible. It should not matter whether the service is offered by a cable company, telephone provider or electric utility. Each should be free to offer the service according to the same rules. If we remove this disparity and uncertainty that accompanies it, I am confident we will see competitive platforms flourish, and the consumer will be the immediate beneficiary.

Mr. Chairman, I thank you for your kindness and for your holding this hearing. I look forward to the result. Thank you.

[The prepared statement of Hon. John D. Dingell follows:]

PREPARED STATEMENT OF HON. JOHN D. DINGELL, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF MICHIGAN

Thank you, Mr. Chairman, for recognizing me. The subject of today's hearing is an important one; in fact, these issues are likely to drive the debate over telecommunications policy for many years to come.

We will hear from witnesses about the critical role of broadband technology in building the nation's new economy, transforming our health care delivery systems, and reinventing the way our children are educated. The benefits to the American public will certainly be staggering, and I am sure the ones highlighted today are just the tip of the iceberg.

The question, though, is not simply how we will benefit, but how quickly. What policies will encourage these new technologies to reach the public in the most expeditious manner?

Four years ago Congress passed the most substantial rewrite of the nation's telecommunications laws since 1934. That Act was quite an achievement. After debating for almost two decades whether to deregulate the telecommunications industry, it was time to break down the barriers to competition once and for all.

To be sure, the Telecom Act has benefitted consumers and the economy greatly since its enactment, but like all legislation, it is not without blemishes. Not all of our hopes have yet materialized.

And like all legislation, the Telecom Act simply reflected Congress's best policy judgments based on facts we knew or anticipated at a specific moment in time. But in the Information Age, these facts change more rapidly than ever before. And for those who operate on "Internet time," the last four years is more like an eternity.

With the benefit of 20/20 hindsight, perhaps the most glaring oversight of the Telecom Act was its failure to create, with certainty, the proper environment for the Internet—one that allows all companies the freedom to innovate and invest in new, more robust ways to carry the vast potential of digital communications to every American home.

As a result, even with its explosive growth the Internet is still, in many ways, grinding along in low gear. While we hear a great deal about the benefits of the "Information Superhighway," the truth is most Americans are relegated to the slow lane.

Mr. TAUZIN. The Chair now recognizes the gentlelady from the west, from Wyoming, Mrs. Cubin.

Mrs. CUBIN. Thank you, Mr. Chairman, for holding this important hearing, but also your commitment and concern to making sure that rural areas are treated the same as urban areas in receiving this technology, also, for your recognition of the fact that Federal regulation really could be a deterrent to deployment of these services as well.

I have always been interested in finding out what broadband Internet technologies are being or soon will be offered to consumers, especially in rural areas. Mr. Chairman, I know that you realize that last year it was reported just 2 percent of U.S. house-

holds have access to high speed Internet service, and even less than that in rural areas. In Wyoming, if consumers have access to the Internet at all, it has been provided mainly over the local telephone lines with narrow band capabilities. If anyone has ever tried to open up a file or download a graphics program using 28 kilobits per second, they soon find out that that is just not fast enough. Wyoming Internet users don't want to get their information from a squirt gun. They would like to get it from a fire hose, and time is money and that is helpful to everyone.

Today several areas of the country are being served with a wide variety of broadband services that deliver from 1.5 million bits per second to 300 million bits per second. I think it is important that the subcommittee holds these types of meetings to find out what Federal policy changes, if any, are needed to help improved telecommunications services.

I hope that this forum will shed some light on the problems facing Americans, especially in rural areas that are trying to keep up with the changing face of global economic, education and communication and determine what role the Federal Government should play in finding solutions to our telecommunications needs. There is no question that small towns across America that lack high speed Internet access will find it harder to attract new jobs and to keep up with the global marketplace.

Consider that in New Jersey, the average distance between a customer and the phone company's nearest switching facility that connects them to the Internet is about 2.6 miles. In Wyoming, the distance is twice that far and in some cases, it is 10 times that far, and the cost to the telephone company of reaching a customer is twice as high. Parts of Wyoming have as few as half a dozen households per square mile compared with the thousands in urban and suburban areas. This discrepancy lessens the incentive to the phone companies, both big and small, to invest in stringing new lines in rural areas where the margin of profit is half of what it is in urban areas.

One way in which I have been working to speed the deployment of new telecommunications services in rural areas is by advocating for the reduction of outdated regulations on companies that serve many rural areas. This streamlining of regulatory burden on small and mid-sized telecommunications providers will allow for greater investment in telephone networks and in new services. It only makes sense, I believe, to provide small and mid-size companies the regulatory environment so that they can both lower prices in response to competition and roll out new high speed data services.

For too long, outmoded rules have held small and mid-sized companies back from serving consumers in rural areas. Federal telecommunication regulations need to be brought into the competitive realities of the 21st century. There is no reason why telecommunication companies that primarily serve rural areas should not have the opportunity to deploy high speed services so we can enjoy the same types of technological advances as people who live in Denver, Chicago, New York and Los Angeles.

New technology has brought billions of dollars worth of revenue to all corners of the globe, and I believe it will bring much needed jobs and revenue into rural America as well. Here in Congress we

have to look and have to work to ensure that the Federal regulatory environment is conducive to luring businesses into rural areas of the country.

Mr. Chairman, thank you again. I appreciate your holding this important hearing.

Mr. TAUZIN. And the Chair now recognizes the gentlelady from California, Ms. Eshoo, for an opening statement.

Ms. ESHOO. Good morning, Mr. Chairman and thank you for holding the hearing today on the status of the broadband and welcome to our panel. Peter Harter is here with Emusic, and I am very proud that they call the 14th Congressional District their home in Redwood City.

Mr. TAUZIN. If the gentlelady would yield, is it true he has brought some Cajun music?

Ms. ESHOO. Yes, I understand that. So you will be highly entertained.

Mr. TAUZIN. I never hear that stuff.

Ms. ESHOO. Because of you we will. Today's hearing addresses one of the most exciting components of the technology revolution, the development and the deployment of the delivery system used to bring the information age into our homes and businesses. The term broadband is used to describe this system in which sufficient bandwidth is used to utilize large amounts of information, whether it be voice, video, graphics or data. The explosive growth and economic success of the Internet is dependent upon the size of this pipeline.

Mr. Chairman, we were here and helped to shape the Telecommunications Act in 1996. As you know, we intended that that legislation deregulate a communications industry in which competition had been choked off by years of monopolistic practices. Since the law was passed we have seen the telecommunications revolution occur with breathtaking speed, in my view. No sooner does one technology seem to offer more speed and capability when along comes another that offers more data and faster. I think the Telecom Act has resulted in a larger menu of broadband delivery options with an increase in competition and it has produced lower prices for consumers across the country.

One of the best examples of this is seen in the development of the development of the competitive local exchange carriers or CLECs. These companies, companies like Covad and Rhythm Networks, are children of the Telecom Act. They provide DSL-based access to the Internet through local loops or their own high speed fiber networks. Once these companies were permitted to offer their services, what happened? Telephone companies that before had only offered the more expensive T-1 lines began to rapidly expand their DSL service, a service I think they could have offered much earlier. The result increased broadband services at a cheaper price.

As we hear today about the outstanding services that are available on the Internet today, I think we need to keep in mind the successes of these recent years. I think we also need to recognize that more dramatic successes are just around the corner. I hope Congress will be patient in permitting the brilliant and creative entrepreneurs, some of whom are here today before this committee, to achieve those successes.

So thank you again, Mr. Chairman, for holding this hearing. It will be interesting and lively, and who knows, we may even dance to the music. I yield back.

Mr. TAUZIN. The Chairman thanks the gentlelady, and speaking of high speed movement, the Chair is now pleased to welcome the chief deputy whip of the majority in this House, also an esteemed member of our committee from Missouri.

Just to give you an idea how important that position is, just a few short months ago the speaker of the House Denny Hastert held the position of chief deputy whip. The gentleman from Missouri, Mr. Blunt, is recognized.

Mr. BLUNT. I thank the gentleman for the introduction. I will tell you, when the speaker knows more about your job than you do, then you are in a tough situation, which I have been in for some time but glad to be there. I am glad to be at this hearing also, and in your theory of high speed movement I think I will let the hearing move on. I don't know that I can say anything better than has already been said. This is an important hearing, it is an important topic. I look forward to a chance to see both the technology and to hear what our witnesses have to say, and I thank the Chairman for holding this hearing.

Mr. TAUZIN. I thank the gentleman. The Chair now yields to the gentleman from Ohio, Mr. Sawyer, for an opening statement.

Mr. SAWYER. Thank you, Mr. Chairman. Thank you for your leadership on this issue generally and for holding this hearing in particular. I have a wonderful five-page opening statement. I know it will move all of you. You may laugh, you may cry, but I urge you to reference it in the record of this hearing, and I will not offer it for you today.

Just let me say, in brief part though, that the future of broadband is full of both promise and uncertainty as companies and industries try to anticipate technological advances and cultural and societal changes, market conditions, consumer preferences. The work that we do here today to try to ensure that deployment is timely, that industry competes fairly and that the service is provided to all sectors and geographical locations of the country for the good of all concerned is important work, and I urge that we get on with it. I yield back the balance of my time.

[The prepared statement of Hon. Tom Sawyer follows:]

PREPARED STATEMENT OF HON. TOM SAWYER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OHIO

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.

Currently, the cost of residential broadband service ranges from about \$40 and upward per month, plus up to several hundred dollars for installation and equipment. On the other hand, a May 1999 survey conducted by ZDNET found that near-

ly 80% of respondents were only willing to pay a monthly fee of \$25 or less for broadband service. According to research from Juniper Communications, broadband users will number about 5.5 million through 2000, compared to 43.6 million dial-up users, and by 2002, broadband penetration will be 11.7 million users or 19% of online households.

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. Congress should work to ensure that broadband deployment is timely, that industry competes fairly, and that service is provided to all sectors and geographical locations of American society.

Some analysts assert that legislation is necessary to ensure fair competition and timely broadband deployment. Currently, the debate centers on two specific proposals. Those are: 1) compelling cable companies to provide "open access" to competing Internet Service Providers, and 2) easing certain legal restrictions and requirements, imposed by the Telecommunications Act of 1996, on incumbent telephone companies that provide high-speed data (broadband) access.

Compelling open access to cable broadband

Currently, customers using cable broadband must sign up with an Internet Service Providers (ISPs) 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. Some members of Congress think we should 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.

Easing Restrictions and Requirements on Incumbent Telephone Companies

Another proposal, H.R. 2420 would ease certain legal restrictions and requirements, imposed by the Telecommunications Act of 1996, on incumbent telephone companies who provide broadband access.

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. Rural communities argue that present regulations 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 incumbent local exchange carriers (ILECs) to upgrade their networks, while the Bell operating companies (BOCs) interLATA data restrictions unnecessarily restrict the development of the broadband network. 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.

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 in telecommunications will develop. Modification of these regulations, critics claim, will remove the incentives needed to open up the "monopoly" of local services. A major change in existing regulations, opponents claim, would not only remove the incentives needed to open up the local loop but would likely result in the financial ruin of providers attempting to offer competition to incumbent local exchange carriers.

There are also concerns over the inability of regulators to distinguish between provision of voice only and data services if BOC interLATA restrictions for data services and ILEC unbundling and resale requirements for advanced services are lifted.

I look forward to hearing from our witnesses today on the current application and access to broadband services as well as their comments on what Congress can do to improve these features of broadband in the future.

Mr. TAUZIN. The Chair now recognizes my friend from Florida, Mr. Stearns.

Mr. STEARNS. Thank you, Mr. Chairman. I will make my statement part of the record. I just want to mention that according to Forester research business to business, e-commerce will explode in growth from \$43 billion in 1998 to more than \$1.3 trillion by the year 2003. And this hearing, unfortunately, is bringing out the as-

pects that this broadband deployment in the suburbs and small towns or rural areas is not as good as it should be. The practical effect is that rural and underserved users must suffer with Internet access that is far slower and unreliable than those that are available to some of the densely populated areas.

The New West report captures the implications of being without high speed Internet access in today's business day and age, and their report indicates, most of America's small businesses have a symbiotic relationship with a big business, with large business enterprises increasingly preferring to deal with their small and mid-size business enterprises over high speed data lines because business transactions are faster, cheaper and more timely and with fewer errors. If the small and mid-size business enterprise does not have access to high speed transport, they cannot be players in the new economy, and their large business customers will look elsewhere for suppliers who can.

So I think it is important to have this hearing, and I commend you, Mr. Chairman, and look forward to the testimony of the witnesses.

Mr. TAUZIN. The gentleman from Minnesota, Mr. Luther.

Mr. LUTHER. Thank you, Mr. Chairman, and thank you for the hearing today. I am looking forward to the testimony of the witnesses, and particularly I hope that they will address some of the positive changes that we can see from broadband. The kinds of things that I have in mind are probably similar to those of other committee members, but dealing with obviously the so-called digital divide that we hear a lot about. Obviously the whole consumer issue, what will help consumers, what gives them more choices, what gives them better information, and finally, just what we can look for in the future in terms of more positive contact quite frankly, whether it is educational services or whatever. I mean, I think a lot of times we spend our time thinking about more video games or whatever. What would interest me is how we can see broadband working in the equation of providing more positive, delivering more positive content to people in this country, and so I look forward to the testimony. Thank you.

Mr. TAUZIN. The Chair thanks the gentleman. The gentlelady from Missouri, Ms. McCarthy, for an opening statement.

Ms. MCCARTHY. Thank you, Mr. Chairman, and I thank the witnesses for being with us today. I agree with all that has been said about the importance of this discussion as we reconcile the digital divide in making sure that the public and private sector are working together to make sure this technology is available to as many people as possible.

I don't want to overlook the fact that as we work toward progress being made and bringing entertainment products to the consumers that we also consider the effect on the artists, particularly the recording artists, and what this may mean to them, what will be the effect on the—will it create competition for content? What do we do about copyright issues? What about work-for-hire matters? So I would welcome any input you have on that today as we explore this issue.

Thank you very much, Mr. Chairman, for having this hearing.

Mr. TAUZIN. The Chair now recognizes the gentleman from Chicago, Mr. Rush, for an opening statement.

Mr. RUSH. Thank you, Mr. Chairman. Mr. Chairman, I too am very excited about this particular hearing. I look forward to the testimony of the panelists here. I am very interested in what they have to say about the future of broadband.

Consumers are now more sophisticated and are more demanding in terms of requiring that the industry provide better and faster Internet access. Hence, it is increasingly important that enhanced Internet access and broadband deployment is available to Internet users. The status quo simply does not cut it anymore. It is incumbent upon us, members of this committee and this Congress, to remove any regulatory impediments that may stifle broadband deployment. Broadband is the technology that will fuel the continued growth of the Internet, and it is important that this technology is available to all Americans.

I look forward to this hearing, Mr. Chairman, on the creative uses of broadband technologies, especially as it relates to bridging the digital divide, and I also look forward to hearing about what is being done to deploy those technologies at a faster pace to all of America and to America's consumers, and I want to thank you, Mr. Chairman. I yield back the balance of my time.

Mr. TAUZIN. Finally, the Chair now recognizes the gentleman from Tennessee, Mr. Gordon, for an opening statement.

Mr. GORDON. Mr. Chairman, this is an important and timely issue. I appreciate you having this. I hope you will have additional hearings. I want to become better educated in this area. I am also interested in Mrs. Cubin's concerns about rural development and look forward to hearing the witnesses today. Thank you.

Mr. TAUZIN. The Chair thanks the gentleman. Any further requests for opening statements?

[Additional statements submitted for the record follow:]

PREPARED STATEMENT OF HON. STEVE LARGENT, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF OKLAHOMA

Mr. Chairman, thank you for holding this morning's oversight hearing on the current state of broadband deployment as it relates to applications that utilize broadband networks, and the use of broadband networks to provide service to what is traditionally thought of as underserved areas of America.

After this subcommittee's recent consideration of the Rural Local Broadcast Signal Act, I now have an entirely new perspective as to what qualifies as an underserved area. I would hope for the purpose of this hearing, an underserved area is just that—underserved.

On February 2, 1999 the FCC released its first report on the state of deployment of advanced telecommunications services.

At that time, the commission concluded that broadband deployment appeared to be "reasonable and timely" although the commission believed that it was difficult to reach a firm judgement given the early stage of deployment.

On February 17th of this year, the FCC initiated its second notice of inquiry, as required by Congress, to look into the current state of broadband deployment to business and residential customers, and to different geographic areas and socio-economic groups. This report is scheduled to be released by the commission sometime this September.

I believe the 1996 Telecommunications Act is working as intended. Since the passage of the act, we have seen an explosion in the number of new competitors in the telecommunications market and a corresponding growth in e-commerce and the internet economy.

Today, there are over 375 competitive local exchange carriers (CLECs) operating in every state of the country. These CLECs have gone to the capital markets and

invested \$30 billion in state-of-the-art technology to offer service in urban, suburban, and rural areas of the country.

Cable operators are investing billions of dollars to upgrade their facilities to offer broadband services throughout the country.

The fixed and mobile wireless industry is currently developing the so-called "third generation" wireless standard that will enable providers to offer an array of internet-related services to the home, business, and individual handsets.

The satellite industry is developing technologies to bring broadband services to the home.

And the largest market participant providing broadband, the Bell Companies and GTE, have announced plans to make highspeed DSL available to over 60 million households by the end of this year.

As a result of this flurry of deployment, this subcommittee heard testimony from Governor Gilmore last week that "the Nation's internet-based economy grew by 68% last year to produce over \$507 billion in business revenues. The internet economy has created 2.3 million jobs. The internet and the information technology sector now accounts for more than half the capital investment in our economy."

Mr. Chairman, industry has responded quite favorably to the intent of the '96 act. It is important to remember that it took nearly 50 years after its invention before conventional telephone technology became commonplace in America's businesses and homes. It would be a stretch to believe that the '96 act is not fulfilling its promise because high speed internet is not linked to every computer in this country only four years after the passage of the act.

It appears that the so-called "digital divide" has become the poster child of perceived problems with current telecommunications policy rather than a real telecommunications phenomenon. I have to question whether the "digital divide" is being used by the administration and some in Congress as an excuse for governmental agencies to create a role for themselves within the telecommunications industry. It also appears that certain groups and companies are seizing this as an opportunity to undermine the section 271 requirements of the '96 act.

In light of industry's efforts to deploy broadband services throughout the country, I'll be interested in hearing from today's witnesses as to what more industry needs to do to encourage broadband deployment.

PREPARED STATEMENT OF HON. TOM BLILEY, CHAIRMAN, COMMITTEE ON COMMERCE

Thank you, Mr. Chairman. I appreciate you scheduling this hearing on this important topic.

Today's hearing is an interesting twist from the traditional debate over the deployment of broadband services. The witnesses will discuss how they use or apply broadband technologies to bring new services to the marketplace.

These types of companies and organizations provide a new perspective on the issue, which expands beyond the simple deployment of broadband technologies.

However, I am interested to hear views on the important issues surrounding deployment as well. I am hopeful that at the end of the day we will have **a broad, balanced discussion of all issues from all the relevant parties on this subject.**

I believe that if we are to have hearings on this subject that we need to hear from the vast number of companies—from competitive providers to equipment manufacturers—that are flourishing from the explosion in the telecommunications and electronic commerce marketplaces. It is an exciting time to be in these industries.

Much of this success is due to the great work we did to establish the legal rules-of-the-road by enacting the Telecommunications Act of 1996.

I also hope to hear as well from the incumbent providers on how they are complying with their obligations—ones they agreed to—in the Telecom Act. Further, I hope to hear how they are taking advantage of the marketplace to roll-out broadband services. It seems that almost every day I am hearing about a new merger—I mean a new broadband service—from one of the Bell Companies. These folks seem to be doing quite well in the marketplace notwithstanding any restrictions they see as unnecessary.

Today's witnesses will talk about how they use broadband technologies in their product or service offerings. They are examples of the creative and innovative forces making the potential of the Internet and electronic commerce a reality.

And some very creative people are using such technologies to bring products and services to under-served populations. The Internet truly provides a digital opportunity for all Americans. Some people have argued that services and products will only come to rural or urban centers if the federal government forces or mandates

that it occur. I think that today's witnesses are only a small slice of the examples of companies and organizations that are trying to solve any perceived deployment disparity problem rather than look for a federal government program.

I thank the chair for his indulgence and yield back my time.

PREPARED STATEMENT OF HON. EDWARD J. MARKEY, A REPRESENTATIVE IN
CONGRESS FROM THE STATE OF MASSACHUSETTS

Good Morning. I'd like to thank Chairman Tauzin for calling this hearing this morning on broadband applications.

The broadband revolution that is taking place on the Internet today is breathtaking in its sweep and impressive in its rapid evolution. A few mere years after passage of the Telecommunications Act of 1996, consumers are reaping the digital dividend of communications competition. Without the competitive forces unleashed by the Telecomm Act, we probably wouldn't be having this hearing today.

The feature-rich, information-driven content that is everyday igniting the enthusiasm of our nation's entrepreneurs and investors is riding upon a telecommunications infrastructure that is the envy of the world. Across the globe, country after country is trying to emulate the dramatic steps that America has made in opening up historic monopoly markets to marketplace competition, in building bandwidth, and in bringing the benefits to all sectors of society.

The cable industry alone makes broadband capability available to 41 percent of U.S. homes and has over a million subscribers today. The competitive local telephone companies have driven broadband deployment on the competing wire and currently invest roughly a Billion dollars per month on new telecommunications infrastructure around the nation. Bell Atlantic has proven it can meet the market-opening requirements of the Telecomm Act in New York and is setting the pace among incumbents for long distance entry. In addition, wireless applications promise ever more capacity and competition for businesses and residential consumers.

We are truly a long way from the debates in the late 80s and early 90s about deployment of "fiber to the home" and the promise of "video dialtone" and "cabletelco." The marketplace is responding.

That's because the goal of telecommunications policy is not the deployment of a particular technology or application, but rather the goal of telecommunications policy is competition—everywhere and for everyone. Competition will determine whether consumers prefer wireless services, DSL, cable modems or any other technology and competition will pick winners and losers among applications.

Moreover, the competitive telecommunications industry is exerting tremendous effort to meet the bandwidth needs of the growing Internet content industry.

As much as this hearing is an exploration of exciting new applications for the Internet, it is also a celebration of the handiwork of this Subcommittee. The fact that the witness table today has independent content entrepreneurs and entities interested in making the new technology serve important societal needs is testimony to the fact that hundreds of companies today might not even exist—or certain applications would still be relegated to mere speculation—if some of our policy decisions had come out differently.

This is something we should all take stock of because in the end, our effort is not just about the deployment of the latest flavor of digital technology be it ISDN, ADSL, DSL, xDSL, or any other acronym: it's about the future. And I think our competitive future is a bright one if we remain true to our Subcommittee's history with these issues.

Thank you Mr. Chairman and I look forward to hearing from our witnesses this morning.

PREPARED STATEMENT OF HON. GENE GREEN, A REPRESENTATIVE IN CONGRESS FROM
THE STATE OF TEXAS

Thank you Mr. Chairman. Mr. Chairman, the Internet is the fastest growing communications medium in this country. While I am very interested in hearing today's panel discussion on the access to and applications for broadband, I am disappointed that we are not going to discuss the more substantive aspects of broadband like competition and the deployment of competitive networks.

With internet traffic doubling every 90 days and data traffic increasing over voice by roughly 30% a year, implementing a coordinated broadband strategy is essential. Because of this tremendous growth in the Internet, Congress needs to ensure that we balance the need for networks and backbones with the demand for faster service

and innovation. I believe it is imperative that we on the Subcommittee begin taking a substantive look at roadblocks to full competitive broadband deployment.

Again, I do appreciate the panel members being here today and I look forward to hearing from Mr. Linkous regarding his thoughts on the impact broadband will have on telemedicine. I have a particular interest in subject because my home State of Texas is emerging as a leader in the research and application of telemedicine. Texas is one of only three States whose Medicaid program requires insurance companies to cover telemedicine services. And the results from this program have been very promising. Having access to telemedicine using a broadband connection could mean the difference between life and death in many of our rural communities.

Mr. Chairman, I appreciate the opportunity we have today to gain differing perspectives on the benefits of broadband. However, I hope this hearing will be the first of many on this important issue and that the Subcommittee allocates time after the Easter work period to continue the debate.

Thank you Mr. Chairman for beginning the dialogue on this important issue.

Mr. TAUZIN. The Chair is pleased to recognize our very esteemed people. They consist of Mr. Anthony Asnes, president of Pseudo Programs; Mr. Peter Harter, formerly introduced of Emusic.com; and Dr. Eric Allely, founder and owner of Tekamah Corporation. And we will see some exciting demonstrations I think about what broadband can do and what consumers might just be able to just enjoy if we have full deployment of broadband services across America.

We will begin with Mr. Anthony Asnes of Pseudo Programs, and gentleman, your demonstrations will not count against 5 minutes of oral presentations. The way we work the committee is that if you have written statements, they are part of our record, without objection and so ordered. The Chair will also make all members' written statements part of the record, without objection so ordered, so that when we get to the time for the testimony, we will ask you to summarize in conversational tone with us the major points of your testimony within a 5 minute frame. However these demonstrations will not count against that 5 minutes. We will begin with Mr. Anthony Asnes of Pseudo Programs.

Welcome, Mr. Asnes.

STATEMENTS OF ANTHONY K. ASNES, PRESIDENT, Pseudo PROGRAMS; PETER F. HARTER, VICE PRESIDENT, GLOBAL PUBLIC POLICY AND STANDARDS, EMUSIC.COM; AND ERIC ALLELY, FOUNDER AND OWNER, TEKAMAH CORPORATION

Mr. ASNES. Thank you, Mr. Chairman. I will begin with testimony and then we will show you some of the demonstration as I go through this. I would like to say good morning to the committee and again, thank the chairman and the rest of the committee for inviting me here today.

My name is Tony Asnes and I am the president of New York City-based Pseudo Programs, Inc., the world's largest original Internet TV network. Today I will give you some background about Pseudo, explain what Internet TV and streaming media are, and describe the technology we and others use to deliver our programming throughout the world.

To understand Pseudo today, it is important to know about our core funding mission, to harness the communications and interactive powers of the Internet to create a new medium. Pseudo was founded in 1994 by Joshua Harris, who also founded Jupiter Communications, which is now one of the world's largest and most re-

spected research and consulting firms dedicated to the Internet economy.

Pseudo began as a company that managed on-line chat communities on the Prodigy on-line service and later on the Worldwide Web. In 1995, we added streaming media audio capabilities to those chat communities and introduced Chat Radio. In 1997, Pseudo added streaming video capabilities to our Chat Radio communities and became one of the earliest enterprises to begin Web casting or transmitting video and audio via the Internet, and a pioneer in the Internet TV business.

Today, Pseudo is positioned as a leader in what the vision consulting group predicts will be a multibillion dollar business by 2004. Our investors include Prospect Street Ventures, the Tribune Company, Intel and Sycamore Ventures. We produce approximately 50 different Internet TV shows per week, organized into 10 Web site channels. Pseudo's shows cover topics from ranging from politics, space exploration, business, hip hop music, NFL football, computer games and entertainment.

Unlike traditional broadcast media, Pseudo's net television shows are fully interactive. Internet audiences tune into live video shows from a chat room where they can interact not only with other audience members, but also with the hosts and performers who appear on screen.

The Pseudo on-line experience combines live video, interactive features like chat that makes the audience part of the show, editorial graphics and other features into a vibrant on line entertainment community.

Pseudo operates in a very similar fashion to traditional TV or cabled broadcasting. We shoot our programs on digital video, which is then captured from our studio control room and sent to a bank of encoders. These encoders convert analog video and audio signals into a digital signal. Our software creates several signals for low and broadband consumers. These signals are then streamed live over the Internet and also archived and made available for on-demand viewing.

It is no secret that the Internet is becoming a way of life for more and more people, but what you might find astonishing is that a growing number of those Internet users now have the capability of watching live video over the Internet, at school, in the office and at home. Real networks reported yesterday that their streaming video player software has been downloaded more than 100 million times and that its user base grows by more than 200,000 users per day. In addition, more than 100 million licensed copies of Microsoft windows media player are in circulation around the world.

We are proud to be a broadband content creator. In the past few months, Pseudo has delivered millions of viewers some truly exciting moments live or available on demand, and the really exciting part is that our interactive features allow the audience and the guests and host to talk back and forth.

In December, Pseudo's Spacewatch channel captured the drama of an anticipated video feed from the Mars Polar Lander and informed and entertained space fans of all ages with detailed video explanations of the experiments, interviews with NASA engineers and more. Our Pseudo politics channel, together with the hotline,

reported from the polling center for the South Carolina Republican primary. We repeated the experience on Super Tuesday live from our New York studios and guests included Congressman Gerald Nadler and Congresswoman Carolyn Maloney, among others.

The audience not only watched and listened, they asked questions, took part in polls and engaged in a dialog with voters from around the country.

Our music channels allow viewers to be truly engaged in sight, sounds, people and cultures they might not otherwise experience where they live. Because we can produce our programming in a very cost effective manner, we can offer viewers programming and access to communities that appeal to special, cultural or ethnic groups that are often underserved by traditional media.

Viewers can watch our programs on either low band dial-up connections to the net or via different broadband delivery methods, but the experience for the end user is dramatically different. Those viewing via dial-up or low bandwidth connection must wait longer for the streams to load, they will subject to more interruptions and might receive blurry, distorted images and audio, but broadband connectivity is another story.

About 6 percent of U.S. Internet users can afford and are lucky to enough to live in areas where cable modem, digital subscriber lines, satellite and other high speed access is available. Those with broadband access see clear digital images delivered at much higher speed and with much higher reliability than those with dial-up connections can, but right now, broadband is still primarily only within reach of the well-educated and well-to-do. They also tend to live in urban areas. Most broadband subscribers earn at least \$100,000 per year and are college educated. That is an imbalance I would like to see corrected.

As a businessman, the success of our company depends on much higher penetration of broadband access. We want to ensure that broadband access is affordable, but just as important, we want broadband to be available, period. And right now there are too many geographic regions, both urban and rural, that don't have access to those fat broadband pipes.

As a citizen I also want to see more rapid deployment of broadband to as many people as possible. Unless businesses and policymakers work together, a huge segment of the population will not benefit from the educational, cultural and economic advantages that broadband access offers and the digital divide that already exists in this country will be even more serious.

In conclusion, the latent consumer and business demand for broadband services is tremendous, even greater than the recent decades of demand for faster and more affordable computers. This presents industry and our economy with a huge opportunity to fill this demand, provided we can build the infrastructure and offer content that truly realizes broadband capabilities. Policy-makers and industry must work hand in hand to create a competitive environment that will spur innovation and facilitate the further development of broadband infrastructure. We must also work together to ensure cost effective delivery of these services to as many consumers as possible.

Thank you.

[The prepared statement of Anthony K. Asnes follows:]

PREPARED STATEMENT OF ANTHONY K. ASNES, PRESIDENT, PSEUDO PROGRAMS, INC.

Good Morning. I would like to thank Chairman Tauzin and the rest of the members of the Committee for inviting me here today. My name is Tony Asnes and I am the President of New York City-based Pseudo Programs, Inc., the world's largest, original Internet TV network. You can find us on the Web at www.pseudo.com.

Today, I will give you some background about Pseudo, explain what Internet TV and streaming media are and describe the technology we—and others—use to deliver our programming throughout the world. I will also tell you about some exciting developments in our industry that can only be advanced with a rapid and robust deployment of a broadband infrastructure. I hope you'll see why we believe that the unimpeded expansion of broadband in this country is critical, not only to our business, but to the future of our nation's economic health and global leadership.

To understand Pseudo today, it is important to know about our core founding mission: to harness the communications and interactive powers of the Internet to create a new medium. Pseudo was founded in 1994 by Joshua Harris, who also founded Jupiter Communications—which is now one of the world's largest and most respected research and consulting firms dedicated to the Internet Economy.

Pseudo began as a company that managed online chat communities on the Prodigy Online Service, and later, on the World Wide Web. We recognized the social and communications power of chat, and created virtual “destinations” where consumers could go to communicate with like-minded people on subject matters that were under-served by traditional media, such as poetry, the arts, different kinds of music and the culture of the Internet itself.

In 1995, we added streaming audio capabilities to these chat communities and introduced “Chat Radio.” The chat audience not only talked to one another, they could also interact with the hosts and guests on the radio show and not just see written replies, but actually hear them. In 1997, Pseudo added streaming video capabilities to our chat radio communities and became one of the earliest enterprises to begin Webcasting—or transmitting video and audio via the Internet—and a pioneer in the Internet TV business.

Today, Pseudo is positioned as a leader in what The Vision Consulting Group predicts will be a \$4.1 billion business by 2004. Our investors include Prospect Street Ventures, The Tribune Company, Intel and Sycamore Ventures. We produce approximately 50 different Internet-TV shows per week, organized into ten Website “Channels.” Pseudo shows cover topics ranging from politics, space exploration and business to Hip-Hop music, NFL football, computer games and entertainment.

These video programs are digitized into one's and zeros, encoded—or formatted so that Internet users can view them—and streamed out via the Internet to viewers around the U.S. and the globe.

Pseudo Overview

Unlike traditional broadcast media, Pseudo's Net-television shows are fully interactive. Internet audiences tune into live video shows from a chat room where they can interact not only with other audience members, but also with the hosts and performers who appear onscreen. (See Figure 1)

The Pseudo online experience combines live video, interactive features like chat that makes the audience part of the show, editorial, graphics, and other features into a vibrant online entertainment community.

The result: Pseudo's onscreen performers communicate directly with Internet audience members watching the show, and in turn, audience members can ask questions of the performers, vote in “quick polls” associated with each show, contribute comments, play in live trivia games, and request songs (Figure 2). This dynamic, two-way programming creates a powerful communications tool, builds a strong sense of community and brings culture, news and entertainment to a worldwide audience. Pseudo's audience currently registers an average of ten to twelve million page views and approximately 750,000 media stream views per month.

How Pseudo's Technology Works:

Pseudo operates in a very similar fashion to traditional TV or cable broadcasting. We shoot our programs on digital video, which is then captured from our studio control room and sent to a bank of encoders. These encoders convert analog video and audio signals into a digital signal. Our software creates different kinds of digital signals: one for low bandwidth, and one for high bandwidth. These signals are then streamed live over the Internet and also archived and made available for on demand

viewing. At high bandwidth, viewers can get amazing quality that approaches a standard television signal.

It's no secret that the Internet is becoming a way of life for more and more people: more than 123 million U.S. consumers have access to the Internet, and 77 million of them used the Net at least once in the month of February. But what you might find astonishing is that a growing number of those Internet users now have the capability of watching live *video* over the Internet—at school, in the office and at home. Real Networks reported yesterday that their streaming video player software has been downloaded more than 100 million times, and that its user base grows by more than 200,000 users per day. In addition, more than 100 million licensed copies of Microsoft's Windows Media Player are in circulation around the world.

We're proud to be a broadband content creator. In the past few months, Pseudo has delivered millions of viewers some truly exciting moments—live or available on demand. And the really exciting part is that our interactive features allow the audience and the guests and hosts to talk back and forth.

- In December, **Pseudo's Spacewatch Channel** captured the drama of an anticipated video feed from the Mars Polar Lander and informed and entertained space fans of all ages with detailed video explanations of the experiments, interviews with NASA engineers and more.
- We've even jumped into the election, with our **Pseudopolitics Channel**. Together with *The Hotline*, we reported from the polling center for the South Carolina Republican Primary, where we put our live audience in touch with candidates, noted journalists and opinion-makers from both parties. We repeated the experience on Super Tuesday, live from our New York studios, and the guests included Congressman Gerald Nadler and Congresswoman Carolyn Maloney, among others. The audience not only watched and listened; they asked questions, took part in polls and engaged in a dialogue with voters from around the country.
- Our music channels, such as **88HIPHOP.COM** and **Streetsound.com**, bring live performers and interviews with some of the world's best-known performers and emerging artists to a global audience. We allow viewers to be truly engaged in sights, sounds, people and cultures they might not otherwise experience where they live. Because we can produce our programming in a very cost-effective manner, we can offer viewers programming and access to communities that appeal to specific cultural or ethnic groups that are often under-served by traditional media

Future Innovations

At Pseudo, our mission is to harness all the communication power and interactivity of the Internet to create and define a whole new medium. To that end, our research and development group is experimenting with some very exciting innovations that will put tools in the hands of our viewers to allow them to play producer. We envision a day when consumers will be able to watch and interact with our programs anywhere or anytime, such as on hand-held or wireless devices like pagers. We will invite consumers to contribute their own content. We will allow viewers to pick from several different camera angles and watch several simultaneous streams. The technology is available, but we will need a robust broadband infrastructure to make it possible to deliver these innovations (Figure 3)

Lowband Versus Broadband

Viewers can watch our programs on either low-band dial-up connections to the Net or via different broadband delivery methods, but the experience for the end-user is dramatically different. Those viewing via a dial-up or low bandwidth connection must wait longer for the streams to load, they will be subject to more interruptions and might receive blurry, distorted images and audio.

But broadband connectivity is another story. About 6% of U.S. Internet users can afford broadband service and are lucky enough to live in areas where cable modem, digital subscriber lines, satellite or other high-speed access is available. Those with broadband access see clear, digital images, delivered at much higher speed and with much higher reliability than those with dial-up connections can. Those with broadband access have a much richer experience and can really realize the full potential of the Internet. It probably won't surprise you to learn that, while the average person goes on the Internet about 18 times in a month, those with broadband log on between 30 and 40 times a month.

But right now, broadband is still primarily only within reach of the well educated and well to do. They also tend to live in urban areas. Most broadband subscribers earn at least \$100,000 per year and are college educated. That's an imbalance I would like to see corrected.

As a businessman, the success of our company depends on much higher penetration of broadband access. We want to ensure that broadband access is *affordable*. But just as important, we want broadband to be *available*, period. And right now, there are too many geographic regions—both urban and rural, that don't have access to those fat, broadband pipes.

As a media company, we generate revenues from advertising, and as broadband access rises, our ability to build our audience and attract more advertisers will rise with it. A broadband infrastructure is not only critical to our business, it is also critical to of keeping the U.S. economy competitive and growing.

As a citizen, I also want to see more rapid deployment of broadband, to as many people as possible. Unless businesses and policy makers work together, a huge segment of the population will not benefit from the educational, cultural and economic advantages that broadband access offers, and the digital divide that already exists in this country will be even more serious.

The latent consumer and business demand for broadband services is tremendous, even greater than recent demand for faster, more affordable computers. This presents industry with a huge economic opportunity to fulfill this demand, provided we can build the infrastructure and offer content that truly realizes broadband capabilities.

Policy makers and industry must work hand-in-hand to create a competitive environment that will spur innovation and facilitate the further development of a broadband infrastructure. We must also work together to ensure cost-effective delivery of these services to as many consumers as possible.

Thank you.

INSERT OFFSET FOLIO 1 HERE

Mr. TAUZIN. Thank you, Mr. Asnes.

Did you want to do your demonstration now?

Mr. ASNES. Sure. I will take you through a very quick walk through the visuals here and cross my fingers that this works. As we mentioned, we have 10 different channels. We will bring up as an example, Spacewatch, which covers space and space exploration. We do our programming live out of our studios in New York city, as well as one live show from Space Center Houston, where we actually get the people at NASA to come across the street from the Johnson Space Center and be a part of the live programming. It is a chance to get to know more than just the astronauts, but the actual men and women who work behind the scenes to put everything up in the air and keep it running.

What you are seeing on the screen is our player. The video is embedded within that player, and to the left and right of the player are HTML areas that allow for either polling or pushing of editorial or other static images. Down below is the chat environment. During the live programming, users come in and watch the programming while being present within a chat room, and a very bonding opportunity to talk with each other and know that everybody is watching the same thing as well as have the chance for the hosts and guests of the programming, who are also looking at the chatters, respond to them and actually talk to them. It is a very powerful experience in the live format. The on-demand format is incredibly convenient and allows you to pick up the week's new programming whenever you would like.

What we see this player evolving into is an opportunity to deliver very factual brand messages as well as what we call contextual e-commerce opportunities for our sponsors and advertisers. As the programming is being delivered, commercials will be embedded within the programming like normal television commercials, and additionally synchronized with those advertisements will be opportunities to purchase product.

This is really an interesting medium because it allows for the delivery of an entertainment experience that combines not only video but communications, editorial, and allows our advertisers and sponsors to complete the final objective, which is to sell their product.

Our music categories cover several different cultures. 88HIPHOP is a very strong channel covering hip hop and urban culture. The programming brings in the artists in a very collegial atmosphere. It is much more down to earth than the kind of blow-dried presentation of traditional television and it has a lot of meaning and credibility to the audience. This is the way we tackle the musical genres to really bring the audiences much closer to the stars and the guests who are very important to them.

Now, I guess, as a final comment you can see right now the screen embedded within this player is tiny. You have really got to be pulled up close to your computer and it works, and if you are involved with the chatters, it is a compelling experience. The reason why that screen is so small is because of the broadband limitations. We could actually expand the size of that screen but the picture would pixilate and would not be as clear, and that is purely a function of how much data we get through the pipe.

We really need to think about who our users are. Most of them are 56K modem users, which allows us to get a video stream through that has a very slow frame rate. Once you start encoding 80K and above, the video really starts to smooth out, and the broader the connection for the end user, the larger that screen can get and the more compelling the experience can get.

So that gives you a flavor of where we are. Again, when you pull up close, it is an interesting experience. I think from the distance that you are at now you can see some of the limitations that the broadband environment faces us with. Thank you.

Mr. TAUZIN. Thank you very much, Tony. Now what we have seen what video streaming begins to look like on the Internet and what television itself will become on the Internet. We will now turn to music, and Mr. Peter Harter, vice president of Global Public Policy Standards and representing Emusic.com will give us not only a presentation, but a demonstration of what the music industry—how it views the possibilities of broadband-delivered services.

Mr. Harter.

STATEMENT OF PETER F. HARTER

Mr. HARTER. Thank you, Mr. Chairman, and members of the committee. It is a pleasure to be back as a witness before this committee. Last year I was here to speak about the Digital Millennium Copyright Act, and I imagine many of the issues we talked about there are still relevant as some of their members in their statements mentioned, and I will try and touch upon those. I am sure we can get into those in the Q and A, but I have been invited here to talk about downloadable music and the music industry's view of broadband, and I would like to make my comments brief. But Mr. Chairman, I would like to formally ask to introduce my written statement into the record.

Mr. TAUZIN. Without objection, that is so ordered.

Mr. HARTER. Thank you. Again, my name is Peter Harter, and I serve as vice-president for Global Public Policy and Standards at Emusic.com, a 2-year old company based in Redwood City, California, in the heart of Silicon Valley. Emusic has offices in New York and Los Angeles, Nashville and Austin, the country's centers for music, and we also own 20 percent of a company in London called Crunch, and we have an interest in expanding worldwide because music is a worldwide medium, art and business, and I will get back to that point later. It is a fairly important point.

But I also serve as president of DiMA, the Digital Media Association, and while I am not here today on DiMA's behalf formally, I think it is important to note that this industry has grown very rapidly. DiMA started 2 years ago with just a handful of founding companies, and notwithstanding the consolidation within the Internet, audio and video industry of companies buying other companies, mergers and so forth, which is another issue up here on the Hill, it seems these days DiMA's membership has grown from a handful of companies to nearly 60 companies, and now we are expanding over to Europe.

We have many European companies that are over here in the U.S. with operations. Audio Soft from Switzerland has offices in San Francisco and Catewa from Italy has offices in, of all places,

Salt Lake City, Utah. Why they are there, with no disrespect to Utah, I don't know. I guess the technology sector there, but music and Utah, well, maybe I should go to Salt Lake and find out for myself.

So the music industry is a very interesting industry, blending music and technology, blending southern California, Los Angeles, with northern California high technology, blending music from New York City with technology from the west coast, the different cultures in the business of how to get music out, and we are all trying to figure out how to get music out on broadband networks because I think college kids, the biggest demographic consumers of music, are people under age 25, and there is a large concern of piracy by high school and college kids on their broadband networks on college campuses, but I do think we have to focus on getting broadband access to the home so consumers can actually buy music legally.

And I am proud to say Emusic is the leading retailer in the world for legal, downloadable music. All the music on Emusic's site is there by license from the rights holders and we pay royalties for the performance rights and publishing rights and we also make money for the artist or rights holder. There is no illegal music on Emusic, in contrast to some other sites on the Internet I won't mention by name unless of course I am asked.

I am also proud to say that in the short 2-year history of Emusic, we have now sold over 1 million songs, legal songs in the popular MPEG format. MP3 is an open standard. Emusic uses this open standard because not of its sound quality or anything else, it is relatively free. We pay a small patent fee to the Fundhoffer Institute in Thompson, which owns the IP rights to the format, but MP3 is the most widely used, and any business trying to gain access to a market, they are going to choose the method that consumers most readily use, and MP3, to date, is the most readily used format and that is what we will use, but there are better sound qualities out there in technology that we are looking at, and so we can see the world moving away from this well-known format of MP3 into other platforms. It could be real networks. It could be Microsoft. It could be AOL. It could be some other new startup. We just don't know. This industry moves very quickly. So MP3 today, maybe not MP3 tomorrow. We should not get hung up on formats.

Emusic's catalogue has over 100,000 high quality MP3s for sale from over 650 independent labels. Emusic has focused on bringing independent label music to the masses because in the record industry, you have five major record labels that earn over 80 percent of the revenue but only produce about 20 percent of the music. In contrast, the independents produce 80 percent of the music and garner little more than 20 percent of the revenue, and we think the Internet distribution channel will rapidly accelerate the market share revenue for independent labels.

It is often said the record industry is a \$100 billion industry trapped in a \$40 billion suit. I think the inefficiencies of physical distribution and the pricing schemes by the major labels which they have to have because the cost of physical distribution will be very interesting to see how the market plays out, because I think there are people in Britain and France and southern Louisiana who

want to share culture, and you frankly can't get a Cajun music star to get on MTV with their music. It is just not going to reach the same audience size as Brittany Spears.

Mr. Chairman, it is a problem. I don't know if you can do anything about that.

Mr. TAUZIN. Did you know Brittany Spears is also from Louisiana?

Mr. HARTER. I didn't know that. Well, maybe you should get her some Cajun music. Anyway the point is, there are people all over the planet who share culture and traditions, and the Internet can obviously connect them in a very efficient and inexpensive rate, and I think we are already seeing people share culture through music and downloading songs for free or for, at my company, is \$.99 a track, \$8.99 an album, very inexpensive, that we are going to see people consuming more music. If you lower the prices and make the experience more convenient than buying it through traditional channels, you will see the existing demand that I think there is a lot of demand out there.

And Mr. Chairman, I am not going to go over time, but I wish to conclude that we think broadband is very important for downloading music, because as you will see in my demonstration not having a direct broadband connection to the Internet here in this hearing room, I have gone through some difficult gyrations to get a demonstration, but if we had a broadband connection, I could simply go out and download some music, but I will make do here without the connection.

Mr. TAUZIN. You mean we don't have access to broadband in this room?

Mr. HARTER. Your router is down I was told this morning. But on the issue of broadband, we do believe at Emusic that we need more competition among satellite, wireless and land line providers so there are competition on six points: competition on availability of access; competition on price; competition on features; competition on content choice—that is very important—competition for user control over the access; and most importantly, competition.

So there is a quality of service, that broadband is a better quality of getting access to communications than existing medium, and with that I will conclude my remarks, Mr. Chairman.

[The prepared statement of Peter F. Harter follows:]

PREPARED STATEMENT OF PETER F. HARTER, VICE PRESIDENT, GLOBAL PUBLIC POLICY AND STANDARDS, EMUSIC.COM, INC.

Mr. Chairman and members of the Committee. It is a pleasure to appear before you to discuss the broadband revolution that is taking place today on the Internet. My company, EMusic.com, Inc., is the world's leader in online, Internet-based distribution of downloadable, digital electronic music. We are a key player in that broadband revolution, and can report to you that the new commercial, educational and recreational opportunities that broadband-based Internet content promises to make available will transform America's communications and economic system in very profound ways, for the benefit of all Americans, and indeed the entire world.

Introduction

There has been much discussion of broadband as a form of Internet transport, that is, a "faster pipe" to bring the Internet into the homes and offices of Americans and throughout the world. But in reality, broadband is about far more than mere transmission speed alone; it is about the new and exciting forms of rich, interactive digital content that this high-speed transmission supports. Just as television replaced movie theater newsreels, and now 24-hour cable news channels have vir-

tually supplanted the once-dominant network news divisions, broadband will allow not just faster content, but new forms of digital-based information. This feature-rich content (making the Internet an interactive experience instead of an adventure through static World Wide Web pages) is just beginning to appear. EMusic and the digital music revolution are the vanguards of broadband content, but we are just the start.

Ten years ago the telephone companies were all abuzz about “fiber to the home” and the promise of interactive television. Like many false starts on the way to the Information Superhighway, that one turned out to be a clear dead-end. But now, Digital Subscriber Line (DSL) services, cable modems and fixed wireless services (as well as satellite-delivered, locally cached broadband packet-switched networks) are bulldozing away the underbrush of these old pipe dreams to create a new type of Internet. From the Bells to Covad, from Akami to Excite@Home and RoadRunner, among others, firms are building a new Internet infrastructure that will provide a platform for new Internet content. We in the content business are eagerly awaiting the continued development of this new, broadband Internet, because our businesses benefit directly from consumers’ having access to a broadband Internet connection in all of America and throughout the world.

Since the explosive growth of the Internet began less than ten years ago, demand for Internet content has increased dramatically. Americans spend on average more than one hour online every day. More than 40 million Americans subscribe to an Internet service provider, and it is predicted that this number will double by 2005. Stephen King has published the first Internet novel, and the downloadable music service industry is changing the recording industry forever. In my roles as President of the Digital Media Association and member of the Board of The Progress and Freedom Foundation, I have been happy to observe the very rapid growth of membership. In just a short two years, DiMA has grown from a handful of founding companies to more than 50 companies in the audio and video products and services industry. These companies know how important public policy is and are working diligently to educate policy makers about digital media issues.

About EMusic.com

Let me take a few moments to tell you about EMusic. Since it was founded in January 1998, EMusic has established itself at the forefront of how new music will be discovered, delivered and enjoyed in the next decade. In addition to having the Internet’s largest catalog of downloadable MP3 music available for purchase, EMusic operates one of the Web’s most popular families of music-oriented Web sites (including RollingStone.com, EMusic.com, DownBeatJazz.com, and IUMA. The company is based in Redwood City, California, with regional offices in Chicago, Los Angeles, New York, Nashville and Austin.

EMusic.com is the Web’s leading site for sampling and purchasing music in the MP3 format, which has become the standard in the digital distribution of music. Through direct relationships with leading artists and exclusive licensing agreements with over 650 independent record labels, EMusic.com offers music fans an expanding collection of more than 100,000 tracks for purchase (individual tracks for 99 cents each or entire downloadable albums for \$8.99. EMusic.com features top artists in all popular musical genres, such as Alternative (Bush, Kid Rock, They Might Be Giants, Frank Black), Punk (Blink-182, The Offspring, Pennywise), Jazz (Duke Ellington, Dizzy Gillespie, Louis Armstrong, Concord Records), Blues (John Lee Hooker, B.B. King, Buddy Guy), Hip Hop (Kool Keith, The Coup), Country (Willie Nelson, Merle Haggard, Patsy Cline), Rock (Phish, Goo Goo Dolls, David Crosby), World (Nusrat Fateh Ali Kahn, Lee “Scratch” Perry) and Vintage Pop (Liza Minnelli, Eartha Kitt, Judy Garland).

To give you an idea of how fast the downloadable music industry is growing, the company has now sold over 1 million songs in the popular MP3 format since its launch. This total includes single-track sales as well as tracks included as part of albums and special collections. In addition, we recently announced an exclusive deal to sell all of Elvis Costello’s albums in MP3 format online.

I have brought a sample of EMusic services to demonstrate for the Committee how Internet content can work.

Broadband Content Needs Broadband Networks

Consumers’ search for online music, film, video games, shopping and educational services in many cases is far greater than the supply of network facilities that must support it. As so often happens, demand has outrun technology. One reads in the news that the traffic from college students downloading the 300 greatest songs of all time has congested campus Internet servers. Many e-commerce shopping Web sites ground to a halt over Christmas, unable to serve the millions of Americans

eager to do their shopping without braving the malls. Thus, though the services are there for consumers, access remains limited. The Internet needs the communications industry to catch up.

More importantly, Internet content has become increasingly rich, consisting of large data files that become interactive news, video and sound at the end user's computer. This richness of content requires large amounts of data to be transmitted efficiently, which is achieved through compression and decompression technologies (CODECs). MP3, for instance, a shorthand for MPEG-3, is a format initially developed for digital transmission of motion pictures. Because MP3 files can be either audio or video or both, they are perfectly suited for the digital transmission of music, and today are the dominant form in which digital music is stored, sold and transported over the Internet. EMusic principally sells its music in MP3 file format, but is in fact format agnostic, and will distribute content in whatever form is desired by consumers. We are also particularly conscious of the need to provide legal, efficient mechanisms for the distribution of digital content that do not undermine the interests of musicians and other content creators. While the term MP3 has often been coupled to the concept of piracy, EMusic has proven the skeptics wrong by fashioning a viable revenue model for the sale of licensed MP3 files on the Internet.

But whether a digital music file is encoded in MP3, RealPlayer, LiquidAudio or any other CODEC format, it takes a huge amount of bandwidth to make downloadable music work seamlessly. For instance, EMusic is now offering, as a free cut, "Radio, Radio," a song from one of Elvis Costello's first albums in the 1970s. In MP3 format, this three-minute cut is a full 2.3MB (that's nearly the size of two 3.5" floppy disks). For those members of the Committee familiar with dial-up Internet services, even using the fastest 56 Kbps modem available (which provides an effective throughput of only three to five kilobytes per second), this song would take approximately 15 minutes to download. At ISDN speeds (144 Kbps), download time is reduced to about three minutes. And at T-1 or ADSL speeds (1.55Mbps), download time is something on the order of 30 seconds or less.

Without delving too far into the technical realm, the lesson is clear: feature-rich Internet content requires bandwidth, bandwidth and more bandwidth. The ubiquitous availability of high-speed Internet connections will create a sea-change in the distribution of digital information of all sorts. Not only will consumers be able to get more and faster content, they will get higher-quality content. Soon the compression loss that is inherent in squeezing broadband content into the narrow, slow confines of dial-up connections will be a thing of the past. No longer will streaming video look like a Keystone Cops silent film when delivered over a truly broadband Internet.

Public Policy for Accelerating Broadband Deployment

The communications industry is striving to meet the needs of Internet content. EMusic applauds the efforts of this industry to provide broadband capability to consumers. Cable modems and DSL technologies are leading the way, providing Internet connectivity at speeds 20 to 100 times faster than dial-up modems. These technologies make seamless, high-resolution Internet and data communication possible, enabling Americans to access information and services as quickly from home as from any office building. The continuing development and deployment of broadband technology will truly build the Information Superhighway and give content providers like EMusic a path to every American home.

The Telecommunications Act of 1996 ("1996 Act"), fashioned by this Committee, has created a competitive marketplace that has spurred the fastest rollout of innovative communications technologies in history. Just two years ago, almost no one except corporate Internet users was able to get a high-speed Internet access service. Today is vastly different. The robustly competitive telecommunications environment forces prices down and increases carrier efficiencies. In addition, by unleashing competitive forces into the telecommunications arena, the 1996 Act has broad broadband connectivity to consumers at an unprecedented rate. Cable modems, DSL providers, and fixed wireless services connect millions of Americans to each other and the world through the Internet.

The varying types of broadband services help to ensure that every American has access to at least one choice of service and service provider, enhancing the ability of content providers to reach as many consumers as possible. Equally as important, this competitive environment has ensured that the prices for these services have consistently decreased as their reach has widened. EMusic congratulates this Committee and the FCC for fostering this competitive environment for all technologies and carriers, by leveling the playing field rather than picking technological winners. We believe that public policy should encourage providers to deploy broadband services by reducing barriers for "last mile" interconnection and by ensuring that the

government maintains a hands off policy towards the Internet. We do not believe that government can manage or structure the development of broadband networks better than the competitive marketplace.

Addressing the "Digital Divide"

Broadband access is limited, however, by the Digital Divide facing America today. This divide lies not only in the fact that personal computer penetration is far lower in minority and lower-income American homes and schools, but also that rural, inner-city and low-income areas do not typically offer the population density or economics to make rapid entry possible in the near term. Although the Digital Divide grows more narrow every day as the competitive broadband industry widens its footprint, it is clear that some governmental attention to this social problem is warranted, in order that we do not unwittingly create a two-tiered system of access to digital information and the Internet. EMusic supports this Committee's continued efforts to monitor, analyze and remedy this inequity that to varying degrees remains a divisive force within our society and threatens to disenfranchise many areas from the economic and information revolution that the United States is experiencing.

But there is another divide that persists and, in many cases, lies along the same boundaries: This divide creates different have-nots (Americans living in areas that have limited commercial presence. These persons include the rural doctor who must travel miles to the nearest pharmacy, the woman living in an inner city abandoned by the retail sector, and the elementary school situated 50 miles from the nearest supply store. It is this divide that makes the Internet so necessary, for only the Internet can reverse the abandonment of inner-city and rural citizens by the forces of commerce. Just as the Sears Catalog empowered rural Americans in the late 19th and early 20th centuries, a broadband Internet will empower both rural and inner city Americans in the 21st century.

The Internet makes every library, doctor and music store immediately ubiquitous. Its tremendous economies of scale and ability to operate in the realm of the virtual allow it to reach every American in every sector simultaneously. The Internet server has replaced the "bricks and mortar" storefront, and a well-constructed sales Web site performs faster and more reliably than any staff. Without adding any urban infrastructure, without constructing another shopping mall, the Internet can become the nation's library, video rental store, and CD player. It can become the nation's equalizer, for it cannot detect the race or ethnicity of its users and has no means to discriminate among cities, neighborhoods or customers.

To realize these benefits, the United States must ensure that the sophistication and diversity of Internet content is supported by the nation's telecommunications network. This Committee can assist in this effort by exploring ways to encourage all technologies and carriers to build faster, more efficient communications networks. It was the procompetitive but technology-blind 1996 Act that spawned the broadband industry in the first instance. Through local network unbundling and interconnection, as well as a consistent policy of forbearance in information services regulation, Congress and the FCC have created rampant competition out of monopolies. With competition came the incentive, if not the necessity, to win customers by providing faster, less expensive services. Innovation was the result.

EMusic is committed to working with this Committee, the FCC and other federal and state government agencies to address the Digital Divide, to improve technological and informational literacy in our nation's impoverished areas and to help grow the Internet as a liberating force for rural and insular Americans. This is a truly exciting time to be involved in the broadband Internet content business. If you thought that the Web changed the world in 1995, just wait!

I again thank the Committee for its time and attention, and would be pleased to answer any questions that the members have.

Mr. TAUZIN. Thank you, Peter, and if you would be kind enough to do your demonstration. By way of explanation there were four committees that crashed this morning 5 minutes before the hearing so we are limited in the way we can demonstrate this, but I think you have still done a good job of presenting it to us if you will do that now.

Mr. HARTER. Yeah, sure thing. I am not going to bother going through the settings again and take more of the committee's time, but basically what you see on the screens is Emusic's Web site at www.emusic.com, and what I will briefly do is take you from our home page to what a consumer sees when they download music,

and I will play a brief sample of some music and that will be the demonstration. You are seeing Emusic's home page here. On the left hand side become brassed by different genres. We have rock, classical, electronic, hip hop, alternative, punk, country, new age, reggae, sound tracks, inspirational, jazz, blues and within each genre there are sub genres.

These are very general high-level separations, different categories of music, and since the Chairman is from New Orleans and I am going to Jazz Fest, and my girlfriend, I figured I would see what we had in our catalogue from country, folk, and well, there is some Zydeco music and Cajun Zydeco music, I hope the Chairman likes that, listens to that, and we don't have all that much yet.

We just licensed two catalogues in New Orleans. One is the Jewel Pollop catalogue, which is mostly rhythm and blues, and also Black Top Records, I believe, from the Stan the Music Man, who is an infamous figure down in New Orleans music scene. You can download a whole album from Sunset Beaujolais, and I have stored locally on my laptop here the 30-second samples. Before the consumer buys the music, they can sample as many songs as they want to.

[Playing music]

Now do did you recognize anything from the catalog there?

Mr. TAUZIN. No.

Mr. HARTER. Anyway, the other things I can't show because we don't have a full-time connection here is you can see on the right, you can check off which songs you want to buy and then go through a checkout counter which is similar to other e-commerce sites.

Mr. TAUZIN. Explain the buying process.

Mr. HARTER. Once you sample and figure out which songs you want, we don't make you buy the whole album. You can just pick out the songs you want. So you don't end up buying a CD and have all this music you don't really care to listen to. You just get the songs you want and you check off which tracks you want by putting a checkmark there. So I want to buy the Accadian Two stuff and then I would check songs above and then add to the cart, and what is not going to work here, since we don't have a connection, we don't have an interactive session with our service and user.

But basically what happens is the shopping cart will remember which songs you checked off during the time you have browsed through our site. You have a customer profile set up, you register as a customer with your name and credit card and so forth, and then we charge the amount of the songs and albums you bought to your credit card and that is very quick. We have very good relations with the credit card companies, do it very cheaply at a good rate and very quickly, so you don't have to sit there and wait and then songs are downloaded.

In terms of the speed of the songs the latest data I have and other people's data may differ is that in the MP3 format a 3-minute song is about 2.3 megabits, and that is about the size of two floppy disks. For those members of the committee that have normal dial-up access using 56K modems, that song would take 15 minutes to download.

If you are at an ISDN, it downloads about 3 minutes per song. On T-1 or Radio Cell, speed is about 30 seconds or less. At our corporate network at Emusic, when we download a song it takes between 15 and 20 seconds, and some friends here in the audience from various companies like John Ingel from Excite@Home, which is down the street from me in Redwood City, he may brag that his network is even faster. Redwood City is interesting. We have liquid audio, Emusic and Excite@Home all within 4 blocks of one another, but yet we don't have a business deal with Excite@Home, John.

Anyway, any other questions about the Web site, Mr. Chairman?

Mr. TAUZIN. Anyone want to hear or see any other demonstration? We are limited, as you said, because we don't have the broadband connect, but the idea again is that the consumer can actually receive all this music, download it on demand, pay a price so the artist is compensated, and the music is then stored in his own computer?

Mr. HARTER. Right, and that is important because the computers aren't all that stable these days, and say a person doesn't make a backup copy of their hard disk, well they can download the music and their hard disk will be the library and they can copy the music under fair use to all their devices within their household, if the computer crashes or stolen, all the music is gone, well, at Emusic, because we have a customer profile—and we protect your privacy, we don't show it to anybody else—they can come back and say, hey, I am so and so, here is my name and here is my credit card, I bought this music, we will download to them, again, no charge but because it is another copy, we will pay again to the rights holders because the rights holder is whole new sale, but as a customer service to our customers, we will provide that service.

So we are trying to make this easier, for simple for the customers. Over the 2-year period of our history at Emusic, we have reduced the number of steps it takes for a person to click through to a purchase, and we are still working on that. This is a very new industry, but we are working very hard and we are the world's leader in retailing music on line.

Mr. TAUZIN. Any member want to see any more of this demonstration?

Mr. Stearns.

Mr. STEARNS. Just when you have it on your hard disk do you put on a real audio player?

Mr. HARTER. What you can do is play it off your laptop. What you just heard was on the hard disk here, and you can have these speakers. Many people have their hard disk connected by wire to their home stereo. Just as your home stereo has a cassette deck, a CD player, this is another component to your stereo at home. As hard as it may sound, people have home area networks where they simply connect their laptop or desktop computer to their home stereo.

Mr. TAUZIN. And under fair use, they can copy it on those systems, right?

Mr. HARTER. Or you can copy it to a portable device like a Walkman. Under fair use, you can copy it in your home because I only have one set of ears, so whether it is in my hard disk or my home stereo or my portable device, I have paid for one song and

I listen to one song. Now where the problem is, digital copies are very easily recopied, transmitted, a kid could e-mail to his thousand closest friends, and these are some of the more recent issues. We thought the DMC would address all these, but we are applying a law to these new technology distribution schemes.

The Computer Science Technology Board, the National Research Council, has a great report out called the Digital Dilemma, where they have studied issues about access to technology and what access does to copyright, and the gentleman who read the report, a professor at MIT whose name escapes me right now, he said technology enables access to broadband and other things but technology can also control access, and I think for consumers, we have to find a balance between enabling access, we break the digital divide, get access to rural areas as people have asked about this morning. We also have to be careful that we don't have too much technology to slow down access to make access more expensive or too difficult, otherwise consumers are not going to adopt this technology.

Walt Mossberg of the Wall Street Journal who writes a great column on personal technology, heavily criticized Sony products because security tools impeded consumer use of music in the Sony music club, and his own words, Walt Mossberg's word in the paper and on CNBC Power Lunch, the Financial News Channel, he said the security used by Sony and their music club treats consumers like criminals.

So I think the music industry is still, as I said before, still learning how to get music out legally to consumers so it is easy and inexpensive, and they adopt it and you meet this pent-up demand for music, but also protect the rights of the rights holder because Emusic, we have relations with over 500 independent record labels. If we are not selling the music legally and not returning the revenue to the them, then this channel distribution—well, what I think we have proven is that in 2 years we are selling lots of music legally, and I am not terribly worried about that, but piracy is not an insignificant issue, and I think other companies in this industry of Internet have to look at the issue more carefully than they are right now.

Mr. TAUZIN. Thank you very much, Mr. Harter, and now we will turn to our third—

Mr. GORDON. May I just say quickly, I want to acknowledge the responsible approach to the copyright issue here. You can't make money if you don't have a product and you don't have a product if, in your case, the copyright holders aren't rewarded. The music is going to run out, and you have been farsighted enough to understand that. I look forward to working with you and others that want to handle this in a legal way to help us better understand the technology and keep it legal and to get the bad guys off the street. Thanks.

Mr. TAUZIN. Thank you, Mr. Harter. The Chair now recognizes the third member of our panel, Dr. Eric Allely, founder and owner of Tekamah Corporation. Dr. Allely, if you will give your testimony and a demonstration, sir.

STATEMENT OF ERIC ALLELY

Dr. ALLELY. Good morning, Mr. Chairman, and members of the subcommittee. I am Dr. Eric Allely, and I am the founder and chief executive officer of the Tekamah Corporation, a software development company based up in Rockville, Maryland, and our primary focus in life is training and education technologies. So that is what I would like to focus on today is how I see the high speed Internet servicing people in their training and education needs.

First of all, I am honored to have the opportunity to testify before this committee and I am also excited about your interests in the technology, and I know that you have some difficult decisions to make as we go forward, and I hope that my input can serve in some small way.

I come to you today wearing several hats. In fact, I wear them everyday. I am surgeon, I am a physician, a doctor as a physician doctor, not a technical one. Although I shouldn't probably tell that to my patients about the technical part, but my interest from a medical perspective is in propelling or pushing medical information out, in other words, a knowledge transfer, and I will speak to that in a moment.

I am also a lieutenant colonel in the army national guard, and in that capacity I am interested in the idea of improving the readiness in our forces and in the mixture of those two positions will be the basis of my presentation and you will see that in a moment.

I am also a scientist and I am very interested in the concepts and the things that make people learn, what makes them learn faster, what makes them retain information longer and what makes them perform better under stress.

But foremost, of all these things, I am a teacher. I enjoy learning things and then imparting that information to somebody else, and I am very excited about the technologies that we have unfolding before us, particularly in the ability to reach more people, and so if I urge the committee to do anything, I urge them to act on those things that they have said today, and that is to make sure that everybody has access to this because whether it is Pseudo television or Emusic or training and education, the Digital Divide is going to be defined or eliminated by your actions.

A couple of things I like to preach about, one is that I see the opportunity to raise everybody up a notch, and what I mean by that is rather than, for example, in medicine, rather than focusing on things like telemedicine, we focus on telemedicine extending the reach of the physician, you know, being able to provide care at a distance. This is very important stuff, and I am very much in support of it, but my emphasis, I think, is on something that is going to have a much larger impact to the greater good, and that is to project the information outward. In other words, other than trying to reach people with my capabilities, I would rather teach people what my capabilities are and raise everybody up.

I would like to see the general public be a little bit more like medics. We all own a body. It would be nice to know something more about it than we do. It would be nice to be able to help other people on the street when you see them injured. I would like to see medics be a little bit more like physician assistants and nurse prac-

tioners, and I would like to see nurse practitioners be a lot more like physicians.

So rather than trying to hold on to what I know as a physician, so that I can meter it out and charge for it, I would rather push it outward and raise everybody up a notch, and I think that it applies not just in medicine, but in any industry. We find a lot of expertise and reliance on experts to do our jobs. The example I like to make is the fact that my grandmother was probably more comfortable managing a temperature of 104 degrees in her children than my wife is, and my wife has a medical background. To me this is a little bit backwards, and part of it has to do with the fact that we have kind of become accustomed to sort of handing over what we know about things to an expert, so that when we have a problem with it, we run up and say, hey, can you help me with this, and if the technology comes and only answers the question rather than teaching me something about how to deal with it next time, then I would argue that all it is is a crutch, all it is is something that encourages me to remain naive in what may be a very important area of my life.

So that is a considerable difference. So that is my little piece on raising people up a notch.

The second thing I would like to say is that we need to be flexible. We need to approach training in a little bit different way than we have before. In the past, things were kind of homogenous. I mean, from the Industrial Revolution, we needed lots of people that did the same thing. So what we did was brought we them in and trained them all the same way, we taught them the same thing at the same time, and what we got is we got a production line taken from the Industrial Revolution and turned into an education system.

And I would fight the tendency to keep that kind of a system and instead try to develop a technology that is, rather than homogenous, one that is heterogenous, one that is flexible, one that responds to individual people's needs, because what we are going to find in this rapidly changing environment that we find ourselves in in terms of the workforce is that at greater and greater speeds, people are going to need to be better reeducated. There is going to be greater need for just-in-time training.

The labor force is going to enter at the age of 20, and by the time they are age 40, they may have had to change jobs several times, not necessarily by their choice, but simply by the changing environment, and I would suggest it is going to be difficult to ask those people to stop every 10-years and go back to school so they can re-enter the workforce and instead what we need to do is develop a system that teaches them what they need to know and let them change with the workforce environment, and I would argue that the distance learning kinds of technologies that would be available only if broadband is accessible are the kinds of things that we can use to make those changes.

So what I would like to do is—I also thank the chairman, by the way, for allowing us to submit our written comments separately, and what I would like to do is change to an example now, a simple demonstration, one that I do from the desktop rather than on the network, but one that can be done if the bandwidth were available

through the network, and I am going to attempt a technological—let me get it working on one side of the room. There we go.

What I am about to show you is a mix, again, of military and medical kinds of things. The scenario that I am going to pay is a casualty scenario that we used to train, actually, to reorient physicians. It was developed in order to reorient physicians and nurses to field medicine. You know, we are used to doing tertiary care kind of things at Walter Reed or Bethesda Naval, and then all of a sudden we are asked to go to someplace else in a much different logistical situation.

So in order to help them prepare for that, we have developed some of these scenarios, and I am going to hope that the audio plays appropriately.

Now here we are playing video straight from the computer. It would be streaming if we had the bandwidth. Essentially, we are setting a scene, and what is going to happen is a number of casualties are going to come off of the vehicle, and the teaching point here we are focusing on is the first step in caring for these individuals is to triage them. We all watch ER, and we all know what Dr. Carter does, although some of us are more entertained by it than others, but what we see, one of the first problems we have in medical care is knowing what to do for whom and in what order. So what I am going to do here is I am going to go ahead and triage these individuals.

This gentleman is an immediate category person. We need a little bit of information. I have to make what could potentially be a life-saving decision based on a small amount of information which, again, is part of what we are getting people to do. This gentleman is a little more immediate than the other one, so I am going to make him a little bit higher priority, and I am going to say I am done there. Anyone talking that comfortably is delayed until proven otherwise. And finally, this gentleman has a little bit of combat stress. We will treat him, but we will wait for a while.

Now what happens now that it naturally just went back and spoke to the server, and it tells us a little bit about what we can do. We can go in here, here is the most immediate guy, I am going to examine him. I can take a look at his leg. It looked kind of gross. I apologize for those who don't like that kind of picture, but I can go ahead and treat him. I can do all the kinds of things that I would need to do, including in the military setting, I need to be able to decontaminate him and finally I need to dispose of him.

I apologize for our terminology, but that is what we talk about, and including talking about the prognosis, how far he is going to have to go back, et cetera. And once I evacuate him, he leaves my care and he is gone.

These are all things that I would normally be doing in a real environment, and I am going to go ahead and jump to an evaluation and see how bad I am.

So now what has happened is based on my score—well, actually, the device is scoring in the background. It is reminding me of what was happening because if I had done this properly, I might have taken 15, 20 minutes to get through this and I will skip over this, and I assure you that I am a better field surgeon than this if when really presented with a problem.

But you see, what I am now afforded is I am afforded a review of each of these. In fact, I am now shown the seven core areas that we would like you to be thinking about when you are doing triage. I can jump between the casualties and change ways.

What I would like to talk about very briefly in the wrapping up is the transference that I talked about before, raising everybody up. I mean I believed in this before we made this program. Then we made this program and I am ready to throw everything else out the window, but to talk about raising people up a notch. This was designed for physicians and nurses. We saw so much value from it. In fact, some of the other ancillary medical people came in and said hey, that that looks like a great game, let me play it, that we set up a study and we went out to Camp Pendleton and got a bunch of enlisted Marines and we ran them through this training program alone, and then we took a bunch of independent duty corpsmen, which is the Navy's version of a medic, and we ran both the Marines and the Navy medics through a controlled side-by-side study to see who would do better in managing field casualties.

Well, the marines, shall I say, did very poorly in the areas of applying treatment. We hadn't taught them that. But when it came to making triage decisions, they were statistically indistinguishable from the Corpsmen and they did it only with this program, and these were, God save us, United States enlisted Marines, who I love dearly, but I will tell you, they are not highly schooled in medicine. They picked it all up from the program.

In fact, the then-commanding general of Camp Pendleton, after seeing the results made the comment that he hoped that one of these guys driving home on I5 in his little Ranger pick-up would come across an accident and jump out and look at what the problem was and get on the cell phone and call 911 and say, you know, I have got four guys here, one of them is immediate because he has got a blocked air way, two guys delayed and the other guy can wait a while, and was hoping this would all be recorded on 911 so that when the dispatcher said, oh, are you a medical resident, he says no, I am a gunnery sergeant at Camp Pendleton. He was praying for that to happen.

The point is, I think, well made in that we can easily forget that we have given a lot of our lives over to experts, and I would suggest to you, with the right technologies and with good access to high speed Internet, we can reclaim some of that stuff and quickly close not only the Digital Divide, but even some of the educational divide that we already know exists in our fair country today.

And with that, sir, subject to your questions, I conclude my briefing.

[The prepared statement of Eric Allely follows:]

PREPARED STATEMENT OF ERIC ALLELY, FOUNDER AND CHIEF EXECUTIVE OFFICER,
TEKAMAH CORPORATION

INTRODUCTION

Good Morning, Mr. Chairman and members of the Subcommittee. I am Dr. Eric Allely, Founder and Chief Executive Officer of Tekamah Corporation, a software engineering company based in Rockville, Maryland.

I am honored to have the opportunity to testify before this subcommittee today and appreciate your interest in learning more about the potential benefits of broadband—or high-speed Internet access—technologies.

I come to you today wearing several hats: I am a physician interested in pushing medical information forward to patients and the general public; I am a Lieutenant Colonel in the Army National Guard interested in improving the overall readiness of our Services; I am a scientist interested in what makes people learn faster, retain information longer and perform better under stress. But foremost, I am a teacher and I'd like to share with you my vision of how broadband technologies will impact training and education in the future.

First, we need to raise everyone up a notch.

RAISING EVERYONE UP A NOTCH

There has been a lot of work done in medicine to reach patients through telemedicine. A great deal more can be done and other panel members may speak to those specific issues. While providing diagnostic and therapeutic services over a distance may provide significant advancement in medical care, I suggest that Distance Learning using broadband technologies will do far more for the common good by transferring medical knowledge rather than simply extending the reach of the physician. While both may be needed, those methods that *project* capabilities are usually not as efficient as those that *multiply* capabilities. My vision for medicine is that everyone would be raised up a notch. The general public would be more like medics. Medics would be more like Physician Assistants (PA's) and Nurse Practitioners, and PA's would be more like Physicians. In my opinion, *transfer of knowledge* should be a key focus for the use of broadband technologies. Not just in medicine, but in all industries.

However, raising everyone up a notch is not the end of it. We need flexibility in our training technologies.

FLEXIBLE TRAINING

Today's work environment is changing so rapidly that it will not be enough to simply provide continuing education. Continuing education, as we know it today assumes that a particular worker will remain within a single career track. Unfortunately, the type of work you are trained to do when you are twenty may be what you will be doing when you are forty. In fact, the earlier job may no longer exist due to changes in technology. With the work environment changing so rapidly, we need to provide better methods for life long training so that workers can change with their work environment. Workers cannot be expected to drop out of the work force every ten years to be "re-educated". Instead, their continued education needs to meet them where they are. Doing "just-in-time" training is a beginning, but we will have to become much better at adaptive training techniques to meet the needs of tomorrow's work force. Workers in the continuous schoolhouse environment of the future will be far from homogenous. Instead, they will come from a wide variety of backgrounds and capabilities. They will not be well served by a single teaching method but will require an engaging and effective learning environment that can adapt to their individual needs and interests.

What do we need to implement such a flexible learning environment? One major requirement will be the rapid movement of data between the training server and the student

MOVING DATA RAPIDLY

Much of the information needed to manage an effective Distance Learning program can be passed between a training server and a student using current Internet connections. However, the major difficulties come when we need to move high-density data such as video, audio, and high-resolution images or graphics. The Internet connections most of us use today are not capable of moving high-density data between the training server and the student rapidly enough to produce a high quality learning environment. Students rapidly lose interest with increasing download times.

Streaming video and audio over the current connections have provided a step forward in making engaging materials. Unfortunately serving multiple students simultaneously can quickly cause information bottlenecks that slow or even stop the training program. Even when the connection speeds are adequate to move video and audio, the current streaming technologies make it difficult to rapidly change the content being sent from the server to the student and therefore are limited when it comes to computer adaptive training.

Add to this the demands of team training and network speed rapidly proves to be the limiting factor. Broadband technologies will significantly change the quality of training available using the Internet by providing the higher speed connections we need to move high-density data rapidly between the server and the student.

Tekamah has been building toward the day of broadband Internet.

ABOUT TEKAMAH CORPORATION

The Tekamah Corporation opened its development lab in Rockville, Maryland in January of 1995 and has been active in research and development of advanced training technologies. We have done a significant amount of work on adaptive training technologies and realize that any particular piece of information may be used in several ways, particularly when serving a variety of audiences.

To reduce the need to rebuild the same materials for each new computer technology, we have designed an extensible training language that supports a variety of computer devices including computer flat screens, virtual reality display devices and even instrumented mannequins. Each of these human-computer interface technologies has its own particular strengths and weaknesses with no single training technology meeting all training needs.

By developing our training materials and algorithms to support a wide variety of training methods, we are building the training library needed by tomorrow's students. Distributing this library to those that need it when they need it will require much higher bandwidth. The full benefits of our technology are currently limited to use on local area networks and for those who have very high-speed Internet connections. The full impact cannot be felt until such high-speed access is widely available.

CONCLUSION

While I am proud that Tekamah is using the latest in Internet technologies in our products and services, the technologies are not our principal focus. Training and education are. I am here today as an advocate for everyone interested in learning; whether it's something required by his or her job, something that gets him or her a better job, or something simply new and interesting. I believe that as access to broadband Internet technologies expands, we will witness a watershed in Distance Learning technologies that will radically change our ability to access information *and to learn*.

I leave you with one thought: these technologies will create new opportunities for those whose homes and businesses have the high-speed connections. I am not an economist and cannot help you figure out how best to encourage the deployment of broadband Internet. However, I am a teacher and will tell you that no matter how cool the technology, for those without access to it, it may as well not exist.

I thank you again for the opportunity to appear before you this morning and look forward to answering any questions you may have.

Mr. GILLMOR [presiding]. Thank you very much, Dr. Allely. My thanks to all of the panel. We will now move to questions. The gentlelady from Wyoming.

Mrs. CUBIN. I don't have any questions.

Mr. GILLMOR. Any questions from the minority side? If not, I want to thank all of you for your testimony and your demonstrations. Thank you. We will move to our second panel.

We will begin with our second panel and we do have the complete written statements of all the panelists. We would ask that the panelists try to stay within the 5-minute limit, and then we will get into questions after the panel is completed. And first is Mr. John Linkous, who is the executive director of the American Telemedicine Association.

Mr. Linkous.

STATEMENTS OF JONATHAN D. LINKOUS, EXECUTIVE DIRECTOR, AMERICAN TELEMEDICINE ASSOCIATION; GENE VUCKOVICH, EXECUTIVE DIRECTOR, MONTANA RURAL DEVELOPMENT PARTNERSHIP; RAY A. CAMPBELL III, EXECUTIVE DIRECTOR, MASS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS; AND DAVID KUSHNER, CHAIRMAN, DIAGNOSTIC IMAGING AND RADIOLOGY, CHILDREN'S NATIONAL MEDICAL CENTER

Mr. LINKOUS. Thank you, Mr. Chairman. My name is John Linkous, and I am the executive director of the American Telemedicine Association, and I provide these remarks today about broadband deployment and telemedicine on behalf of the Association. ATA is a nonprofit membership-based organization based in Washington, DC, established in 1993 and serves to promote telemedicine and resolve the barriers to its deployment. This morning I will make my remarks brief, as my written remarks will be in the record, and I thank you for that.

Telemedicine represents a marriage of advanced telecommunications technology and new approaches to improving medical and health care at affordable rates. Be it through telehome care for homebound frail patients, remote medical support for astronauts in space, or the Nation's military in the front lines of battle or access to comprehensive data bases of health medical information for consumers over the Internet, telemedicine holds a promise of using telecommunications in a direct way to improve the lives of all Americans. It is not surprising that telemedicine is one of the fastest growing segments in health care.

Today, telemedicine encompasses a multimillion dollar industry, including high speed networks, linking hospitals and clinics, remote patient monitoring systems that need health services.

The Federal Government alone is estimated to spend close to \$300 billion for telemedicine this year. Critical to the growth and success of telemedicine is access to broadband networks. Deployment of telemedical links to rural and suburban medical centers require communication networks that are reliable and capable of handling large amounts of data in a short time. In the very near future, telemedicine will be used in practically every part of the United States, and I would dare say that there are telemedicine projects probably active in every district of every Congressman who is represented here today.

I would like to share two examples of how access to broadband technologies can make a substantial difference in providing patient care. Teleradiology allows medical clinics in a rural or suburban area to gain access to services of qualified radiologists by simply digitizing an X-ray or an MRI scan, sending it to the radiologist at some distant point. Two mid-size medical images with relevant patient data attached needing rendering for medical opinion can easily consist of anywhere from 5 to 15 megabits of data. If this was transmitted over plain old telephone lines with a normal 56K modem, this could take about 2 hours to transmit, maybe double that if there are glitches in the line. For most emergency situations, that amount of time to wait is unacceptable. For other situations, that amount of time is, at best, inefficient.

Transmission of live video images from a quality that allows for actual medical diagnoses of a patient's condition also requires broadband technology. Live video is required for such applications as mental health consults, assisted surgery, emergency medicine and even some pathology examinations. The standard frame rate for a high quality video like you would see on television is 30 frames per second, although lesser quality may be employed with the use of some image compression that is available today.

Transmission of video, typically requires bandwidth speeds of anywhere from 128K to 1.5 megs, what is known as a T-1 line. Rural areas of the country which do not have such bandwidth will continue to lack access to many types of telemedicine service, and indeed we are seeing that throughout the country today. Parts of Louisiana, parts of Montana, parts of other parts of the country that do not have access to broadband technology are not getting access to telemedicine as the more urban parts of country do have today. The alternative for people in rural areas is either travel by the patient and a patient's family to the distance location or simply doing without health care alone.

There are broadband issues with telemedicine, both in rural and metropolitan areas, but both differ. Rural communities are limited in the availability of high speed communication networks and where available have problems with reliability and cost. The problem is lessened in metro areas in recent year as more areas come on line with alternative bandwidth choices such as in the wireless area with cellular and satellite as well as terrestrial applications with cable, ADSL, DSL, other types of services that are related to that.

Reliability with the Internet has been less of an issue and more dependent as had mentioned earlier here in the testimony today as to whether the user has to compete with a small finite pipe coming into their work area versus a slow computer that makes downloading information tedious.

A related issue is providing reliable and affordable communication networks to the home. As mentioned earlier in my testimony, telehome care is one of the promising new applications of telemedicine and from a business perspective probably has the greatest market potential of any application we have seen to date. While much can be accomplished over voice grade telephone lines, some applications into the home require a greater bandwidth. Deployment of high speed networks to the home via wire line, wireless or cable should be a priority in the development of telecommunications-related policy by this subcommittee.

Finally, I should mention the program within the Federal Communications Commission that provides assistance to rural health providers in obtaining access to broadband services. The rural health program, which was established by Congress under the Telecommunications Reform Act of 1996, provides improved broadband access by rural health centers. Although well intentioned, this program has fallen far short of its potential, and my association has been particularly critical of its implementation. However, recent improvements by the Federal Communications Commission in the program create hope that the program can still be a major benefit to rural America.

Indeed money for grant fees is finally flowing 2 years after passage, and the potential impact of the program on rural health is also finally growing. So we would encourage Congress to continue this relatively small yet very significant program.

Thank you very much for the opportunity, and I will answer any questions you may have.

[The prepared statement of Jonathan D. Linkous follows:]

PREPARED STATEMENT OF JONATHAN D. LINKOUS, EXECUTIVE DIRECTOR, AMERICAN
TELEMEDICINE ASSOCIATION

Mr. Chairman: My name is Jonathan D. Linkous. I am the executive director of the American Telemedicine Association and provide these remarks today about broadband deployment and telemedicine on behalf of the Association. ATA is a non-profit membership-based organization, established in 1993, which serves to promote telemedicine and resolve barriers to its deployment. The Association seeks to bring together diverse groups from traditional medicine, Internet online firms, academic medical centers, technology and telecommunications companies, e-health sites, medical societies, government and others in order to resolve barriers to the advancement of telemedicine through the professional, ethical and equitable improvement in health care delivery.

Telemedicine represents a marriage of advanced telecommunications technology and new approaches to improving medical and health care at affordable rates. Be it through telehomecare for homebound frail patients, remote medical support for astronauts in space or the nation's military on the front lines of battle, or access to comprehensive databases of health and medical information for consumers over the Internet, telemedicine holds the promise of using telecommunications in a direct way to improve the lives of all Americans.

It is not surprising that telemedicine is one of the fastest growing segments in healthcare. Today, telemedicine encompasses a multimillion-dollar industry including high-speed networks linking hospitals and clinics, remote patient monitoring systems and e-health services available over the Internet. The federal government alone will spend close to \$300 million for telemedicine over the next year. Private insurance reimbursements as well as applications in managed care settings are also on the rise. Market reports consistently predict a healthy and steady increase of 15 to 30 percent per year in telemedicine investments over the next five years.

However, critical to the growth and success of telemedicine is access to broadband networks. The deployment of telemedical links to rural and suburban medical centers require communications networks that are reliable and capable of handling large amounts of data in a short time. In the very near future telemedicine will be used in practically every part of the United States. In the Chairman's home state of Louisiana, telemedicine is already used in: the state's correctional care facilities, for a multi-specialty program at LSU, for telepsychiatry in Lake Charles, for ophthalmology exams for patients in rural communities out of St. Francis Medical Center in Monroe, and for home care in Baton Rouge. Each of these applications benefits from the availability of broadband technology.

I'd like to share two examples of how access to broadband technologies can make a substantial difference in providing patient care:

Teleradiology allows medical clinics in a rural or suburban area to gain access to the services of qualified radiologists. An X-ray or other radiological image is transmitted to the radiologist for an assessment. For almost all radiology services there are several images to be viewed of the area in question taken from two or more angles. Two mid sized medical images sent at the quality needed for rendering a medical opinion can easily consist of 5 megs of data. If transmitted over plain old telephone lines with a normal 56 K modem this could take almost two hours to transmit. If there are glitches in the line affecting the initial transmission, it could require double that amount of time. For most emergency situations, that amount of time to wait is unacceptable. For other situations that amount of time is, at best, inefficient.

Transmission of live video images of a quality that allows for an actual medical diagnosis of a patient's condition requires broadband technology. Live video is required for such applications as mental health consults, assisted surgery, emergency medicine and even some pathology examinations. The standard frame rate for high quality video (like seen on television) is 30 frames per second although lesser quality may be employed with the use of image compression. Transmission of video typically requires bandwidth speeds of anywhere from 128 kps to 1.5 mbs. For most

telemedicine services this requires more than just plain old telephone service. Rural areas of the country without such bandwidth will continue to lack access to many types of telemedical services. The alternative is either travel by the patient and the patient's family to a distant location or simply doing without health care. Unfortunately, national health statistics show that all too often patients in remote areas without adequate healthcare do not ever get the care they need in order to remain healthy, productive citizens.

In March 1994 ATA testified before Congress about the need for rural access to high-speed telecommunications infrastructure saying:

"Installation of telemedicine equipment serving rural communities would be fruitless without adequate transmission lines and facilities to carry the quality of video and speed of transmission required for many medical consultations. A principal goal of health care reform is providing greater access to health care for all Americans. Without an adequate communications infrastructure, rural America will lose the opportunities it now holds for using telemedicine to increase access to medical care."

There are broadband issues with video teleconferencing, both in rural and metropolitan areas—but both differ. Rural communities are limited in the availability of high-speed communications networks and where available, have problems with reliability and cost, whereas metropolitan areas are less affected. This problem has lessened in recent years as more areas come on line with alternate bandwidth choices—wireless (cellular, satellite) as well as terrestrial (cable, ADSL). Our members have had problems in the past with various ISDN providers having different "clock speeds" for their proprietary ISDN systems, such that connecting between facilities was impossible or fraught with reliability concerns. This is less of a problem now as ISDN development matures in this country. Reliability with the Internet has been less of an issue and is more dependent on whether a user has to compete with a small finite "pipe" coming into their work area, vs. slow computers that make downloading information tedious. Again, this has become less of an issue as technology improves for both hardware as well as bandwidth availability.

A related issue is providing reliable and affordable communications network to the home. As mentioned above, telehomecare is one of the most promising new applications of telemedicine. While much can be accomplished over voice grade telephone lines some applications require more than just plain old telephone service. Deployment of high-speed networks to the home via wireline, wireless or cable should be a priority in the development of telecommunications related public policy.

Finally, I should mention the program within the Federal Communications Commission that provides assistance to rural health providers in obtaining access to broadband services. Congress established the program under the Telecommunications Reform Act of 1996 to provide improved broadband access by rural health centers. Although well intentioned, this program has fallen far short of its potential and ATA has been particularly critical of its implementation. However, recent improvements by the FCC in the program create hope that the program can still be a major benefit to rural America. Indeed, money for grantees is finally flowing and the potential impact of the program on rural health is growing. ATA encourages Congress to continue this relatively small yet very significant program.

Thank you. I will be happy to answer any questions you may have.

Mr. GILLMOR. Thank you, Mr. Linkous.

And we will move to Gene Vuckovich, the executive director of the Montana Rural Development Partnership.

STATEMENT OF GENE VUCKOVICH

Mr. VUCKOVICH. Thank you, Mr. Chairman, committee members. For the record, I am Gene Vuckovich. I am the executive director of the Montana Rural Development Partners. We are a partnership of Federal, State, local and tribal governments and private development entities, both for profit and nonprofit, and our mission is to improve and develop prosperous Montana rural communities through the collaborative efforts and resources of all of our partners. I am deeply honored to be afforded the opportunity to testify before you today as to the status of deployment of broadband technologies in Montana and the need for same.

With the passage of the Telecommunications Act of 1996, it was anticipated that because of the increase in competition, broadband technologies would be made available to rural areas of the country, such as Montana, as well as to the urban areas. I am here to tell you this has not happened. Most private companies have targeted the urban centers for deployment of broadband technologies due to the greater return on their investment. Again, it is the old formula of density and distance.

Montana has been designated as one of the "disconnected dozen," and through the perspective of the high-tech economy prism, Montana is closed to business. A pressing need exists in this country to address the alarming Digital Divide that continues to grow between western and southern rural communities and the rest of the Nation. According to a recent report, the current gap is expanding between the rural poor and the rest of the Nation regarding computer use and on-line access. Organizations such as ours and others in many communities throughout the country are working to provide the assistance needed to allow rural citizens to participate in the new economy. However, all of the preparation in the world will be of little avail if fundamental broadband deployment to rural areas is not achieved.

Montana's business market has to become more diverse as our traditional extraction industries of coal, gas, mining, timber decline, and we are forced to compete on the world market. Farmers and ranchers must be able to communicate with the world and track market trends and future opportunities. More and more of Montana's businesses need and demand access to advanced telecommunication technologies to be successful in Montana. We have individuals who want to move their businesses to Montana for the quality of life offered there. We have lone eagles that can do business anywhere that has the telecommunications capabilities to operate their businesses.

Young people in rural parts of America like Montana need the same access to educational materials as young Americans in urban areas. Advanced telecommunications and the Internet are an efficient way to provide educational opportunities to Montana, and the same is true with regard to provisions of health care and government services.

The important point that must be emphasized to this committee is that our government policies must keep pace with the demand of people everywhere for evolving telecommunications services. The Internet and other telecommunications technologies is the great equalizer for businesses and individuals who are geographically isolated from major national and world markets. We do not need another study or more regulatory hurdles thrown in in our way. Areas need access to quality, affordable, advanced telecommunications from every potential resource, and we need them now.

And in closing, I want to thank you once again for the opportunity. I would be glad to answer any questions. I have one other thing to say, Mr. Chairman, and that is, there is rural and then there is rural. In Montana, we have the fourth largest State in the union that if it were superimposed and started in New Hampshire, it would go to Virginia, and we only have 890,000 people there and many people in Montana consider us one community. We wouldn't

even be large size city there. We have very long streets. We go from east to west 500 miles and from north to south 275 miles.

Thank you.

[The prepared statement of Gene Vuckovich follows:]

PREPARED STATEMENT OF GENE VUCKOVICH, EXECUTIVE DIRECTOR, MONTANA RURAL DEVELOPMENT PARTNERS

The Montana Rural Development Partners, Inc. (MT RDP) is part of a national initiative to strengthen rural America by, coordinating among existing development agencies; identifying intergovernmental projects; eliminating duplication of effort; and removing impediments created by poorly designed regulations. This organization which was created in 1992 is one of thirty-seven State Rural Development Councils throughout the United States. The Montana Rural Development Partners' mission is to improve and develop prosperous rural Montana communities through the collaborative efforts and resources of federal, state, local, and tribal governments and private development entities, both profit and non-profit.

Due to the explosive growth of the new e-commerce economy, the Internet and the high-speed data infrastructure that supports it have become essential to the economic goals of this organization. This year, the Montana Rural Development Partners is undertaking a variety of projects to increase the use and knowledge of Internet related resources, including the following. (1) **Small Business/Marketing On The Net:** this project allows MT RDP to provide training through the use of a ten laptop portable lab, for web site development, instruction in marketing on the Internet, and temporary web hosting to economic development agencies, small business owners and the general public. (2) **Montana Cities/Counties Online:** this is a challenge to provide support for web page development, training and hosting so that all Montana cities and counties can be online. (3) **Wow Van—Widening Our World:** this project coordinates the scheduling of training through the use of a high-tech van that is put to use by trained University of Montana interns who travel the state to provide on-site Internet training to individuals, teachers and businesses. It is a goal of this partnership through these efforts and others like them to prevent communities in Montana and other rural areas from being left behind by the data revolution sweeping most of the country.

Government Policy: Organizations like the Montana Rural Development Partners push to educate and prepare our residents to participate in the new Internet economy in hopes that, despite the shortcomings of the Telecommunications Act of 1996, rural America will some day have the broadband infrastructure sufficient to fully participate in this new world. The enactment of the Telecommunications Act of 1996 brought anticipation that increased competition among industry sectors would allow broadband technologies to be made available in rural areas of the country, such as Montana, as well as in urban areas. This has not happened. Today, over four years after passage of the 1996 Act, most competitors have targeted urban centers for the deployment of broadband technologies due to greater potential return on investment. It is simple: greater densities in population coupled with shorter distances to transmit equals larger revenue and profit. However, many states in this country are not densely populated and the distances that data or voice communications must travel are not short. Consequently, these profit-only motivated companies are not serving the vast majority of citizens in Montana or other rural areas of the country.

Montana has been designated one of the "Disconnected Dozen". Through the perspective of the high-tech economy prism, Montana is "closed for business". A pressing need exists in this country to address the alarming "Digital Divide" that continues to grow between Western and Southern rural communities and the rest of the nation. According to a July, 1999 NTIA report, "Falling Through The Net II", the current gap is expanding between the rural poor and the rest of the nation regarding computer use and online access. Organizations like this one, and many communities throughout the country, are working to provide the assistance needed to allow rural citizens the opportunity to participate in the new economy. However, all the preparation in the world will be to no avail if fundamental broadband deployment to rural areas is not achieved.

Rural Economies: Montana's business market has to become more diverse as traditional extraction industries such as coal, gas, mining and timber decline and we face new competition in the world market. Every day, more of Montana's businesses require and demand access to advanced telecommunications technology. Even our farmers and ranchers must be able to quickly communicate with the world to track market trends and future opportunities. The Internet and advanced tele-

communications technology is the great equalizer for rural businesses who are geographically isolated from national and world markets. Consequently, to a large extent, Montana's ability to be economically competitive has become directly contingent on the establishment of a world class high-speed telecommunications infrastructure. Unfortunately, existing taxes and regulatory restrictions on for-profit telecommunications companies make it difficult for them to justify investment in Montana's communications infrastructure.

The important point that must be emphasized to this Committee is that our governmental policies must keep pace with the demand of people *everywhere* for evolving telecommunications services. Young people in rural parts of America like Montana need the same access to educational materials as young Americans in urban areas. Advanced telecommunications and the Internet are an efficient way to provide educational opportunities to Montana. The same is true with regard to the provision of health care and government services. **We do not need another study or more regulatory hurdles thrown in our way. Rural areas need access to quality advanced telecommunications services from every potential provider now.** Set forth below are some examples of the various sectors' needs for advanced broadband services.

Distance Learning: The Jason Foundation for Education offers a nationally recognized curriculum focused on teaching science and math to students in grades 4 through 8. Montana schools are eager to use this curriculum, however, ubiquitous distribution is problematic. Currently, satellite downlink and cable are serving most of the schools in the program. Cable, however, cannot be used to bring real time broadcasts to the classroom since regular programming is already scheduled. Consequently, programs are taped and played at other times. Expanding satellite reception requires a sizeable expenditure of capital, and the technology is not easy for teachers to use. The ideal medium for distribution is interactive video over the Internet. However, to bring the students quality visuals of Jason activities and experiments, classrooms must have access to additional bandwidth.

Cisco Academies: This project in high schools and colleges of technology provides viable career opportunities for Montana children who choose not to seek four-year degrees. There is a high demand for router technicians throughout the country. Cisco Academies' produces the most nationally recognized certificates. Many of Montana high schools have enrollments of 50 or less, so installing a full academy is financially impossible. However, it is possible for remote schools to be linked to larger institutions through the Internet and for students in both locations to be taught by one instructor.

Internet based businesses: All businesses will need to be able to conduct transactions via the Internet in the foreseeable future, in order to remain competitive. In Montana, over 50 percent of businesses employ less than five people and 96 percent employ less than fifty people. The customers of and suppliers to these small businesses are much larger companies and are beginning to demand that their business transactions be handled electronically.

Tourism: Today, Montana's largest economic sector, next to agriculture, is tourism. In 1999, revenues from the accommodations tax were \$10.9 million. Out-of-state visitors spent \$1.6 billion in Montana, and total travelers (in state and out of state) spent \$2.0 billion. In 1996, the State Tourism Department began offering vacation-planning information through its web page. In 1999, 1.3 million user sessions were logged (a user session is a contact that goes beyond the Home Page). Log-in times have gone from 3 minutes to 13 minutes and 48 seconds. We are getting 3,400 hits per day and 83 percent of our inquiries are not filled electronically. The travel industry tells us that 50-60 percent of travelers get their information on line. The new electronic distribution method now includes a reservation feature. As Internet-based services continue to provide more opportunities to local Montana businesses, and as they change to streaming video for information distribution, access to small communities within Montana becomes increasingly important.

The Montana Grain Growers: This group realized a few years ago that Montana producers were not trained to market their products in an international market. And in fact, at least \$100 million "was left on the table" in 1998 because of missed marketing opportunities. To remedy this problem, the Grain Growers developed a training program to bring producers up to speed. This training often includes real time presentations delivered to producers via satellite. Additional broadband access in our rural agricultural communities would permit these training sessions to be delivered via the Internet, into homes and businesses, rather than requiring producers to travel long distances to centers with satellite downlinks.

Native American Economy: The state is currently assisting a new business venture, which would bring jobs to Native Americans. This new venture converts hard copy technical manuals to digitized formats, so repair and service information

can be accessed via the Internet and manuals can be updated quickly. Success of the business will depend upon broadband capability within Montana and capacity to end users throughout the United States.

Conclusion: The Internet exploded into our lives and our economy beginning primarily in 1997. Its growth and impact since then on the economies of the nation, states and localities is almost immeasurable. The Telecommunications Act of 1996, passed over four years ago, is now ancient history in Internet years. The law needs to be updated to reflect the realities of what has occurred since its enactment, and to ensure that all potential providers of broadband and/or builders of communications infrastructure be allowed to participate.

Mr. TAUZIN. The Chair is pleased now to welcome Mr. Ray Campbell, executive director of Mass Corporation for Educational Telecommunications of Cambridge, Massachusetts.

Mr. Campbell.

STATEMENT OF RAY A. CAMPBELL III

Mr. CAMPBELL. Thank you very much, Mr. Chairman. Mr. Chairman and members of the subcommittee, my name is Ray Campbell. I am executive director of the Massachusetts Corporation for Educational Telecommunications. It is a public instrumentality of the Commonwealth of Massachusetts, and we were chartered by the legislature with a mission of providing distance learning and education services for the citizens and businesses of the Commonwealth.

What I would like to talk about today is a recent initiative we have had in Massachusetts called the Massachusetts Community Network, and it has been a novel approach to the Digital Divide and to the broadband deployment question, and it is not something that can be replicated everywhere, but I think it represents an interesting approach to these problems that the committee find useful as you go about your deliberations.

Government has been active in the telecommunications field using a number of the different levers that government can bring to bear on public policy questions. I mean, whether it is taxing or regulating or subsidizing and things like that. The Massachusetts Community Network is premised on using government in a different role, and that is, government as a market participant, as a purchaser of services. We tried to leverage the government's role as a large player in the market and tried to address some public policies concern that we had with regard to Digital Divide issues.

Prior to the advent of the Massachusetts Community Network, every city and town, every library, every public school in Massachusetts would go to market individually for Internet access services, and as a result, other than cities like Boston, most of these purchasers were treated as small retail participants in the market and they were charged accordingly. The range in prices for a T-1 connection to the Massachusetts ranges from \$900 a month in Boston to as much as \$2,500 in some of the rural areas of the State.

So we thought that if the State was to go to market and speak with a single voice on behalf of all the municipal organizations in the State, which collectively have some 4,000 facilities, that we would be able to exercise enormous presence in the market and get a very different reception from the vendor community.

So to test this proposition, my organizations, MCET, issued an RFP seeking a private sector partner to provide data communications and Internet access services for any public sector facility any-

where the Commonwealth of Massachusetts. We decided that rather than having a State-owned-and-operated network, we would rather rely on the expertise of a private sector partner due to the changes in technology and the core competencies involved in running a network.

In response to the RFP that we issued, or in the RFP that we issued, we only had two mandatory requirements. We insisted that any vendor that we partnered with would have to serve any public sector facility anywhere in the Commonwealth of Massachusetts, no matter how remote, and the second requirement is that we insisted on a flat rate pricing structure so that regardless of location, any organization would pay the same amount for a given amount of bandwidth anywhere in the State.

We had a fiercely competitive selection process. I think there were 23 vendors that participated, and at the end of the day, we partnered with a competitive local exchange carrier called Digital Broadband Communications, which is a Massachusetts-based company and also with a Tennessee-based company called Education Networks of America, and the deal that we got is pretty astounding. These are very high quality vendors. We did a lot of due diligence about their capabilities and their performance and were very satisfied in that regard, but the price point we were able to achieve by aggregating our demand is pretty astonishing. Our price point is \$400 anywhere in Massachusetts for T-1 speed Internet access, and as I said, that compares to the previous prices of 900 to \$2,500. So we were able to achieve remarkable cost savings and were able to get that price point for everybody, including the most rural locations in Massachusetts. So in exchange for the franchise of the whole State, there was very aggressive competition and it resulted in a breakthrough price point.

I should mention that there are a couple of interesting things about this network. No. 1, nobody has to use it. There is no requirement that public organizations join MC in a buy fee out. So we have to earn everyone's business, and we are very happy to do that because we think it will result in better long-term service. In addition, the cost of starting this network, there was a \$9 million appropriation from the State legislature to cover some one-time expenses and some startup costs, but the \$400 per month is the fully loaded cost of operating the network.

We have committed to the administration and the legislature that we will never come back for any additional funding. So \$400 covers all of my organization's costs in providing the service as well as all of the vendor costs we incur, and it includes a state-of-the-art Cisco router with each installation. So \$400 for T-1 speed Internet access and also including a router.

Another interesting thing about the deal we struck is that the vendor is going to be using SDSL rather than ADSL technology wherever they can because it has got some inherent cost advantages, but if there is any public facility that is too far from a central office or if there are line quality or other issues, they will be provisioning standard T-1 circuits. So regardless of location, 1.54 megs of bandwidth, and it is up to the vendor to find the technology that will deliver on that requirement.

I think one of the things that is most important to mention about the network is that because we have put this requirement in place that the public sector needs statewide data communication services, our private partner is having to build out their infrastructure in every single central office in Massachusetts. That was not in their business plan.

Frankly, it is not in anybody's business plan to serve the 100 to 150 smallest communities in Massachusetts, but because the State came to market and said we insist that we find a partner that will serve every single corner of the State in exchange for being able to serve the more lucrative parts of the State, our partner has now altered their investment strategy. They are building out every central office in Massachusetts with digital subscriber line technology.

Once that is in place to serve the public sector organizations that we represent, it is available to serve residential and business customers in all of those communities. So by this summer when the network is fully deployed, to my knowledge, Massachusetts will be the only State in the country that has DSL technology available in every single central office in the State, that is, in addition to other providers that are serving the tier 1 and tier 2 markets in Massachusetts.

Another final interesting point that I would like to mention is that our arrival on the scene with this Massachusetts Community Network product offering has ignited just an explosion of competition by the providers that are already in the market. We have seen across the board 50 percent price cuts offered to the city of Boston by their existing carrier. The Commonwealth of Massachusetts, where I used to work at the information technology division, which does data communication services for most State agencies, has similarly been approached and offered a unilateral 50 percent price cut. We are seeing an incredible amount of competitive energy occurring in the market in response to our arrival.

So I know it is not a solution that can probably work in a State that is 500 miles by 250 miles, but it is an interesting, and it is a different way of thinking about the Digital Divide and the broadband infrastructure deployment issues, and I hope it is useful to the committee.

Thank you very much.

[The prepared statement of Ray A. Campbell III follows:]

PREPARED STATEMENT OF RAY A. CAMPBELL III, EXECUTIVE DIRECTOR,
MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Mr. Chairman and members of the Subcommittee, my name is Ray Campbell and I am the Executive Director of the Massachusetts Corporation for Educational Telecommunications ("MCET"). MCET is a public instrumentality of the Commonwealth of Massachusetts, chartered by the legislature in 1982 to use technology to improve education, the business climate, and the lives of the citizens of Massachusetts. Thank you for the opportunity to testify at this hearing on the status of deployment of broadband technologies.

The Commonwealth of Massachusetts has been at the forefront of the information revolution ever since Alexander Graham Bell invented the telephone, in Boston, in 1876. Massachusetts has also been at the forefront of the Internet revolution ever since Cambridge-based BBN won the contract to build the original ARPA-Net in 1968. Over the years, Massachusetts has incubated and been home to an incredible number and variety of businesses that have created many of the computer and communications tools that are fundamentally changing our economy and our society. We are proud of this tradition and look forward to even greater successes in the future.

I would like to focus my comments on a recent, highly successful initiative in Massachusetts called the Massachusetts Community Network ("MCN"). With the leadership and support of Governor Paul Cellucci, Lt. Governor Jane Swift, and both branches of the state legislature, MCN is a pioneering example of how government can speed the deployment of broadband infrastructure without relying on the traditional mechanisms of government regulation or subsidies. Instead, MCN has capitalized on the government's role as a major purchaser of data communications services to spur private investment in the state's telecommunications infrastructure. Once completed this summer, MCN will result in state-of-the-art broadband infrastructure being available in every city and town in Massachusetts. To my knowledge, we will be the only state in the nation able to make this claim.

Before the arrival of MCN, every city and town, school district, and public library in Massachusetts went to market for Internet access services on their own or in small groups. With the exception of Boston, and perhaps two or three other cities, this resulted in these public organizations being treated by the market as small retail purchasers. As a consequence, the monthly cost of a T-1 speed (1.54 megabits per second) Internet connection ranged from a low of \$900 in Boston to as much as \$2500 in the more rural parts of the state. The central premise of the MCN initiative is that if MCET went to market on behalf of all these organizations, which collectively have over 4,000 separate buildings, we would be by far the largest purchaser of data communications and Internet services in the state. We believed this would allow us to radically alter the nature of the Internet service market for public-sector organizations in the Commonwealth.

To test this theory, the legislature and the Cellucci Administration provided \$9 million to MCET to cover MCN's startup and other one-time costs. The early visions of MCN were of a state owned and operated network, but the rapid pace of technological advances and the emergence of robust competition in the market for Internet access convinced MCET that MCN should rely, to the maximum extent possible, on the infrastructure and expertise of a private partner. In the fall of 1999 MCET, in cooperation with the state's Department of Education, issued an RFP seeking a private sector telecommunications firm that saw a strategic opportunity in partnering with the Commonwealth in this endeavor.

The RFP purposely contained only two mandatory requirements. First, whoever we chose as a partner would have to be able provide service to any public-sector facility in the state, regardless of location. Second, we insisted on a flat-rate pricing structure so that a given amount of bandwidth would cost the same for any public organization in the state, regardless of location. These two requirements reflected MCET's determination that as a public instrumentality dedicated to serving all of the people of Massachusetts it was unacceptable to deploy a solution that excluded more remote parts of the Commonwealth from the benefits of MCN.

As a result of a fiercely competitive selection process, MCET has partnered with a Massachusetts-based competitive local exchange carrier, Digital Broadband Communications, to provide statewide data transport services. Digital Broadband intends to use 1.54 mbps symmetric digital subscriber line technology wherever possible, because of its inherent cost advantages, but has committed to provisioning standard T-1 circuits where distance or other limitations rule out SDSL. Regardless of the last mile technology, MCN will deliver its services on a brand new, cutting edge network that has been optimized for advanced applications including data, video, and voice traffic. MCET has also partnered with a Tennessee-based company, Education Networks of America, to offer additional network services such as filtering, caching, web hosting, e-mail, and the like. ENA's experience operating Tennessee's statewide K-12 network ensures that they have the expertise to provide unparalleled services at the scale of operations demanded by MCN.

The combined MCN service offering features state-of-the-art technology, commercial grade reliability, 7x24 network monitoring and help desk support, and a rich set of bundled services. And the price point we have been able to achieve is nothing short of revolutionary: high-speed (1.54 mbps SDSL or T-1), fully managed data communications and Internet access for \$400 per month, including a new router. The same services at the same price anywhere in Massachusetts. In addition to closing the digital divide for Internet access, we project that MCN can save the public sector, and hence the taxpayers, approximately \$125 million over MCN's first five years.

There are two other important points to note about MCN. First, no public organization is required to use MCN. While it would have been easier if the legislature had directed end users to subscribed to MCN, MCET prefers an environment in which we have to earn our customers' business each and every day. Second, MCET has made a commitment to the Cellucci Administration and the legislature that MCN will never require additional state funding. Instead, end user monthly charges

will cover all of the operating costs of the network. While state funds were essential in getting MCN started, the \$400 monthly price is the unsubsidized, fully-loaded cost of ongoing operations. The combination of these two factors means that MCN can, and in fact must, operate like a private business. We think this is in the best interests of MCN's customers and the taxpayers of Massachusetts.

Beyond direct cost savings, MCN also offers the promise of improving the efficiency, quality, and convenience of government services. Not only will MCN allow more government organization to get online, but the fact that these facilities are on the same homogeneous network will facilitate data sharing and electronic interoperations. Imagine a world where school districts are connected to each other and the Department of Education across the same network, where local police stations are connected to each other and the State Police across the same network, where public health facilities are connected to each other and the Department of Public Health across the same network, and so on, and so on. The possibilities for more responsive, more cost effective government are staggering.

One final accomplishment of MCN is worth noting. In order to satisfy MCET's requirement that MCN be able to serve any public facility in Massachusetts regardless of location, Digital Broadband will be deploying its broadband infrastructure into every central office in the state. Once installed, this infrastructure will be available to serve residential and business customers in these towns. This will result in the availability of broadband Internet access in communities that otherwise would not have had access to such services for at least several years.

I hope the foregoing has given the Subcommittee a sense of the historic accomplishment Massachusetts has been able to achieve with the Massachusetts Community Network initiative without relying on the traditional mechanisms of government regulation or subsidies. By leveraging the public sector's status as a major purchaser of data communications services, MCN has allowed Massachusetts to attract private investment in the state's telecommunications infrastructure. I thank the Chairman and the members of this Subcommittee for the opportunity to testify today on this important topic. If there is anything I can do in the future to be of assistance as you weigh your options in this critical area, please feel free to call on me. Thank you.

Mr. TAUZIN. Thank you very much, extremely interesting. And finally, Dr. David Kushner, chairman of the Diagnostic Imaging and Radiology at Children's National Medical Center here in Washington, DC.

STATEMENT OF DAVID C. KUSHNER

Mr. KUSHNER. Thank you, Mr. Chairman, for the opportunity to present our testimony. Thanks to the committee and the members. I would like to compliment all of you for your sophisticated understanding of these issues. It is quite difficult work, and I can understand there are some areas where fact and fiction clearly do not demarcate. I would like to thank the previous presenters who I endorse in their approach, and I would like to present a different view of the Digital Divide, that of the urban underserved.

Children's National Medical Center has been in Washington, DC. Since 1870. For all of this time, we have served the people of the Washington metropolitan region focusing on high quality pediatric subspecialty health care with many primary care providers in the city and in the surrounding suburbs. Our current challenge is to present and to practice high quality cost effective health care that gives children access that is appropriate to the American expectations.

We find and you know that the children in the inner city are simply underserved in every category with regard to health care and education. We are taking on the challenge of providing such health care, and the real issue is access. Children's Hospital has invested significant infrastructure and physical buildings in the inner city. We have four urban health centers. We have 250 spe-

cialty practitioners trying to provide health care to the underserved, but it is very difficult for a young child who is ill in a family where two parents are working to get access to health care. The parents miss a day at work, the children miss days at school. The impact on this family, on the economy of the District of Columbia and on every city in America is tremendous. And so I would urge you to consider the bandwidth issue as one of the issues that can help us provide access to health care for those who do not have access currently.

If one were to take three taxi rides from your home to Children's Hospital and a day off from work, you would begin to understand the cost and time and frustration and difficulty for each of these families. So we have established the inner city connections with partnership health care providers, with our own health centers. We have telemedicine network deployed into these health centers and the problems are many.

Current barriers are three, that is, reimbursement for technology, reimbursement for physician services and bandwidth. It is very difficult for us to send the information across the city. We still use trucks and courier services because the bandwidth electronically is insufficient as you have seen in this committee room. I would like to try to persuade you that this issue is replicable in every city in America, in fact, across the world.

In an odd way I present the opinion of the other 56 children's hospitals in this country who are trying to do the same thing.

It is not cost effective to have a physician sitting in every single inner city location. It is cost effective to have telecommunications serve as a foundation for early access, early triage and early entry into the system to provide medical information to travel from the central treating site out to the community, to deal with schools and churches and community centers as places where health care can happen.

One of our partnerships is a place called Brookland Manor, which is a Washington, DC, housing area that has been rehabbed and it has a smart home project in it, a telehealth center in it, and we are the health care providers to it. The local residents, in fact, are the telemedics who examine the patients and can communicate with us via an indwelling T-1 line because there is no way to get a less expensive form of communication going through.

It is not currently cost effective. I would implore you to consider the bandwidth issue in this application as a way to lower the cost and increase the access for health care to the urban underserved.

And so I live and practice in the Digital Divide as do 250 of my colleagues at our hospital, as do the other children's hospitals across America. So on behalf of this group of physicians and health care providers and institutions, I would ask you to consider making it easier and less expensive for us to provide access to children.

Thank you.

[The prepared statement of David C. Kushner follows:]

PREPARED STATEMENT OF DAVID C. KUSHNER, MEDICAL DIRECTOR, PEDIATRIC
TELEMEDICINE PROGRAM, CHILDREN'S NATIONAL MEDICAL CENTER

Good Morning, Chairman Tauzin, and Members of the Committee. My name is Dr. David Kushner, Medical Director of the Pediatric Telemedicine Program at Children's National Medical Center. I am happy to have the opportunity to testify before

the Committee on the application of broadband technology in improving health care access for poor and underserved communities.

According to the Children's Defense Report is 1998,

Every 43 minutes a child was reported abused or neglected...

Every 6 hours a baby was born to a teenage mother...

Every 7 hours a baby was born at low birth weight...

Every 3 days a baby died during the first year of life...

These "moments" represent reality in the lives of many District of Columbia infants, children and adolescents, and are reflective of a growing trend in our region and our nation. The region's children face a long list of challenges that impact their ability to receive quality health care so that they may lead healthy and productive lives.

Despite dramatic advances in our knowledge of how to treat the medical conditions of our population, children of urban underserved communities encounter many obstacles when attempting to access quality healthcare—including socioeconomic isolation, maldistributed health services, lack of health insurance, and poverty. Fragmented access, inconsistent quality, excess costs, loss of continuity, and ineffective continuing medical education characterize the deficiencies of our existing health care system.

Since 1870, Children's National Medical Center has provided comprehensive quality medical care and health services. Children's is the only integrated healthcare system in the Washington D.C. area dedicated exclusively to the care of infants, children, adolescents and young adults, and ranks among the nation's top pediatric hospitals. In addition to our main campus, Children's network of care includes four inner-city pediatric health centers, six regional outpatient centers, several suburban ambulatory surgical locations, and a hearing and speech center.

Children's seeks to be preeminent in providing pediatric healthcare services that enhance the health and well-being of children regionally, nationally, and internationally. We are creating solutions to pediatric healthcare problems. To meet the unique healthcare needs of children, adolescents, and their families, CNMC will excel in the core components of our mission—Care, Advocacy, Research, and Education.

Currently, much of our community outreach and our efforts to improve healthcare access occur through the four Community Pediatric Health Centers (CPHC) located throughout the District. They are in Adams Morgan, Shaw, Anacostia on Good Hope Road, and Hadley Hospital. Since the first opening in 1967, the CPHC have provided three generations of District of Columbia families with high quality primary, specialty and preventive healthcare services.

After a decade of preliminary work, CNMC established a formal Pediatric Telemedicine Program in 1997 in an effort to provide leading edge technological support for clinical care and research. CNMC has actively pursued telemedicine in an effort to define opportunities where technology can be leveraged to improve patient care and medical education. The telemedicine team is dedicated to planning, implementing, and analyzing telemedicine activities in order to improve access to primary and specialty care, to increase convenience for patients and physicians, and to improve education for physicians, healthcare professionals, families and patients.

Meeting the healthcare challenges of our inner city children and families requires a collaborative network of community partners working to improve access to the health-related services for preventative care, education, treatment, and disease management. These partnerships provide the foundation for a new technology-enabled delivery model, the Pediatric Community Health Network (PCHN). Our proposed approach will be a major step toward achieving our long-term goal of providing a means to improve pediatric health indicators at the local and national level.

The deployment of broadband communication and advances in technology will facilitate access to pediatric healthcare in underserved urban communities. Initially, telemedicine technology will be integrated into current practices at partner sites such as schools, community health resource centers, and a primary care clinics. The pilot sites have been chosen for their location in an underserved community, and have direct, regular contact with children lacking access to healthcare.

The Pediatric Community Health Network uses broadband technology to enable children to have direct and immediate access to primary and specialty healthcare. The network augments current systems by providing the means for effectively integrating health services at the point they are most needed. In addition, the underserved community are exposed to benefits of technology in an effort to bridge the "Digital Divide".

We envision a telehealth "suite" at each community site, linked by broadband telecommunication to Children's National Medical Center. The "suite" will include PC-based technology capable of clinical care and distance learning (digital otoscopes,

scanners, and cameras). This technology will link the child (via store-and-forward technology or synchronous video conferencing) to a pediatric healthcare provider and educator.

This technology-enhanced model strives to achieve the following goals: 1) increase access to pediatric primary and specialty healthcare for the child and family; 2) increase convenience of healthcare delivery by bringing the specialist and healthcare professionals to the child and family; (2) decrease cost and time to primary and specialty care (lost school days, lost work days); (3) decrease delays in diagnosis by allowing earlier access to the specialist, reducing cost and time involved in diagnosis and treatment; (4) improve communication and provide a means to support the continuum of care for the patient, family and healthcare provider(s); (5) improve healthcare education by providing the patient and their family with better resources from which educational healthcare material can be accessed and discussed; (6) improve quality and effectiveness of medical follow-up appointments.

By deploying this broadband technology in the urban setting, the impact on the underserved community will be extensive. This technology and telemedicine program empowers families and communities to improve the health status of their most valuable asset—the children.

Children's telemedicine program for the underserved urban community sites is the first initiative of its kind. Our goal is to build a sustainable model that will be replicated across the country. However, significant barriers prevent us, and other health care providers from deploying this technology solution in the underserved community. The significant challenges we face are (1) funding for technology; (2) reimbursement for physician services; (3) bandwidth; and (4) licensure, legal questions and others issues.

Children's National Medical Center is dedicated to improving the health status of our community. We can not do this alone. The advancement of new technologies coupled with a highly competitive and challenging healthcare environment requires innovative patient care. It is critical that telemedicine be permitted to enter the mainstream delivery system. We implore Members of Congress to: (1) conduct an aggressive review of reimbursement issues are barriers for urban health care; (2) develop incentive programs for payors, including Medicaid that support telemedicine programs; and (3) support research and development initiatives for urban telemedicine programs through annual appropriations process that advance the use of broadband technologies in an urban setting.

Again, thank you for the opportunity to testify before your committee. I look forward to working with you and my colleagues to advance the use of broadband technologies to help build healthy communities.

Mr. TAUZIN. Thank you very much.

The Chair recognizes himself and members in order. Let me first thank you all for contributing again to our understanding of how bandwidth broadband itself can expand our capability of providing service to citizens of our country in medicine, and we learned earlier in entertainment and other uses.

I wanted to put on the record a couple of quotes that I found extraordinarily interesting. There is a story just out dated Tuesday, April 11, relative to the fact in San Diego, California, that a high speed service provider in San Diego this week told several hundreds of its customers to stop running the music exchange software, Napster, or lose their cable modem accounts, and the reason they did so is the fact that apparently by running it, running the Napster, the music service on their cable modems, that they were interfering with the capacity of the system to continue its e-mail service, and this is a quote: This e-mail serves as a 72-hour notice to reduce account activity to compliant usage levels and to remove any servers. What is a compliant usage level? I mean, you get the picture.

We have increasing evidence that the lack of bandwidth, the lack of capacity in these systems is beginning to impact even the reception of music, and yet we are talking about increasing the use of visual and video streaming in the Internet and the capacity to do

telemedicine, serving consumers in their home without dragging them all over the city when they need services. We are talking about reaching out to rural areas of Americas with service which they can't even contemplate having today. You can see how we have some real problems and why innovative solutions like Mr. Campbell's solution in Massachusetts, you have to think about them all, what works to get it out there.

There is a quote from someone I think everybody will recognize, John Chambers of Cisco Systems, who sells so much of the components of the Internet and broadband systems in America and around the world. His quote, the next wave will be e-training, e-education, e-convenience. We should talk about E medicine, says Cisco's CEO John Chambers, envisions a world in which companies and universities will put courses on line, people will turn to the net for streaming video, other forms of entertainment. These applications, in his quote, are bandwidth hogs that will make e-mail, which is a major load on the Internet today, look like a rounding area, Chambers says.

In short, if our Nation is to realize any of the benefits that you gentlemen represent here today, the extraordinary advances in inefficiently serving people medically, the extraordinary capacity to reach out and bring rural America into the heartbeat of our country economically, the capacity to touch parts of underserved urban areas that are not going to be served we are told by some account 3 to 5 years from now will still be underserved in broadband, we have got to do some real work quickly in ensuring that this Digital Divide does not happen.

I wanted to ask you, Mr. Campbell, sort of this project you put together in Massachusetts, you say it might not be replicable in a State like Montana, many of our western States. How many States in the Nation might you see this sort of a concept replicated if the States became interested in it?

Mr. CAMPBELL. I think that it can be replicated probably just about everywhere but not exactly. Massachusetts is not a geographically large State, so our provider believes it will be able to provide 1.5 meg SDSL connections to about 65 to 75 percent of the facilities in Massachusetts. So it will be provisioning T-1s to only 25 or 35 percent. Because of that relatively large proportion of SDSL to T-1 it could offer us flat rate pricing. I think the general model of banding together and aggregating demand and having government come to the market, not as a regulator, not as a taxer, not as a prescriber, but instead as a market participant—

Mr. TAUZIN. Facilitator.

Mr. CAMPBELL. Exactly. And leveraging its market presence and demanding that the market respond to it, that I think you can replicate everywhere. Maybe you don't get complete flat rate pricing. Maybe it is a tiered-pricing structure. There is any one of a number of varieties on the themes. So I don't think what we have been able to accomplish could be exactly duplicated in a much larger State, but I think the concept of having the government come to market as a market player instead of as a market maker, that is something you can do anywhere.

Mr. TAUZIN. Where are the bottlenecks in the system right now? Identify them for us. You are all in this business of wanting to

make sure that there are no bottlenecks, everybody gets access. Where do you see the bottlenecks? I have got a quote from Nortel and from other companies indicating that bottlenecks occur all over the place. You can experience them in many places, not just in the phone wire or the cable. You can get it, for example, where the crossing points exist in the major hubs. There are real slowdowns there. There are estimates, according to Solom Heddeya of Infolibria, found that health sites manage their service. It is a quote from him, but I think the greatest bottleneck is in the backbone itself and the crossing points between the major networks.

So are they correct that the bottlenecks exist not, just in the rural parts of America, but even in the major backbones where their crossing are inefficient and there are literally problems across the spectrum of the infrastructure? Is that accurate? Are there bigger problems in the country, bigger problems in the urban centers? Where are they? Who is now going to get this stuff?

Mr. VUCKOVICH. Mr. Chairman, I would just like to comment on that, that I don't know if the problems are with regard to the bottleneck is the points of presence and the backbone because we don't have any in Montana, and I think this is a real—

Mr. TAUZIN. Let us say that again. You have no point of presence of Internet access in Montana? There are quite a number of States that have problems.

Mr. VUCKOVICH. And that is correct, and I think that what it is going to do in order to get points of presence, we are going to have to aggregate the demand, and several States may have to go together to do that, to aggregate that demand so that it is feasible to have a point of presence there. However, with the present legislation, that can't be accomplished because of the LATA lines and other things there.

Mr. TAUZIN. What is a LATA line?

Mr. VUCKOVICH. It is an imaginary line.

Mr. TAUZIN. Drawn by a court.

Mr. VUCKOVICH. I am not sure.

Mr. TAUZIN. By the court in the decision that split up AT&T. So these old LATA lines are preventing the accumulation of market demand that might connect you to a POP in Montana, that's right?

Mr. VUCKOVICH. That is right.

Mr. TAUZIN. And that is true of a lot of western States and rural States, is it not? And so the services we are talking about, you might eventually get them in DC. You may eventually get enough—they are tearing up streets like crazy in DC. You might eventually get enough fiber and systems deployed so that with the right kind of dollars you can serve this underserved community in DC. How long will Montana have to wait?

Mr. VUCKOVICH. Mr. Chairman, that is a very good point, and the longer we wait, the more we lose, and we can't afford to lose anymore. Businesses are leaving our State because there is not a point of presence there, and it is virtually impossible to get them back from wherever they have to go.

So I don't know how to say this, but we are hurting in Montana with regard to broadband deployment, and one of the few areas is telecommunications that we can compete on an equal footing with urban areas, but we have to have that and we don't have it now,

and I think it is going to take a partnership of Federal, State, local, and probably private industry to be able to provide this the same way that we had to do to get our interstate highways built, to get electrification to the rural areas and so on. I think we are going to have to—this is a basic infrastructure for a State and we have to have it.

Mr. TAUZIN. And you put your finger on it, and my friend from Oklahoma, I want to recognize him in a second, but if I lived in Oklahoma and I didn't have access to the backbone, and I couldn't cross these LATA lines to get service, I might have high speed in my little town among all the residents in that town, but we can't get to the main highways, we can't get to the backbone because there is none in our State, or so far away the only thing we can get is an expensive T-1 line. That is where I am.

Mr. VUCKOVICH. We don't care about the price of the service as long as somebody provides it.

Mr. TAUZIN. The choices you face there, you may be left out of a business network or to be in that business network, you have to move, you have to move to an urban center somewhere where a point of presence or connection is available to you, and that is the dilemma of lack of service. It is not just the lost opportunity. It is the fact that whole communities potentially could dry up if the people who live in those communities are limited to high speed conversations in the family because they can't get outside and talk to anybody else.

If they are a Ford parts supplier, GM parts supplier and they can't get in on that part supply network because they don't have high enough speed. Nobody wants to connect to them because it drives them all down to the lowest denominator speed, and then they have to go out.

And so that the point I think you make, and I keep trying to make to my colleagues, is that if we don't, as quickly as possible, take away all the barriers to everyone building out and create some new innovative facilitation of the deployment of these services to parts of America that don't now have them, then places like Montana will become deserted in e-commerce, in effect. They will become deserts of e-commerce, and places in Oklahoma and Louisiana and States that don't necessarily have the capacity as perhaps Massachusetts had to put together such an innovative plan, Mr. Campbell. We will be left in the dust and when this train leaves it is leaving pretty fast.

My friend from Oklahoma, Mr. Largent.

Mr. LARGENT. Thank you, Mr. Chairman. Mr. Vuckovich, who is the incumbent carrier in Montana? Is it U.S. West?

Mr. VUCKOVICH. U.S. West serves approximately, I would say, 60 percent of the residences and businesses in Montana.

Mr. LARGENT. And what has the experience been in Montana with U.S. West? Are they trying to provide service to the rural communities in Montana?

Mr. VUCKOVICH. I think, for the most part, they have been fairly receptive to providing upgrades to their system. I know we have probably the best digital switching of all of the U.S. West States. We do have DSL in one community, and that is in the State capital right now. That is the only community that has DSL.

As I stated in my testimony, we were under the assumption that as was the FCC and everybody else with the passage of the Telecommunications Act, that competition would come in, and we would get this broadband service. We have not seen that. We have not seen any of the big carriers, the AT&Ts, the Sprints, the MCIs, and we have not seen them come into the State. We wish they would.

Mr. LARGENT. Mr. Vuckovich, are you familiar with Dr. John Fitzpatrick?

Mr. VUCKOVICH. I am. He is now with Touch America.

Mr. LARGENT. Located in?

Mr. VUCKOVICH. Butte, Montana, 25 miles from where I live.

Mr. LARGENT. In his testimony in the Senate here is what he says. For example, during the past 5 years U.S. West has offered 70 of its Montana rural exchanges for sale and has undertaken similar initiatives in others States in its region. That doesn't sound like a real commitment of U.S. West to rural communities in Montana.

Mr. VUCKOVICH. I can't answer for U.S. West or what—

Mr. LARGENT. I am just talking about—

Mr. VUCKOVICH. —John is saying. I know that U.S. West has put up some exchanges for sale.

Mr. LARGENT. Let me just continue by saying that Dr. Fitzpatrick's testimony, he doesn't view that as bad thing, but as a good thing because he is saying that U.S. West is not committed to the rural community in Montana in the first place, and that is obvious in the fact that they are offering to sell 70 of their local exchanges in rural communities in Montana. So U.S. West is bailing out on rural Montana. That is the bad news.

The good news is that there is a lot of private sector companies that are coming in, competitive local exchange carriers that are coming in and buying these and upgrading them. Let me give you some examples because you mentioned that Montana doesn't have a point of presence. You mentioned that DSL is available in only one city in the State of Montana. Here is what he says: Examples of this commitment to rural customers include—these are the people who are coming in and buying the exchanges from U.S. West that is bailing out on Montana—Blackfoot Telephone Cooperative acquired nine exchanges totaling 7,000 access lines from U.S. West in 1994. Since then Blackfoot has invested \$17 million upgrading switching equipment, installing fiberoptics and improving service offerings.

Five years ago, areas that did not have access to 911, custom-calling features, voice mail, ISDN, DSL or even simple dial-up access Internet have them today. Montana Advance Information Network created by the State's small independent companies and cooperatives provide fiberoptic connectivity and transport throughout Montana's rural areas. VisioNet, Midrivers and range cooperatives who use main networks provide interactive video services to around 90 rural sites in the State of Montana. Midrivers' Telephone Cooperative, based in Circle, Montana, plans to deploy DSL services in exchanges during 2000 including Circle, Jordan, Baker and Ekalaka, Montana. These communities are located in some of the most sparsely populated territory in the continental United States.

In contrast, U.S. West currently offers DSL in one Montana community, Helena, the State capital, and the Montana headquarters for U.S. West.

My point is, and there are several other examples here, my point is we just this year updated Glass-Steigel, a law that went into effect in 1934. In your testimony what you are asking for in your conclusion, it says the Internet exploded into our lives and our economy beginning primarily in 1997. Its growth and impact since then on the economies of the Nation, States and localities is almost immeasurable. The Telecommunications Act of 1996 passed over 4 years ago and is now ancient history in Internet years. The law needs to be updated to reflect the reality of what has occurred since its enactment and to ensure that all potential providers of broadband and/or builders of communication infrastructure be allowed to participate.

Aren't we being a little impatient? I mean, we just updated Glass-Steigel that was enacted in 1934 this year, and now 4 years after we enacted the telecommunications bill, you are saying we need to update it, when, in fact, the private sector is already doing what you are asking to be done. Isn't patience called for here, Mr. Vuckovich?

Mr. VUCKOVICH. Mr. Chairman, Representative Largent, I think that the private sector is moving forward in this. I also think that the Internet, 4 years since the passage of the Telecommunications Act, is probably like 24 or 25 years of normal time because advances have been so rapid, and that is why I think we have to be able to make adjustments and changes to this rapid change of information and technologies that are available, and even though it is—the law is a great law, and I applaud it, and even though it is only 4 years old I think it has to be upgraded because it is 4 years of Internet.

And in that 4 years of Internet, the progress has been so tremendous that it is equivalent to probably 25 years or 24 years of progress prior to the Internet. And so I think that we have to look at whatever is viable out there and make adjustments to be able to provide and do what the Act says it will do, and that is, provide everybody in the country with access to these telecommunication entities that are out there or the things that are out there.

Mr. LARGENT. Thank you, Mr. Vuckovich. I would like to ask unanimous consent, if I can ask one more question, seeing that there is not a long line here.

Mr. TAUZIN. I think we can probably accommodate you, Mr. Largent.

Mr. LARGENT. I would like to ask Dr. Kushner. Dr. Kushner, you are at Children's Hospital here in DC.?

Dr. KUSHNER. Yes, sir.

Mr. LARGENT. Can you give us kind of a laymen's definition of Digital Divide?

Dr. KUSHNER. Yes, I can. I would have to do it at several levels if you would permit me to just go on for a moment, I suppose. In health care, the Digital Divide has to do with the distance learning and the practice of medicine using digital technology. For instance, it is very easy for us, or most urban hospitals to connect to suburban hospitals using these high width band lines because they exist.

We, in fact, have some T-1 lines and some T-3 lines or ATMs that go out to other hospitals with which we are connected, ISDN technology.

In the inner city, if we are interested in doing that same service, and we are, because it is part of our mission, the carriers don't provide the service so we rely on CLECs or other sorts of interesting innovative solutions, and the time difference between the moment we could establish such communications with health care systems in the suburbs and those with which we still haven't established telecommunications in the inner city is shocking.

Looking at Pennsylvania Avenue or K street or M street, the whole city is totally ripped up. There are switch hotels all over the city. I have lectures from all of my friends in the telecom business how wonderful it is in DC. And yet there are literally no high speed lines going into ward 7 and 8, and there may be some other wards in which there are none.

So in a technical sense, the Digital Divide portrays that way, and when we try to deliver health care over it or distance learning or just storage of medical records, there is a great discrepancy between what happens in certain parts of the city and other parts of the city or the suburbs.

The same is true for the distribution of physicians. There are certain parts of Washington where there are many pediatricians for a certain number of children and other wards like 7 and 8 in which there are very few. In ward, I am forgetting the ward number which is northwest, in ward 3 there is one pediatrician for 300 to 500 children, and in ward 7 and 8 there is 1 to 5,000 to 7,000 children. So the distribution of health care providers and the technology to provide health care access in other ways is really quite striking.

From our standpoint, if there is a way to use the Digital Divide as a way to address opportunity in general, that is how I view it. These families are, in many ways, as isolated as families on a farm in the middle of Minnesota or Montana. The paradox is shocking. Three miles from where we are sitting, there are people who have never had access to any of this Internet capacity in their health care environment, in their schools, in their churches, their community centers, and as we reach into those communities trying to empower them, trying to teach, as the other gentleman said, trying to teach the families how to take care of their own children, try to give them access to all of the things we have access to, it is a tremendous difficulty.

So the barriers and bandwidth if you are using the technical definition, are clear, from my standpoint. You can just draw a map of where the wires go and where they don't go. It is very simple. From the standpoint of opportunity, in every category these families are, in a way, isolated. The education, access to the Internet in every sense that the Chair on the committee has spoken to today, access to health care, access to e-mail. It is an amazing difference just in this little 3-mile area.

Mr. LARGENT. Just to kind of, in your estimation, what percent of the people in this country do not have access to broadband technology?

Dr. KUSHNER. Sir, I would have to defer for a knowledgeable answer to my friends on the technical side. I don't think I could give you that answer. In terms of physicians, the answer is probably less than 1 percent of physicians have access to broadband technology. That would be my estimate. Mr. Linkous could probably comment on that. I think even the doctors' offices, because that is my area of practice, are, in a way, very primitive compared to where they should be to provide the home health care, to provide the access to hospitals, to make sure we have faster triaging as the other physician said.

It is really shocking. The disconnection between the level of bandwidth provided to businesses and to really the e-commerce side of America is very different than in the health care business itself in any way.

Mr. LARGENT. Do you feel like it is the government's responsibility to make sure that every American has access to broadband technology?

Dr. KUSHNER. You are putting me on the spot. I think it is the government's responsibility to make sure the opportunity exists so that the private and public sector can work together. I tend to be kind of conservative in my views. I am not sure the government needs to do it, but I do know it isn't happening and I can testify with great enthusiasm about that. We need to find out why it isn't happening and create the economic environment whereby if it is appropriate, private individuals or private companies will give us the bandwidth. I don't need for the government to wire southeast Washington. What I need is to have the bandwidth, and I don't really care how it gets there. It has to be cost effective. It has to be technically reasonable. And it has got to do what I need it to do. I don't care who does it.

Mr. TAUZIN. Will my friend yield?

Mr. LARGENT. Yes.

Mr. TAUZIN. There is a Legg-Mason report that came out late last year that indicates that 3 years from now, according to their estimates, that fully one half of America would not have access to broadband, except that one half of that half might have it with one provider. So that a quarter of America would have none at all, a quarter of America would have one provider, perhaps, and half of America would have multiple providers. That is in a 3-year period, according to the Legg-Mason study. And where that occurs also is kind of interesting because they also indicated that it was going to be in the inner cities, underserved areas within the cities and in more rural parts of America, such as yours and mine and much of the western States.

Mr. LARGENT. Dr. Kushner, what percent of the American population do not have access to MRIs?

Dr. KUSHNER. I am certainly not prepared with data to answer that question, and I guess access is defined as how long does it take you to get there. I think all of America can get there. It is a matter of how quickly. Certainly in urban environments, depending on where you live in the urban environment you can get it the next day, but in Washington, DC, for instance there is a relatively limited number of MRIs and the urban underserved that we are talking about, specifically today, have to wait some time to get to them

because they can't figure out a way to get out to the suburbs nor do they have the insurance to get the health care.

Mr. LARGENT. Yet you would acknowledge MRIs are a valuable tool for physicians to use.

Dr. KUSHNER. Oh, absolutely.

Mr. LARGENT. Should it be the government's responsibility to ensure that all Americans have access to MRIs?

Dr. KUSHNER. I think MRIs are a part of health care and the government should be interested in it and should try to determine the barriers to it, and if possible, legislation might be a way to lower the barriers.

Mr. LARGENT. Thank you, Mr. Chairman.

Mr. TAUZIN. Mr. Vuckovich, I know you want to respond, too. I want to let you do that.

Mr. VUCKOVICH. Just briefly, Mr. Chairman, thank you. I think one of the concerns in Montana, as I say, 60 percent of our residents are served by U.S. West, but still a ruling from the FCC that was recently made, it classifies U.S. West as a nonrural telephone company, and they lose access to universal service charges or funds, and in our area, they are serving rural people.

I mean, the whole State is rural. We are actually frontier, and if they don't have the—I think the only way you are going to get broadband service is through universal service fees being part of the equation.

Mr. TAUZIN. I would hope we don't have to go there. It is sort of like Dr. Kushner has pointed out, the first obligation, I think of government, ought to be to remove the barriers that don't allow companies like U.S. West or other companies to provide broadband services to you and get as much done in the marketplace as possible before we go around asking one consumer to subsidize another, as we have done in telephone service. It ought to be the last resort, not first resort, but I want to make a point with you, Mr. Vuckovich.

My friend from Oklahoma talked about some of the CLECs that are offering high speed broadband in given rural areas in Montana. That is not the problem, as I see it, as I think Montanans see it, and I think folks in Louisiana and Oklahoma see it. The problem is you can have all the broadband you want in your little town in rural Louisiana or rural Montana, and you can speak at high speed on the Internet with everybody in town, but if you don't have the connect to connect that town to a POP somewhere to the broadband backbone, you are as isolated as anybody living in a desert oasis. You might have a lot of water to drink in the oasis, but you just can't leave it because you can't cross the desert.

And the problem that I see, and I hope we focus on, is the fact that as long as we have government barriers to any provider providing the service to people in making those connects from the small towns where broadband may be available inside the town, from that town to the broadband pipe somewhere where a POP does exist, until we remove those barriers and open it up to competition, we are going to be stuck with talking about subsidies and innovative concepts of government facilitation as Mr. Campbell has worked out in Massachusetts, or we are going to be debating arguments as to whether how much government owes a responsibility

to connect people up who are not connected in the inner cities of America.

So the concern I have is that we keep debating these old long distance and local issues that have a lot to do with telephones, designed in an old age where distance was relevant, and have nothing to do with the Internet where distance is totally irrelevant, have nothing to do with satellite communications where distance is irrelevant.

I ask any of you, you are on a cable line somewhere, you get cable television, any of you? Do you pay more because you are at the end of the line instead of at the front of the line? If you are on the Internet do you pay more when you are talking to somebody in Tokyo than when you are talking to somebody in Tibido? The answer is no.

Distance is irrelevant in these new systems, and yet we still find ourselves absolutely just incapable of making decisions because we are still fighting the old 1996 battles over who can make a long distance call and who can make a local call and who can carry it in America, and it frustrates the dickens out of me because, again, let me say it again, Mr. Vuckovich, and I think those of you who live out west have this experience so much more than we do in rural bayou country in Louisiana.

I can have all the high speed service I want in Tibido, but if I can't connect to the hub in New Orleans without an expensive T-1 line and nobody is going to build a system for me to get it even at \$400 a month, how many families can afford that, Mr. Campbell? If I can't get connected to the hub, I am dead when it comes to broadband. I am isolated. I am gone in this new world, and yes, it is moving at high rapid speed, and 4 years, you were right, Mr. Vuckovich, 4 years in this system is like dozens and dozens of years in the old communications system, and we need to start thinking a little bit about who are we going to leave behind and who is going to suffer from lack of pediatric care because we haven't figured out how to get telemedicine out to rural and inner city places where there is a lack of physicians and a lack of care.

And it seems to me that the first place we ought to look is at the government barriers. We ought to take them down. We ought to take them down as soon as we can, and then if the market doesn't take care of somebody, then we talk about innovative plans and government subsidies if that is required. That is a model I think this committee ought to focus on. It is the reason we focused that way in SHVA.

The first move was to give the satellite companies regulatory relief so they could carry local programming in the satellites, and recognizing they weren't going to do it everywhere in America because they couldn't, we came with a second bill that provided government loan guarantees to make sure rural America was not left out. That ought to be the model here. We ought to take down the barriers so that companies can deliver.

Mr. Kushner, you said it best. Who the heck cares who it is that is delivering it to you if nobody is? I mean what is the difference whether Bell or an AT&T or a CLEC or somebody is delivering me service if nobody is? Shouldn't we say in America everybody can, come on in? And if companies are selling their exchanges, it may

just be because we don't let companies do business anymore in Montana the way business is going to be done in the 21st century. I mean I would be selling out, too, areas I couldn't serve.

Mr. KUSHNER. Mr. Chairman, I wish I could vote for you right now.

Mr. TAUZIN. Thank you. And the bottom line is, that if you live in Louisiana, even if you are not alive in Louisiana, you can have that privilege in many cases. The bottom line is that this is a subject that will not go away, and the sooner we address, it the sooner we prevent this Digital Divide you talked about today.

I have got a sneaky suspicion, I was just telling staff about it, I am a little cynical as I get older in government. That is a shame, and it shouldn't happen to us, but it is happening to me. My cynical thought is that this government kind of likes the idea that it is helping to create a Digital Divide because government loves to come in and solve those kind of problems, and my conservative heart tells me the first thing we ought to do is prevent government from creating a Digital Divide, so we don't have to end up helping government solve it with my tax dollars. We ought to let the market work in order to free our people.

Thank you very much. Hearing stands adjourned.

[Whereupon, at 12:30 p.m., the subcommittee was adjourned.]