

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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CONTENTS

	Page
Testimony of:	
Apfelbaum, Marc J., Senior Vice President and General Counsel, Time Warner Cable	55
Daggatt, Russell, Vice Chairman, Teledesic	36
Falcao, Glenn, President, Internet and Service Provider Networks, Nortel Networks	32
Gray, Stephen C., President and COO, McLeodUSA, Incorporated	82
Kurtze, Arthur, Senior Vice President, Onesprint, Strategic Development, Sprint	72
Lenox, Howard A., Jr., Director, Federal Relations and Technology Issues, SBC Telecommunications	15
Netchvolodoff, Alexander V., Vice President, Public Policy, Cox Enterprises	57
Pickle, Kirby G., President and COO, Teligent	41
Scott, David E., President and CEO, Birch Telecom, Inc	76
Tauke, Hon. Tom, Senior Vice President, Bell Atlantic	60
Vitale, Mary Beth, President and COO, RMI.NET	87
Vradenburg, George, Senior Vice President, Global and Strategic Policy, AOL	50
Material submitted for the record by:	
Kurtze, Arthur, Senior Vice President, Onesprint, Strategic Development, Sprint, letter dated August 31, 1999, enclosing response for the record .	126

DEPLOYMENT OF DATA SERVICES

Thursday, June 24, 1999

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

The subcommittee met, pursuant to notice, at 10:13 a.m., in room 2123, Rayburn House Office Building, Hon. W.J. "Billy" Tauzin (chairman) presiding.

Members Present: Representatives Tauzin, Stearns, Gillmor, Deal, Largent, Cubin, Rogan, Shimkus, Wilson, Pickering, Markey, Boucher, Gordon, Rush, Eshoo, Engel, Luther, Sawyer, Green, McCarthy, and Dingell (ex officio).

Staff present: Justin Lilley, majority counsel; Cliff Riccio, legislative clerk, and Andy Levin, minority counsel.

Mr. TAUZIN. The committee will please come to order. We will keep trying. The committee will please come to order.

I will ask that all of our guests take seats and witnesses please take your positions at the table. Thank you very much.

The purpose of today's hearing is specifically to provide this subcommittee with a comprehensive overview of what I believe is the next generation of telecommunications. The United of America is rapidly approaching the close of the 20th century with its position as the world leader in the provision of telecommunication services to its citizens firmly established. Congress has laid the groundwork to ensure that, as we move into the 21st century, Americans will have a mature, dynamic, competitive telephone, cable, broadcast industry both wired and unwired to provide a full range of affordable, local long-distance video and over-the-air services.

The provisions of the Telecommunications Act of 1996 and the regulations attendant thereto, while certainly not perfect, have been the safe harbor in which each of these services has been securely docked now for the last 4 years. But there is a new kid on the block—a strapping, unruly teenager—now that is barely recognized, in its infancy, and was only vaguely referred to when Congress and America's great telecommunications companies signed the uneasy truce of 1996.

It is called high-speed, broadband data. And it can travel from house to house and business to business around the globe at light speed through a medium called the Internet. It is swallowing up all of the great telecommunications services upon which we Americans have grown dependent and come to expect and it is spitting them out again in great and wonderful combinations the likes of

which the world has never seen nor imagined. Because in 1996 it was just an infant, vaguely acknowledged, ill-defined as some sort of anticipated, quote, unquote “advanced” telecommunications service, it was left alone to define itself and develop while we policymakers sweated and groaned belatedly crafting policies and rules for the last generation of telecommunications. And now every telecommunications industry in America—ILECs, CLECs, IOLECs, satellite, wireless, phone, fixed wireless, electric, cable, and broadcast, probably some we haven’t heard of yet—is gearing up to use and deploy high-speed broadband data services.

Over the next several years, it can be available to every American home and business that wants to be connected to the next century’s service. It isn’t an exaggeration to say that this technology has begun and will continue to change the way we live, the way we do business, not only in this United States, but in every country on the planet. Its positive effects on our economy is truly staggering.

According to the U.S. Department of Commerce report recently issued called The Emerging Digital Economy II, information technology industry is driving the U.S. economic growth and although it comprised only 8 percent of the Nation’s total economic output from 1995 to 1998, it is responsible now for more than one-third of U.S. economic growth. The report concludes that by the year 2006, almost half of U.S. workers will be employed in the information technology industry or in a field that heavily relies on such technology. Here in the northern Virginia area, I am told, 4,500 high-tech industries now employ more people—more people—than the Federal Government, believe it or not.

We have invited a number of companies to come before us today to present an overview of the broadband data pipes that are developing or preparing to deploy, as well as the companies which are creating this remarkable applications and services that are and will be delivered over these broadband pipes.

To the extent that any of the witnesses today were led to believe that this hearing is an open invitation to attack other companies for perceived sins or perceived commissions or omissions or will be an opportunity to lobby this committee as to your position on particular legislation now before the Congress or possibly before the Congress or to your company’s opposition to any other company’s position on any legislation, let me set the record straight at the outset. There are a number of policy issues attendant to this next generation of telecommunications, including matters of regulations versus deregulation, taxation, open access, privacy, competition, and many, many more. Let me assure the members that those issues will be addressed in upcoming hearings, specifically on legislation that I, Mr. Dingell, and others will shortly introduce and others have already introduced.

However, it is not our intention in calling this hearing to attempt to have the committee explore or debate these matters today. It is specifically our intention today that this be an in-depth exposure for members on the various types of broadband pipes and broadband applications. And I am, therefore, going to ask the witnesses to do something very important. I have read your opening statements. We reviewed them last night. Put them away. If any

of you want to read those statements to us, I will bang the gavel down and we will move to the next witness. If any of you want to engage in attacks on each other or on your business practices or perceived sins or omissions or commissions, I will bang the gavel and we will move to the next witness.

This is an educational hearing. The purpose of it is to give you a chance to do something we sorely need and that is to teach us about the miracle of broadband: what it is; what it does; what it can do; and why it is important to get it out there. And how are you getting it out there and how are you not? And to teach us why it is that we have to, 1 day, consider making some policy in this area for the good of the country and for the planet.

Therefore, put those written statements away. Don't lobby us today. We are not interested in that. And I would ask members: Do your part, too. This is not a day in which you ask witnesses to attack other witnesses. This is a day to learn. This is a day for you to teach us.

We have a large panel before us. I am going to suggest several things. One: I don't do two panels when we do hearings. I have a very specific reason for that. I have been here a long time now and I have been through a lot of hearings with two panels. And whenever I chair a hearing with two panels, it is me and the second panel alone.

We do one panel. That way you can hear from us and we can all here from you and then we can have a good dialog together.

Second, keep your conversation with us conversational. Put those written statements away. Talk to us about what it is you are doing and what you can teach us about broadband.

And, third, if any of you need a break, just give me a little signal and we will call a 5 or 10 minute break. This could be a long process.

Let me thank you for coming. I deeply appreciate the time you are going to spend with us and the fact that we are all going to go to school today. I thank you and I yield now to my friend, the gentleman from Massachusetts, Mr. Markey for an opening statement.

Mr. MARKEY. Thank you, Mr. Tauzin, very much. And I thank you for calling this great hearing today on the subject of the deployment of data services.

The subject of data services is not a new one to this subcommittee. This subcommittee has a long history with the development of competitive data services and I think a brief overview of that history is beneficial. Let us just take a short walk down memory lane.

Some of the most important data service hearings were held immediately after the break-up of AT&T in 1984. The newly divested Baby Bells were clamoring to be relieved of the line of business restrictions of the MFJ which broke up Ma Bell. The most hotly contested issue at the time was the information service restriction with fledgling information service providers and newspaper publishers battling with the Bells in hearing after hearing.

We had long debates in the subcommittee on that subject. We were told back then if we only let the Bell companies into information services, then they could bring fiber to the home. If they could do information services, then they could reach rural areas with dis-

tant learning or do virtual surgery through telemedicine applications. Sound familiar? Fiber to the home became a bumper-sticker slogan to promote the Baby Bell data service agenda.

And who could forget Monsieur Minitel in 1987? We explored Minitel data service that was being deployed in France with Monsieur Minitel who ran it testifying before our committee. We even projected the service up on the hearing room wall right over here so that we could right to France and plug right into that system with their wonderful data service where one could buy airline tickets online, make dinner reservations, or remotely chat with Bridgette in Lyon.

We needed Minitel in America. What a vision.

Simultaneous with these debates in the late 1980's, this subcommittee promoted our domestic information services marketplace. As then-chairman of this panel, I convened numerous hearings as we battled the FCC time and again, in bipartisan fashion, over a proposal to levy so-called enhanced service provider access charges on nascent information providers such as Prodigy, CompuServe, and others. The Federal Communications Commission proposal at the time was to assess charges on data service providers such as would raise the subscriber line charge to almost \$8 so that access charges could be lowered for everyone else. Sound familiar?

And in what FCC Chairman Bill Kennard has called the most important decision affecting the development of the Internet, the FCC finally relented to our subcommittee and put in place an exemption for such charges on information service companies that still stands today as the most important decision. It was that decision, after some very tense negotiations with this subcommittee, that helped to spawn the rapid growth of Internet access to residential consumers because it made such service available.

The computer industry was invited to give us its views as well. We heard testimony from John Scully of Apple; Mitch Kapor, the founder of Lotus, John Gage of Sun Microsystems. We were told to get digital; that we were in a period of convergence; that a bit is a bit is a bit. It didn't matter if it was a voice bit, a data bit, a movie bit, a music bit, a fact bit: all bits could flow over the digital networks and use digital technology. And this subcommittee got digital. We began to foster national proposals to deal with the communications convergence.

I remember the hearings leading to the passage of the Brooks-Dingell-Markey-Fields bills in 1993 and 1994 where we talked about fostering greater growth in data services to help promote growth in the high-tech computer and software fields. I maintained that we didn't need fiber to the home, we could data over copper wire with digital compression. I argued that it would be a good start to promote affordable ISDN or some other flavor of digital service to consumers, a proposal met with great skepticism in the industry.

Our efforts on all these issues eventually bore fruit. We legislated in the midst of this digital convergence and enacted the landmark Telecommunications Act of 1996. That act broke down historic barriers to competition and was designed to unleash a digit free-for-all across all market sectors and industries. Central to the

act was the notion that we would treat all entities based upon the services that they were providing and neither based upon their pedigree as a cable company or phone company nor on the particular type of facility used to deliver this service.

With all this history in mind, one can imagine my surprise when I was told by someone recently that the Telecom Act was only about voice. Simply competition for voice bits. There are apparently many people in the industry suffering from the same bout of telecommunications amnesia. Some people now seem to be saying that a bit is a bit is a bit, but some bits are more special than other bits. Rather than communications convergence, people are proposing digital divergence, proposing to rip data bits out of the bit stream and treat them differently from voice bits. There are also suggestions that identical telecommunications services offered over different facilities should be treated differently. How very undigital.

Now, 3 years after the act, after numerous rulemakings, after numerous court cases challenging FCC decisions, after a couple of Supreme Court decisions, and even after a Bill of Attainder suit, we are now finally starting to see the dividends of digital convergence. We are starting to see the competitive promise of the Telecommunications Act being fulfilled. Companies are turning away from the courts and renewing efforts to open up markets and competing for all consumers.

As much as this hearing is an exploration for how we can further foster competitive data services, it is also a celebration of the handy work of this subcommittee. The fact that the witness table is so diverse and that some companies present today might not even have existed if not for the work of this subcommittee and the decisions which we made is something that we all should take stock of. Because, in the end, our effort is not just about voice, it is not just about data, it is about the future. And I think our competitive future is a bright one if we remain true to our history on these issues.

I thank you, Mr. Chairman, for your incredible panel today. I think it is going to be one of the most interesting days we have ever had in the subcommittee. I yield back the balance.

Mr. TAUZIN. Thank you, Mr. Markey. The Chair is now pleased to yield to my friend from Illinois, Mr. Shimkus, for an opening statement.

Mr. SHIMKUS. Thank you, Mr. Chairman. And, Mr. Chairman, I appreciate your opening comments. I do not want to be in the business of taking sides. What I want to be involved in the business is of fostering competition and I think that is why this hearing is so important. Many of my constituents have an extremely slow connection to the Internet or none at all. For them, the digital divide is all too real. They know that broadband technology is out there and others are receiving it, but no one is willing to make the investment to build out to them.

Mr. Chairman, I also realize that any time we deal with our Federal regulations, it will be controversial. Our constituents demand that we do all we can to help deploy these services. Again, Mr. Chairman, thank you for this hearing and I look forward to hearing from the panel. I yield back.

Mr. TAUZIN. I thank the gentleman. The gentleman from Virginia, Mr. Boucher, for an opening statement.

Mr. BOUCHER. Well, thank you very much, Mr. Chairman. I want to commend you for organizing a discussion this morning on various aspects of broadband deployment for data services.

The Internet has become an enormous engine of financial growth, making an economic contribution that few other industries can equal. Eighty million Americans are now connected to the Internet and there are currently more than 5 million websites in use. But there are barriers, both actual and potential, that limit the experience of current Internet users and, if not removed, will burden future Internet growth.

I hope that, perhaps beginning this morning, our witnesses will discuss an appropriate avenue for removing these barriers and then continuing in our discussion next week where we begin to address specific legislative proposals. A continuation of those recommendations to this subcommittee can be made.

One factor that limits the experience of current Internet users is the paltry pace of broadband deployment over the last mile into homes and places of work. At the present time, there are only 70,000 users of DSL services, the telephone company's broadband offering. And there are only 500,000 subscribers to cable modem transport services, the cable industry's competing offering for broadband connections.

I think we would be very interested in knowing, in the opinion of these witnesses, what factors are limiting the deployment of both DSL and cable-modem services. I think we would also be very interested in knowing what pace of deployment we can expect on a realistic basis in future years. There have been a lot of projections of what that pace of deployment will be. What, in the opinion of these witnesses, is a realistic schedule for deployment of both DSL and cable-modem services. And then I think we also would be very interested in knowing the opinion of these witnesses with regard to what policy changes, either administrative or statutory, we should promote that, in turn, will promote the more rapid deployment of broadband services.

If the Internet is to achieve its potential as a multi-media platform for the offering of voice, video, and data, using the TCP/IP architecture—and we all hope that it will achieve that potential—we simply have got to resolve this bottleneck over the last mile and increase data rates into homes and places of work. And your recommendations as to how we can best achieve that goal will be welcome indeed.

There is another issue that I hope that we can address in this hearing and also the one next week. And that is the potential need for greater competition in the offering of Internet backbone services. There are a number of participants in that market but, at the same time, we are also witnessing an unprecedented concentration in the telecommunications industry. And if that concentration proceeds into the market for Internet backbone services, there could be a threatening of the peering arrangements that today assure that information moves from one segment of the Internet backbone to another without charge.

Backbone providers assume, I think more or less correctly, that they are all at having content of roughly equal value attached to their individual segments of the Internet backbone. But as one company begins to achieve a larger presence in the Internet backbone market, that company might begin to assume that the content attached to its segment of the backbone is of greater value than the content attached to the segments owned by other participants. And then that company might begin to impose charges on the flow of information to and from its segment of the backbone.

The question I suppose we would ask of these witnesses—and I hope you will address this—is, is that a potential problem? And if it is, would we be well advised to encourage greater competition in the offering of Internet backbone service to keep these peering arrangements intact and prevent the gateways that today are toll-free from becoming toll booths in the future? And if you believe we should, how should we approach that?

One final issue I think deserves comment in these remarks and I hope our witnesses will address this. At the present time, when telephone companies provide Internet transport—and that is, by the way, the way that most people get Internet transport today—they are not permitted to package and price as a unity the transport and any affiliated Internet access service that they also offer. They can offer Internet access, but they have to provide that Internet as an option and price is separately and give their customers for transport services an opportunity to purchase Internet access from any of a variety of Internet access providers.

That rule, however, does not apply to the cable industry and it is apparent that, as many cable companies begin to deploy cable modem services, that they will proceed on a very different model and offer as a unity that cable modem transport and their affiliated Internet access service. It would be very interesting to hear from these witnesses any concerns that they have concerning that practice.

I would assume that Internet access providers would be very concerned indeed. There are about 5,000 of these companies across the United States. They are companies that, by and large, did not exist 5 years ago. These are entrepreneurial startups that are succeeding throughout our country not only in offering Internet access service, but, in many instances, in becoming CLECs and qualifying to offer competitive local telephone services as well.

These 5,000 companies carry with them the promise of giving reality to our vision when we passed the 1996 act of creating a truly competitive local telephone and local telecommunications market. And we should be taking every possible step to encourage the growth and the development of these 5,000 entrepreneurial startup companies. And yet their business base is threatened by the emerging practice of the cable modem providers of packaging as a unity their transport and their affiliated Internet access service. These ISPs can have their business base foreclosed to the extent that their customers migrate from telephone platforms to the cable platform to obtain broadband access. And we would be interested in knowing the extent to which that is a serious threat and the extent to which we ought to consider remedies for that concern.

Well, this is a range of questions that I hope our witnesses will consider and perhaps take this opportunity to respond to. Mr. Chairman, I, again, want to commend you for scheduling a hearing on what I think are the most important telecommunications issues before us today and I look forward to hearing from these very distinguished witnesses.

Mr. TAUZIN. I thank my friend from Virginia. The Chair now recognizes the vice chairman of the full committee, the gentleman from Ohio, Mr. Gillmor, who passes. The gentleman from Georgia, Mr. Deal.

Mr. DEAL. Mr. Chairman, I listened to your lecture and I have done my homework and will submit my written statement for the record to be graded.

[The prepared statement of Hon. Nathan Deal follows:]

PREPARED STATEMENT OF HON. NATHAN DEAL, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF GEORGIA

Thank you, Mr. Chairman, for holding this hearing today regarding the deployment of data services. I appreciate your attention to this important issue.

The 1996 Telecommunications Act requires that high speed data services be made available to "all Americans" in a "reasonable and timely manner." However, the interpretation of this requirement by the FCC has been subjective. We must ensure that regulations do not prevent new competitors from entering markets with alternative services, particularly in rural districts such as mine. As we face reauthorization of the FCC in the near future, we must examine whether deployment of data services is occurring and also assess whether deregulation would spur new entrants into the market.

Currently, consumers have two main options for receiving high speed data service—via the telephone and cable networks. Wireless and satellite companies should also be encouraged to compete. In addition, numerous mergers have occurred in the field of technology since the 96 Act passed. We must ensure that we continue to foster an environment where all companies have an opportunity to compete, and that such competition results in consumer choice and affordable prices.

I look forward to learning more regarding the status of data deployment, as well as hearing from our broad span of impressive witnesses here with us today. Thank you Mr. Chairman.

Mr. TAUZIN. Without objection, all written statements will be part of the record and I thank you, Mr. Deal.

The gentleman from Oklahoma, Mr. Largent. Mrs. Cubin is recognized.

Mrs. CUBIN. Mr. Chairman, I do have some brilliant, inspirational, and insightful remarks, but I will submit them.

[The prepared statement of Hon. Barbara Cubin follows:]

PREPARED STATEMENT OF HON. BARBARA CUBIN, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF WYOMING

Thank you, Mr. Chairman, for holding this very important hearing on the deployment of data services.

The hearing is of particular interest to me for two reasons. First, I am eager to learn more about broadband deployment. Secondly, in a few weeks I will be holding a town meeting in Wyoming on the same topic.

The specific issues that I want to concentrate on today are parity and access in rural areas of the country to high speed data services.

The question is: when broadband technologies are fully deployed, will they be available in rural areas at the same time they are available in urban areas?

Furthermore, will the bandwidth be the same? Just because we live in rural areas and enjoy a slow paced lifestyle doesn't mean we will settle for anything less than the latest and fastest technology available.

Competition in the area of data deployment is vibrant. The industry is falling all over themselves trying to deploy the fastest data services to consumers.

That is certainly good news for rural America. Services such as satellite, wireless, and fixed wireless will reach where fiber and cable won't—to the most rural of areas. DSL and cable-modem technology promise to bring high speed services to the most rural parts of the country, and I want to see that promise come to fruition.

The other good news is that some in the industry are starting to recognize the importance of marketing broadband capabilities to small towns.

In the area of e-commerce there is not much difference anymore between a consumer in Wyoming and a consumer in L.A. In fact, businesses such as Tiffany's, Macy's, and Barnes & Noble don't even differentiate between urban and rural regions of the country any more—as long as their customers are accessible via the Internet.

The Internet gives an entrepreneur the unique opportunity to set up a business in Cheyenne or Lusk just as easily as one would in New York or Chicago and have customers visit from all corners of the globe.

However, I have heard from several business people in Wyoming that they can't set up shop in certain towns in the state because the high speed data capabilities are not yet available.

I want to work with industry to come up with incentives to solve that problem. However, there are those that would actually define high speed data services differently in rural areas. That, I believe, is short sighted.

The gap in the "Digital Divide" will only grow wider if we start down the road of legislating or regulating what certain parts of the country should and should not have, or are capable of having, as far as high speed data services.

I agree with US West CEO Solomon Trujillo when he said "It will leave us with a nation of 'Haves' and 'Have Nots.'"

I'm interested in hearing from the witnesses as to what plans their companies have to deploy high speed data services in rural America.

What hinders them from providing services to small towns across the country?

What incentives do we, the federal government, need to provide to move your companies toward providing the latest technological and highest bandwidth capabilities to every rural county across the U.S.?

I look forward to the discussion and learning more about this issue.

Thank you, Mr. Chairman, I yield back my time.

Mrs. CUBIN. I do want to just let the panel know that I am very interested in hearing what plans your companies have to deploy high-speed data services to rural areas in America. I would like to know what hinders you from providing services to small towns. What incentives do we, the Federal Government, need to provide to move your companies toward providing the latest technological and highest bandwidth capabilities to all of rural America? I don't want any of rural America to be left behind because I represent the true rural America and that is the whole State of Wyoming. So I look forward to the discussion, but I do hope you will address those rural issues. Thank you.

Mr. TAUZIN. Like we don't have rural America in the bayous of Louisiana, Barbara. The gentleman from Tennessee, Mr. Gordon, is recognized.

Mr. GORDON. Thank you, Mr. Chairman. This is a very important and high-stakes issue that we are going to be discussing today and I congratulate you for bringing this good panel together. The decisions that this committee will be making in the future is going to have a tremendous impact on the panel's stockholders and on our constituents. And so we need to be well-informed of the consequences of our acts and the potential unintended consequences. So this is a good effort to try to be educated and we need to make educated decisions on these very important and difficult questions. So thank you for bringing this panel together.

Mr. TAUZIN. Thank you very much, Mr. Gordon. The gentleman from Florida, Mr. Stearns.

Mr. STEARNS. Thank you, Mr. Chairman. I notice we have 12 witnesses. That is pretty strong. But I still have my opening statement here.

Thank you for calling this hearing. The roll-out of such broadband services will be integral to the continued high productivity of our Nation's economy, but, of course, we are all concerned how we proceed. Commissioner Michael Powell of the FCC recently gave a speech in which he stated, quote—and I'd like to put this in the record—"I find that regulators often are invited or tempted to take actions and promulgate rules based on sunny or stormy pictures painted by the advocates of action without digging below the rhetoric and testing whether our intervention will really benefit the public. One area that risks having that character is that of advanced services and the associated bevy of issues." I think Commissioner Powell's statement is quite true and applies, also, to Members of Congress here as well.

You know, I think all of us after the recent Portland decision was announced, have some concern because basically, you know, there is a statement by one of the Washington attorneys who stated that, "AT&T's cable pipe provides public service that should be accessible to others," end quote. You know, let me ask my colleagues, is this the new standard we should try to strive for? If it is a public service, then should we regulate? Under this standard, Congress and the Federal Government could regulate how movie theaters show their movies and that competitors should have access to those theaters or to the movie cameras because it is providing, quote, "a public service." Or maybe television networks should have access to their competitors signals because, again, televisions airwaves are a public service.

I suggest that this direction is not the right way to go. Congress created the Telecom Act of 1996 to foment deregulation and to allow the free market to provide competition. Some of the witnesses here today represent companies that owe their existence, very existence, primarily, if not wholly, to this act by allowing them to compete with the incumbent telecommunication providers.

I think the city of Portland decision is a problem. I believe that States and localities should play a primary role in the development of telecommunications services, but if we allow every locality to create conditions for mergers, as Portland has done to the AT&T, TCI merger, we will allow competition to be stifled and that will lead to the slower roll-out of such services as broadband. The Portland decision is a direct violation of the Constitution's Interstate Commerce clause that Congress was bestowed to undertake. I believe that only the Federal Government and really only the Department of Justice should place economic conditions on mergers. The path we have already chosen through the Telecom Act is the road for deregulation.

Deregulation, in the perfect world, would be treated equitably and broadband, regardless of the delivery mechanism, be it cable, telephone lines, satellite dishes, or electrical connections. I would like to see all players have immediate and impartial access to deliver broadband services but, in the case of Bell companies, there is the hitch of section 271 of the act that provides for the mandated 14 point checklist before the RBOCs provide long-distance voice.

But did the act place an equivalent restriction on the RBOCs for data services?

Most analysts believe that data will soon make up 90 percent of the traffic delivered. My main fear is that if we provide interLATA relief, some companies may make an economic choice and forego attempting to offer long-distance voice in their region or in certain States because it would be much more lucrative to offer local telephone and data services.

Now there are two companies, Mr. Chairman, in particular, who have been dedicated to getting into the long-distance market: Bell South and Bell Atlantic. Bell South has dedicated over \$700 million in their effort to comply with the act and its checkpoint list requirements in order to enter the long-distance market. Bell Atlantic has made great strides and is the furthest along in complying with the checklist. I expect both companies will clear that checklist and we will see in New York and Georgia, if not in other States, by the end of the year, full competition.

So hopefully this accomplishment will provide these companies a guideline to overcome the checklist for every State and every region. So I want to be assured that all the Bell companies will make every effort to comply with the checklist in their region and in every State before the interLATA restrictions are lifted. I thank the witnesses and I thank you, Mr. Chairman, for your time.

Mr. TAUZIN. I thank the gentleman from Florida. The gentleman from Ohio, Mr. Sawyer, is recognized.

Mr. SAWYER. Thank you, Mr. Chairman. I, like Mrs. Cubin, I have a wonderful opening statement. I commend it to all of you. I hope you will all read it.

Some of you will laugh; others may shed a tear. But none of you will fail to be moved.

I just hope you won't tell the ending to your fellow readers. It will spoil it for them.

I am reminded of the moment when Vaclav Havel came to the Congress and addressed a joint session. It was a compelling speech. It was compelling because it reminded me of what I had learned when I was a child and that was in no small way the development of the printing press changed the world. It lead directly to the development of representational democracy and to the ability to move ideas from one generation to another in very large ways across huge portions of the world's population. If you think in terms of what the fax machine did all across Eastern and Central Europe just a little more than a decade ago, it gives you some sense of the enormous potential of what we are talking about here today.

When Havel came to the Congress, one of the most compelling things that he had to say was that the events in Czechoslovakia happened so fast that they did not have time even to be astonished. That very same thing is taking place today. It may well, before we complete our consideration of the full range of issues that, Mr. Chairman, you are opening up today, indeed begin changes in the nature of representational democracy across the globe in ways that we can hardly even contemplate. In that sense, thank you very much for this hearing today and for the work that will proceed from it.

[The prepared statement of Hon. Thomas C. Sawyer follows:]

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

Thank you Mr. Chairman for holding this hearing this morning on the deployment of high speed data services. I also want to thank our witnesses for coming to testify before us.

Mr. Chairman, it would be an understatement to say the internet has changed the way we do things because it has profoundly reshaped our culture in the United States, and to a great extent, other developed countries. Electronic commerce is the driving force of the global economy. People in remote places are able to communicate with one another on a real-time basis using the internet. Students can download information to supplement their classroom assignments. Clearly the growth of the Internet can be attributed to the entrepreneurial spirit of the companies and the individuals involved in its continuous development.

If we look back five years ago, we would have never thought that we'd be using the Internet for things we are using it for now. Companies have been able to develop new technologies and products to meet consumers' needs. The development, and deployment, of broadband services will help continue to meet those demands. What does the future hold? We can only speculate. In the very near future, consumers will be able to use nearly any telecommunications device to receive and deliver large quantities of voice, video or data almost instantaneously. And this will be done regardless of whether you are using a telephone (wireline or wireless), cable, or satellite company to access or distribute that information.

The deployment of broadband services is one of the most important issues in the telecommunications industry because of the potential to provide new services to customers. However, questions remain as to who should control the "last mile" or the connection to the household and whether consumers are given fair access to advanced telecommunications services. These issues need to be addressed so that we can continue to keep up with the changing technology and move the world forward.

Mr. Chairman these are a few of my observations. Thank you again for calling this hearing. I look forward to hearing from our witnesses and learning more about this issue.

Mr. TAUZIN. I thank my friend. It is true that your opening statement, by the way, will be available at amazon.com? I thank the gentleman.

Mr. SAWYER. And in comic-book version as well.

Mr. TAUZIN. The gentleman from Mississippi, Mr. Pickering.

Mr. PICKERING. Mr. Chairman, I thank you for having this very important hearing to address these issues. I look forward to hearing this panel. It seems like an old reunion from the 1996 act that all are gathered here together today. But I do want to look and listen today, based on what I call the three Cs: convergence, certainty, and context.

One of the key objectives of the act was that we would have the one-stop-shop, that voice, video, data, all of those products and services would converge and be offered by incumbents and competitors alike to consumers. And so we want to look and listen to these proposals as to how would it relate to the objective or the goal or the intent of the act as far as convergence.

Certainty, the second point. We have had a 3-year battle, both regulatory and in litigation, and now we seem to be, as the gentleman from Florida said, on the verge of some breakthroughs in 271 in New York and Georgia and in Texas. We want to make sure that whatever we do continues the regulatory certainty and the investment certainty, the market certainty, that we are hoping will lead to the objectives of the act.

And the third thing, the context, was, again, where are we today? We are on the verge of that breakthrough. So I hope and look forward to the testimony today and look forward to working with the chairman on these very important policy questions that we do see

the fulfillment of our hopes when we passed the 1996 Telecommunications Act. Mr. Chairman, thank you very much.

Mr. TAUZIN. I thank the gentleman from Mississippi. The gentlelady from Missouri, Ms. McCarthy, is recognized.

Ms. MCCARTHY. Thank you, Mr. Chairman, for holding this hearing today. I think it is important that we do examine the extent to which consumers currently have or soon will have access to broadband facilities and distribution. And we here in this subcommittee must ensure that we allow for adequate and fair competition between all providers so that consumers can benefit from the best technologies available.

I look forward, especially, to hearing from the expert witnesses today as we discuss this new and very exciting technology and the services that are becoming available. And I am pleased that two witnesses today are from my community. Al Kurtze, the senior vice president of strategic development of Sprint Communications and Dave Scott, who is president and chief executive officer of Birch Telecom. These two companies are leading the way in greater Kansas City in the state-of-the-art technology and, of course, in service.

Al Kurtze led Sprint through its combination of voice and data to expand both their wireless and wireline presence and through his continued leadership, Sprint is being transformed into an integrated communications company. This week, Sprint, as you all know, officially announced its new integrated on-demand ION service which will deliver local and long-distance service as well as Internet access through a single connection to the home with a single bill. In addition, customers using this service can use several phones and be connected to the Internet simultaneously because the basic ION package will include four voice lines and two high-speed data connections. With its new ION service, Sprint is not only making our lives more convenient, it is bringing competition to the telecommunications industry and bringing jobs and economic opportunity to our area.

Dave Scott founded Birch Telecom and is chief executive officer. Birch Telecom has grown quickly since its founding in 1997 and it is distinguishing itself by offering service both to residential and business customers. Because it can offer several packages to small businesses, Birch customers can save from 15 percent to 40 percent on their bills. Birch also offers an integrator package, which includes local, long-distance, and high-speed Internet access for its customers. Birch's recent mergers with other communications companies have continued its growth and innovation, as well as its continued competitiveness and service to our community.

So, thank you, Mr. Chairman. I do look forward to the insights which our panelists will share with us today on what Congress should be doing to encourage more deployment.

Mr. TAUZIN. I thank the gentlelady. And, finally, the gentleman from Texas, Mr. Green, for an opening statement.

Mr. GREEN. Thank you, Mr. Chairman. And I will submit my opening statement and I appreciate my colleague from Kansas City giving that commercial.

Also, following up my colleague from Florida, Mr. Stearns, I thought we tried to regulate content last week in the juvenile crime bill. But I will submit my opening statement.

[The prepared statement of Hon. Gene Green follows:]

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

The internet is the fastest growing communications medium. Here are some basic facts about the internet: the amount of traffic on the internet doubles every 90 days; the amount of voice and data traffic are about equal with data traffic growing at 30% per year; approximately 67,000 people sign up to the internet everyday. These numbers are approximations of what is happening to the internet, but it clearly demonstrates that the internet plays a growing role in our day to day lives.

Consumers usually access the internet through a traditional dial up call to their internet service provider. Since the 1996 Telecommunications act there has been new developments and innovations in both the accessing and utilization of the internet such as broadband services. Broadband service allows consumers to gain access to telephony, video, and internet services all over through one pipeline. Also, the development of faster technologies such as the development of both Digital Subscriber Lines and cable modems are helping to push the deployment of broadband and at the same time reduces the cost for this service to the consumer.

There is tremendous growth in the internet, and Congress needs to make sure that we balance the need for networks and backbones with the demand for faster service and innovation of the internet.

I am interested in hearing about the other distribution services that are starting to be deployed for broadband service such as two way satellite and wireless applications. I look forward to this hearing and learning more about broadband applications.

I want to thank the chairman for holding this hearing.

Mr. TAUZIN. I thank the gentleman. The gentlelady from California.

Ms. ESHOO. Well, I think that we are here to listen to the witnesses so I will submit my statement and thank you, Mr. Chairman, for holding this very important hearing. And thank you to the witnesses that are here to enlighten us. And I yield back.

[Additional statements submitted for the record follow:]

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

Thank you, Mr. Chairman, and I applaud you for holding today's hearing.

This is an exciting time for consumers, to say the least. Some of the nation's biggest and most dynamic companies are falling all over themselves to bring consumers high-speed access to the Internet.

And each of them has different ideas on how to do it.

Wireline providers are banking on digital subscriber line technology—otherwise known as “DSL.”

Meanwhile, the cable companies are finally delivering on their promise to enter new markets. Many operators are busily upgrading their networks to enable them to provide two-interactive services.

And the wireless industry—both fixed and mobile providers—are hoping to find their own niche.

And then there's the satellite industry. Some companies, such as Teledesic, plan multi-billion dollar systems for a constellation of hundreds of low-earth orbit satellites that will enable someone to surf the Web—*from anywhere in the world!*

Even television broadcasters, who are in the midst of their own digital deployment, will be players.

All this competitive ferment is good news for the economy, American workers ... and most of all, the American consumer. Competitive choice means lower prices and better services.

This is also good news for Congress, and this Committee in particular. We worked hard to enact the Telecommunications Act of 1996, and we are now seeing the fruits of our labor.

The Act unleashed economic forces that have revolutionized the way in which Americans live, learn, heal and entertain themselves. Indeed, I suspect that some of the companies sitting at the witness table today would not be here today were it not for the 1996 Act. In fact, their efforts would have been illegal in many states.

This good news is only the beginning. As that old saying goes: we ain't seen nothin' yet.

The pace of deployment will soon quicken—*particularly because* the cloud of uncertainty created by all this industry litigation is beginning to lift.

Having firmly established the rules of the road, Congress, the FCC and the courts need to step aside and let these companies compete. There's venture capital begging to be invested, and there are jobs waiting to be created. Let's press on.

So again, Mr. Chairman, I want to thank you for holding today's hearing. I look forward to the testimony of today's witnesses.

PREPARED STATEMENT OF HON. BOBBY RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. Chairman, I applaud your initiative and leadership for holding this hearing today on a matter of growing importance to our country and our economy. When Congress passed the 1996 Telecommunications Act, no one envisioned that the Internet would grow at such an incredible rate. Today more and more people conduct commerce on-line. In 1998 consumers spent over \$32 billion dollars in on-line transactions. It seems that every time one reads the business section of any major newspaper, there is a new Internet-related company or an initial public offering by a growing list of Internet companies. We've also reached that point in time when massive amounts of information-data are transmitted nationally and internationally reflecting the true nature of our global economy.

Mr. Chairman, consumers are now more sophisticated and are demanding 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 any more. It is incumbent upon us, as legislators to remove any regulatory impediments that may stifle broadband deployment. I hope this hearing will enlighten us on the new broadband distributing technologies and what is being done to deploy these technologies at a faster pace to the American consumer.

Thank you Mr. Chairman.

Mr. TAUZIN. Thank you very much. And let us begin, then.

The witnesses will, again, be admonished to be conversational. You will have 5 minutes. The way we operate is I hit this little switch, press this little button and when the red light comes on, kind of wrap it up about that time. Conversational, again. The written statement is gone. Please don't attack. Let us educate. We will start by introducing Mr. Hal Lenox, he is the director of Federal relations and technology issues of SBC Telecommunications—and he will give us an Internet overview. Mr. Hal Lenox, please.

STATEMENTS OF HOWARD A. LENOX, JR., DIRECTOR, FEDERAL RELATIONS AND TECHNOLOGY ISSUES, SBC TELECOMMUNICATIONS; GLENN FALCAO, PRESIDENT, INTERNET AND SERVICE PROVIDER NETWORKS, NORTEL NETWORKS; RUSSELL DAGGATT, VICE CHAIRMAN, TELEDESIC; KIRBY G. "BUDDY" PICKLE, PRESIDENT AND COO, TELIGENT; GEORGE VRADENBURG, SENIOR VICE PRESIDENT, GLOBAL AND STRATEGIC POLICY, AOL; MARC J. APFELBAUM, SENIOR VICE PRESIDENT AND GENERAL COUNSEL, TIME WARNER CABLE; ALEXANDER V. NETCHVOLODOFF, VICE PRESIDENT, PUBLIC POLICY, COX ENTERPRISES; TOM TAUKE, SENIOR VICE PRESIDENT, BELL ATLANTIC; ARTHUR KURTZE, SENIOR VICE PRESIDENT, ONESPRINT, STRATEGIC DEVELOPMENT, SPRINT; DAVID E. SCOTT, PRESIDENT AND CEO, BIRCH TELECOM, INC.; STEPHEN C. GRAY, PRESIDENT AND COO, MCLEODUSA, INCORPORATED; AND MARY BETH VITALE, PRESIDENT AND COO, RMI.NET

Mr. LENOX. Good morning and thank you, Mr. Chairman and members of the subcommittee. It is truly an honor to be here today

and, with your permission, I will at least use my written words to kind of keep on the 5-minute track.

I have been asked this morning to speak with you a little bit about the Internet, not from any particular perspective over than to speak of it structurally, how it is put together, what the components are, in the hopes that it will add some additional frames of reference for the discussion that follows me this morning.

Mr. Chairman, even defining the Internet can prove to be quite problematic. I went to Newton's Telecom Dictionary in advance of today's hearing to hear from the bible what the Internet was and Mr. Newton admonishes that it is very hard to define the Internet in a way that is either meaningful or easy to grasp. I share that definition with you so that if, at the end of my comments, I have completely confused you, it is the Internet's fault and not mine.

Well, let us work with this definition, then, and that is that the Internet is a network of networks linking various individuals together globally through the use of a common computer language. And there are a variety of languages, but they typically reside under a suite of protocols called TCP/IP and you will hear that mentioned frequently as it relates to the Internet.

Well, with our working definition in hand, I think it is appropriate to spend just a moment on the history of the Internet. From its nascent stages in 1969 until today, the Internet has grown to become the enabler of society's transition from a service economy to a knowledge economy and so many of you spoke of that in your opening statements this morning. It truly is a phenomenal event for us.

A number of factors have contributed to the Internet's popularity: the proliferation of powerful computers, privatization of the Internet itself, and the development of a simple user interface which we call the World Wide Web. Now the Internet today features over 42 million domains containing in excess of 830 million pages of web content. Well, let us put that in perspective. In 1996, a year that is frequently spoken of in these chambers, the Internet contained an estimated 240,000 domains and roughly 72 million pages of web content. Now such growth can only be described, I think, as explosive and, in fact, Inc. Magazine recently estimated that approximately 17 new web pages appear on the web every second.

Well, as we know, the growth of PCs really came when they became easy to use. When we moved from DOS into the graphical user interface environment, the use of PCs really took off. And so too it is with the web. When we developed the World Wide Web itself and the accompanying browser, the Internet became accessible and we began to use it with much more regularity than we had prior to. We had the ability to trade stocks, purchase books and even automobiles, preview a CD or movie, or simply chat with a friend in a way that a very few years ago none of us would have even dreamed possible.

Whatever the application, one thing is certain. Our desire for content and media-rich transactions will drive the need for more and more information. We will become less willing to tolerate simple text files and we will demand a great deal more media-rich content. Files that include video, sound, and all these things enrich our experience on the Net, but they also require a great deal more

bandwidth to accommodate the size of the files, lest you try to download something and then come back to it 20, 30 minutes later in the hopes that it may have actually arrived. And for those of you that are on the Net using a conventional modem, I think you know what I am speaking of.

Well, the Net is hierarchical in nature. I would like to spend a moment just sort of structurally how it is built. It is hierarchical in nature and the data feeds up from end-users through a series of computer networks until they finally reach a set of facilities that we commonly refer to as backbones. It is a bit like a river system, if you think about it, in which small streams and tributaries make their way toward a main body of water, all the while accumulating greater and greater volume. And you can think of that volume being the bits of information and the files that we are sending to one another across the web.

Well, backbones are the main network in a particular network system. And the circuits making up that backbone are large, high-capacity lines running both across country and around the world. These networks allow your Internet service provider to exchange data across regional networks in an arrangement that is commonly referred to as peering. The hubs or the intersections at which this data is handed from provider to provider are generally thought of as being network access points or NAPs.

Now to reach a local provider or ISP, the end-user must have some connection to the provider themselves. A number of access methods are currently available or under development. And I am going to mention just a few and if I have left any out, it was not intentional. Analog modems, which is probably the most common way that most of us access the Net, typically now are labeled as running at 56 kilobits. It is rare if ever that you can get a 56K modem to sync at that speed and we have all spent time and the pain of trying to download files in that method.

ISDN came along for a while and is still a product in particular niche markets. It, like analog modems, uses the circuit switch telephone network. In other words, all these are going over the telephone network that was built to carry voice and, originally, exclusively voice. It does, however, unlike analog modems, it does carry the traffic from end to end in a digital form. So ISDN is not just a product, it is actually a set of protocols that make that digital transmission happen over the circuit switch network.

Well, now if we move to packet networks, which is where we will spend the bulk of our time, I suspect, talking today, digital subscriber loop is a suite of technologies that you will hear a great deal about that provide high-bandwidth over existing copper, twisted pair. In other words, we use that last mile that you referred to in some of your opening statements to provide IP-based digital traffic on those loops. It allows us to move much faster than in the traditional format over either analog or ISDN and it gives you something that is often referred to as "always on" which is to say that you don't, like the modem, need to dial into the Internet, wait for the modem to quite screeching, establish your connections, so forth. A DSL, like a cable modem connection, allows you to be there as though you were logged on in your local area network in the office.

I mentioned cable modems. They operate over the CATV network. And, again, like DSL, provide an always-on digital connection.

There are many other access methods that are either in development or are already available. They show great promise, including the electrical industry; wireless, both terrestrial and satellite, offer a variety of ways to access the Net. In other words, there are many, many ways to get to the Internet and we are developing newer and better ways each and every day.

Well, how do these new networks work? The Internet protocol that I mentioned earlier provides the foundation for that. Think of the packets as postcards and think of an IP transaction as sending a novel on postcards through the post office from one end to the other. So we will break that novel up, we will stick it into individual envelopes, we will mail it out, when it arrives at the other end, we will reassemble the novel, and put it back together. Then I read it as though it had been assembled that way the entire time.

So that is what IP does, which is dramatically from the way that the telephone network works in terms of establishing a connection, which is established for the length of the call, we call it in our business “nailed-up” and we leave that connection in place. IP is different. It just sends those packets in a diverse set of routes to get where it needs to go following the best way to get there.

Now as telecommunications and technologies evolve toward the environment of convergence, telecommunications carriers are constructing new, separate data networks that all plug into these—they are all based on IP, but each of us, in our own way, are finding ways to bring IP to the end-user. And I believe that is what this subcommittee is looking at now and trying to understand is all the different ways that this is done and why that is the right thing to do.

In the late 19th century—I will close with this—we saw the emergence of the Industrial Revolution and the entrance of the manufacturing economy. During the 20th century, we saw the migration from a manufacturing economy to a service economy. We now stand at the threshold of the 21st century, Mr. Chairman, where we are about to see yet another structural change in our economy as we move toward a knowledge economy. Now that move is fueled by a robust Internet and this new economy offers the promise of opportunity for all Americans.

In their new book—or in their book—excuse me—The Virtual Corporation, Davidow and Malone observe this, “In the years to come, incremental differences in companies’ abilities to acquire, distribute, store, analyze, and invoke actions based on information will determine the winners and losers in the battle for customers.” That is what the Internet is all about. I think that their comments offer succinct affirmation of why the rapid development and deployment of broadband is critical and why it will be a key enabler for a robust development of applications having both economic and social value.

Mr. Chairman and members of the subcommittee, thank you very much for this opportunity to be with you today.

[The prepared statement of Howard A. Lenox, Jr. follows:]

PREPARED STATEMENT OF HOWARD A. LENOX, JR., DIRECTOR FEDERAL RELATIONS—
TECHNOLOGY ISSUES, SBC TELECOMMUNICATIONS, INC.

Mr. Chairman and Members of the Subcommittee, it is an honor to appear before you today. I am Hal Lenox, Director of Federal Relations for Technology Issues at SBC Telecommunications. I have been asked to provide the Subcommittee with a brief overview of the Internet, the technologies that make it up, and perhaps a prediction or two concerning its future.

Mr. Chairman, even defining the Internet can at times be problematic. In preparation for our discussion today, I consulted *Newton's Telecom Dictionary* for a succinct description that I could share with the Committee. *Newton's* begins its definition with the following admonition: "INTERNET: It is very hard to define the Internet in a way that is either meaningful or easy to grasp."¹ Mr. Newton then goes on to provide a definition that spans $\frac{2}{3}$ of a page. At the other extreme, the textbook *Telecommunications for Managers*, by Stanford Rowe, a text I taught out of at San Diego State University, provides the other end of the spectrum. Rowe offers this definition in its totality: "An interconnected set of government, research, education, and private networks."² Both definitions are correct, yet neither is wholly useful for our discussion today.

I would submit that a useful definition might be: "INTERNET: A 'network of networks' linking various individuals and institutions spanning business, education, and government, together globally through the use of a common computer language". The operative elements of the definition include: network, individuals and institutions, globally, and common language.

BACKGROUND AND HISTORY

With our working definition in hand, I'll begin with a brief history of the Internet. In 1962, the Internet was "born" as an outcome of recommendations from the Rand Corporation in a document entitled, "On Distributed Communications Networks"³. The document detailed the construction of a computer network featuring the absence of a single outage point. In other words, Rand advocated the construction of a network with the theoretical ability to survive a catastrophic event such as nuclear war. In 1969, the Department of Defense commissioned ARPANet with four host computers, or nodes, and a limited number of users made up primarily of scientific researchers⁴.

From its nascent stages in 1969 until today, the Internet has grown to become the catalyst that—together with dramatic improvements in both computing power and bandwidth potential—has become the enabler of our society's transition from a service economy to a knowledge economy. How did an arcane computing network built solely with the intent of conducting military research rise to its current position of prominence and pervasiveness in our daily lives?

A number of factors have contributed to the Internet's newfound utility and popularity: the growth in both number and processing power of computers, privatization of the Internet and the development of a simple user interface, the World Wide Web. While I will confine the majority of my comments to the Web, it is the concurrence of all three that have made the Internet the phenomenon it has become.

The Internet today features over 42 million domains, or discreet sites that one can visit on the Net, containing in excess of 830 million pages of web content. To put things in perspective, it is useful to benchmark these statistics against 1996, the year that the Telecommunication Act was signed. In that year, the Internet contained an estimated 240,000 domains, and roughly 72 million web pages. Such growth can only be described as explosive. Nor is it slowing. *Inc. Magazine* recently estimated that 17 new web pages appear on the World Wide Web every second⁵.

As the Internet has grown, so has the nature of the data carried over it. In its early days, the content on the web was primarily text-based, similar to our first personal computers. In fact, the PC offers a valuable metaphor for the current geometric growth of data on the Internet. I can still vividly recall the first IBM XT computers delivered to our office. During their delivery and setup, it was not uncommon to hear the refrain: "What will we ever do with 10 megs of hard drive?"! Today, that 10 meg hard drive would barely be sufficient to house a simple movie trailer downloaded from your favorite movie site on the Web. The real growth in PCs came

¹ Newton, Harry, *Newton's Telecom Dictionary*, 9e, pp. 610-611

² Rowe II, Stanford H., *Telecommunications for Managers*, 3e, p. 674

³ Zakon, Robert Hobbes, *Hobbes Internet Timeline v1.1*, <http://info.isoc.org/guest/zakon/Internet/History/HIT.html>

⁴ Ibid

⁵ "Data Data", *Inc. Magazine*, January 1999

when the graphical user interface was developed, making computers approachable and easy to use.

The same is true of the Internet. The development of the World Wide Web and “browser” in 1993 had an identical effect; the growth rate in web sites mentioned previously offers ample evidence.⁶ Whereas we once accessed text-based interfaces with programs such as “FTP” and “Gopher” (the Internet equivalent of using DOS), today we merely point and click on our browser.

What follows that action is the ability to trade stocks, purchase books or even automobiles, research an affliction suffered by a loved one, preview a CD or movie, or simply chat with one’s friends. Whatever the application, one thing is certain: our desire for content and media rich transactions will drive the amount of information transmitted even higher, making the need for speeds greater than your modem currently supports all the more important.

THE STRUCTURE OF THE INTERNET

The architecture of the Net is hierarchical in nature, which is to say that things “feed up” from the end user through a series of computer networks connected to local and/or regional service providers until they reach large transmission facilities commonly referred to as “backbones”. One might think of the structure as looking somewhat like a river system beginning with small streams and tributaries making their way towards the main body of water.

Backbone Structure

Rowe defines “backbone network” as “*the main network in a particular network system.*”⁷ The circuits making up the backbone are large, high capacity lines running both cross-country and around the globe, connecting major cities along the way. These privately owned networks allow Internet Service Providers (ISPs) to exchange data across networks. This exchanging of Internet traffic is generally referred to as “peering”.⁸ The hubs, or intersections, at which this data is handed from provider to provider and backbone to backbone is generally referred to as a Network Access Point, or NAP.⁹

Following the privatization of the Internet by the NSF, a total of four NAPs existed in the U.S. However, due to the explosive growth of the Net, additional exchange points—both public and private—appeared. NAP clients may negotiate their own agreements with other NAP clients for the exchange of Internet. These agreements establish mutually acceptable rules by which the providers transact exchanges.¹⁰ It is here that the peering takes place.

End User Access: Narrowband

To reach the local provider, or ISP, the end user must have some connection to that provider. A number of access methods are currently available with a like number currently under development.

Switched Telephone Network (analog modem): Bandwidth on the telephone network is generally limited to the transmission of analog voice and modem-based data in the 0-4 kHz range. Modem manufacturers are now producing 56K modems with 50K downstream capability and 33K upstream. These speeds represent the upper limit for analog transmission on a single pair of copper wires within the circuit-switched telephone network.

Switched Telephone Network (ISDN): The integrated services digital network is both a set of digital transmission standards and a network infrastructure that allows digital transmission over the existing telephone wiring. ISDN is defined as “a network, evolved from the telephony network that provides end-to-end digital connectivity to support a wide range of services including voice and non-voice, to which users have a limited set of multiple-use user interfaces.” ISDN represented an attempt to increase both the bandwidth availability and overall functionality of the legacy telephone network.

End User Access: Broadband

Digital Subscriber Loop (xDSL): DSL is a suite of technologies that provide high bandwidth over existing copper twisted pair local loop cables. DSL employs a modem-like technology and is available in a number of variations. ADSL service

⁶Zakon, Robert Hobbes, *Hobbes Internet Timeline v1.1*, <http://info.isoc.org/guest/zakon/Internet/History/HIT.html>

⁷Rowe II, Stanford H., *Telecommunications for Managers*, 3e, p. 662

⁸<http://www.pacbell.com/products/business/fastrak/networking/nap>

⁹ibid

¹⁰ibid

supports both voice and data services. The service provides a substantial increase in speed over both analog (50 times) and ISDN dial-up access methods. ADSL represents a true, open architecture, high-bandwidth service that is “always on”, allowing the user constant access to information without logging on to the Net each time. Unlike the developing trend in cable modems, the end-user is free to select from any Internet Service Provider (ISP).

Cable Modems: Cable modems are devices that operate over the CATV coaxial circuit. Cable modems operate like an analog modem providing the modulation of the signal, as well as some routing functions. These devices operate in a shared bandwidth, “ring” topology and offer theoretical speeds of up to 4 MBps according to Forrester Research. Cable modems, too, are an “always on” technology.

Other Access Methods: A number of wireless technologies, both terrestrial and satellite are showing signs of promise as high speed Internet access products. In addition, the electrical industry is currently developing a product that utilizes electricity distribution facilities to provide high-speed data access.

INTERNET PROTOCOL

Internet Protocol, or IP, serves as the enabler for data communications networks. It is the foundation upon which diverse data networks communicate with one other and pass data traffic between them.

One can think of IP packets as postcards and an IP message as a novel. An IP communications session is the equivalent of sending the novel through the network on postcards. The cards contain their own “to and from” addresses as well as part of the novel’s content. At the receiving post office, the postcards are reassembled in the correct order so the novel can be read. If some packets (postcards) don’t make it to their destination, the receiving post office asks the sending post office for a retransmission.

With the digitization of payloads—voice, data, video, etc.—and the evolution of Wide Area Networking, Internet Protocol has emerged as the clear winner for data communications. It simplifies management of the network; handles any number of other protocols; is an open protocol and not proprietary; and allows for scalability and therefore easier network growth.

CIRCUIT SWITCHED VS. PACKET SWITCHED NETWORKS

The advent of Internet Protocols, or IP, transmission offers the opportunity to migrate from the legacy public switched telephone network onto IP-based networks designed specifically for the transmission of large data streams.

In a traditional voice, circuit switched call, the call is first set up; calls are routed through traditional class 5 switches, the circuit or path is established and maintained through-out the call; and at the end of the call it is taken down. This is called connection oriented because a connection is set up and maintained for the duration of the call. The call route is not available for any other traffic while the call is in progress.

By contrast, an IP network routes IP packets over diverse and changing routes on the network. The path packets take between two points constantly varies based upon network conditions. As they receive them, each router sends packets out to the other routers and the data eventually makes it to its end point. The path is not pre-established, thus IP is referred to as being “connectionless.”

CONVERGENCE AND THE NEED FOR BROADBAND DEPLOYMENT

Much has been written regarding the phenomenon of convergence. Used in the telecommunications context, convergence may include both services and architectures. As noted previously, legacy network architectures featured payload-specific, service-discreet offerings to end-users. Cable companies provided one-way, broadcast services while telephone companies provided two-way, voice and data services. Today, different providers from previously different industries offer services that cross traditional industry lines.

As telecommunications networks and technologies evolve, telecommunications carriers are constructing new, separate data networks based upon IP, which will exist parallel to the “legacy” voice network. (It is important to note that while these networks reside outside of the legacy telephone networks, they may—as in the case of DSL—employ elements of the Switched Telephone Network.) These networks will require the commitment of significant amounts of capital, which currently is subject not only to market risk, but also—in the case of the ILECs—significant regulatory uncertainty. This regulatory risk represents a potent disincentive to the deployment of broadband networks capable of supporting the nation’s thirst for media-rich (converged) payloads.

POTENTIAL IMPEDIMENTS TO THE DEPLOYMENT OF BROADBAND

Despite the promise of the Internet, a number of issues stand as impediments to its fulfillment. Consider these observations:

- “The single most significant barrier to the continued expansion of the digital economy is the scarcity of digital broadband connectivity to home and offices.”¹¹
- “The local loop, however, remains the biggest obstacle to network convergence. The lack of bandwidth...restricts users from accessing broadband interactive content.”¹²
- “The best available data indicates that new broadband technologies are available in just 10% of US counties...”¹³

CONCLUSION

The late 19th Century saw the emergence of the Industrial Revolution and the entrance of the manufacturing economy. The 20th Century saw an information revolution and a corresponding migration to a service-based economy. We stand now at the threshold of the 21st Century, where we are about to see yet another structural change in our economy as we move towards a knowledge economy. Fueled by a robust Internet, this new economy offers the promise of opportunity for all Americans.

In their book, *The Virtual Corporation*, William Davidow and Michael Malone observed:

“...in the years to come, incremental differences in companies’ abilities to acquire, distribute, store, analyze, and invoke actions based on information will determine the winners and losers in the battle for customers.”¹⁴

Davidow and Malone’s comments offer a succinct affirmation of why the rapid development and deployment of broadband networks is critical as an issue of national policy. The scale deployment of high-speed services, facilitated by the removal of regulatory prohibitions, becomes a key enabler for the robust development of applications having both economic and social value. Our children deserve no less.

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear today. I look forward to addressing any questions you may have.

¹¹ Eisenach, Jeffrey A., “Testimony before the Subcommittee on Communications, Committee on Commerce, Science, and Transportation, United States Senate, April 22, 1998

¹² Taylor, Dan and Bill Hills, “Connecting the pipes,” *The Analyst’s Corner*, <http://www.internettelephony.com>

¹³ “State of the Internet: USIC’s Report on Use and Threats in 1999”, <http://usic.org/usic—state—of—net99.htm>,

¹⁴ Davidow, William H. and Michael S. Malone, *The Virtual Corporation*, HarperCollins, 1992

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Introduction to the Internet

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The Internet Defined...

*The Internet is a “network of networks”
linking various individuals and
institutions (business, education,
government, etc.) together globally
through the use of a common computer
communications language.*

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From 1996 to Today...

1996

- 240K domains
- 72M web pages

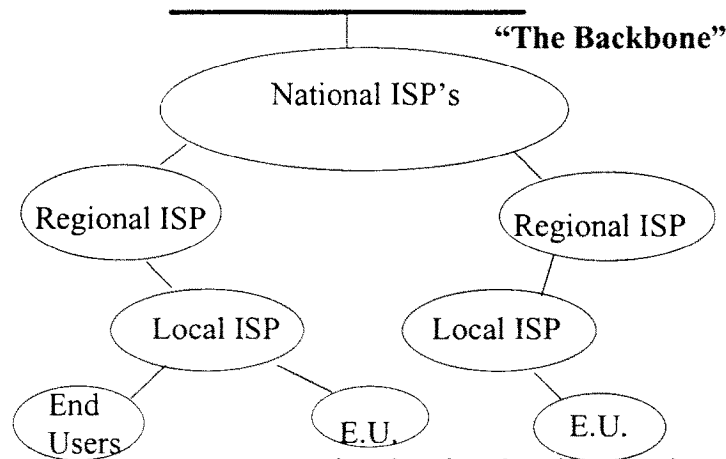
Today

- 42.2M domains
- >830M web pages
- 17 new web pages appear every second (*"Data Data", INC Magazine, January 1999*)
- Data traffic on the Internet doubles annually

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Internet Architecture



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Backbone:

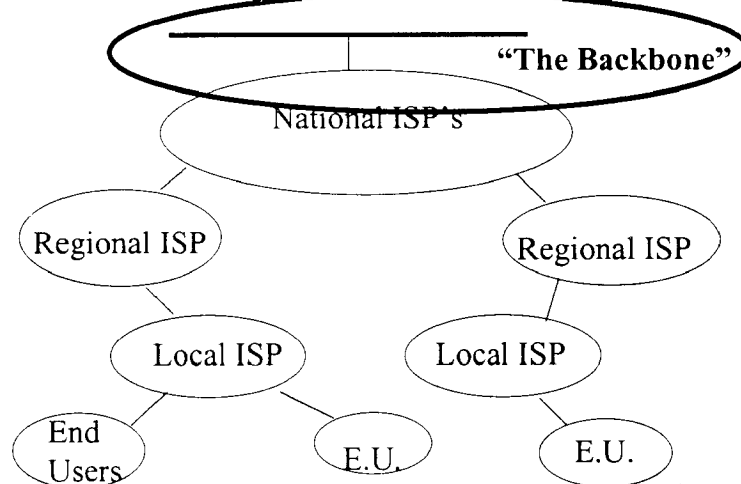
“The main network in a particular network system.”

Telecommunications for Managers

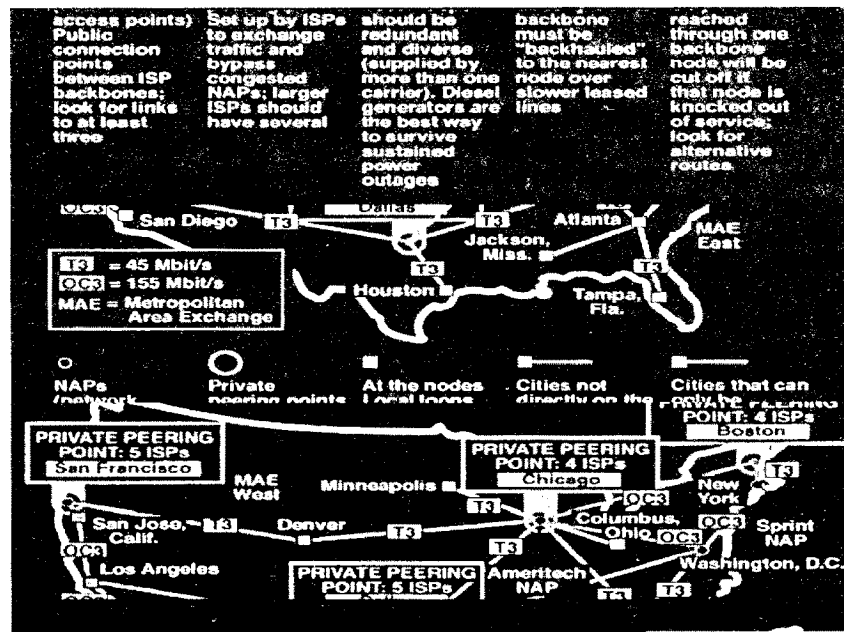
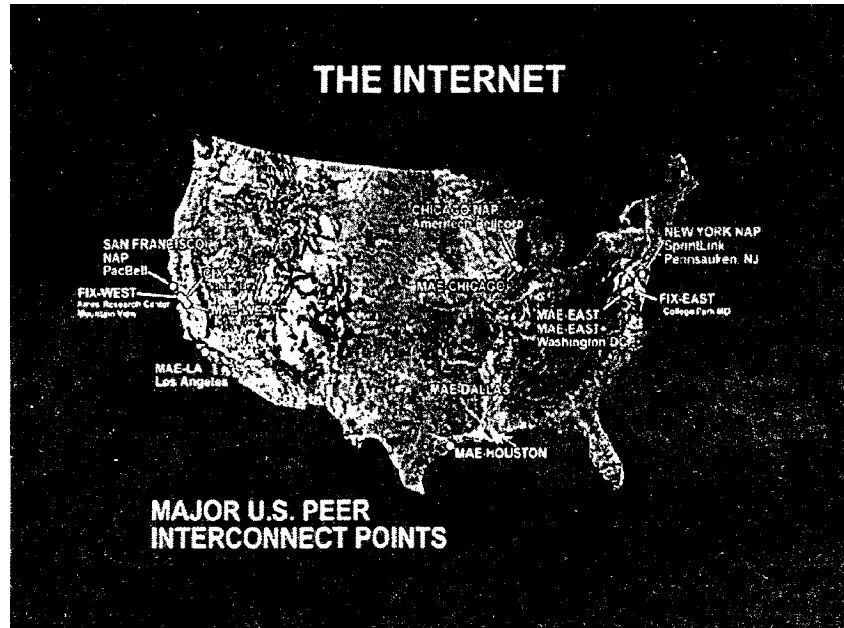
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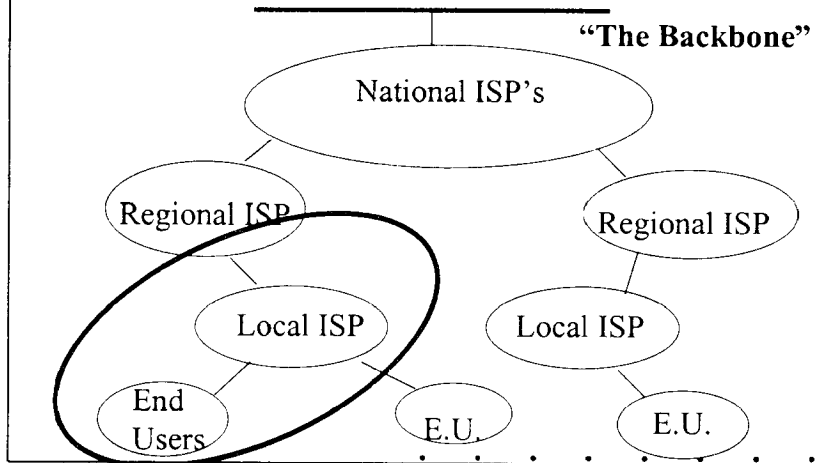
Internet Architecture



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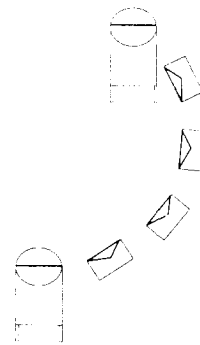


Internet Architecture

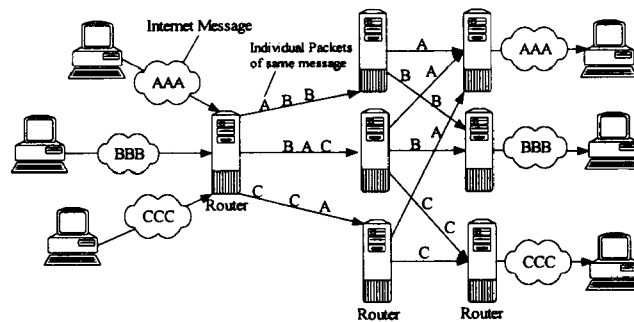


Internet Protocol (IP)

- Sending a Novel on Postcards
 - Page numbering (ordering, duplicate detection)
 - Positive Acknowledgment
 - Retransmission on Time-out
- Packets are Postcards = IP
 - To/From Addresses
 - Content

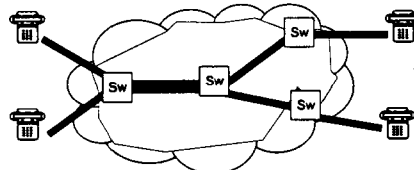


Packets follow independent routes

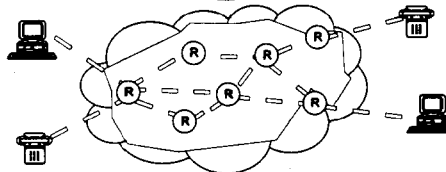


Circuit vs Packet Switching

Telephone Network
(connection oriented)



IP Network
(connectionless)



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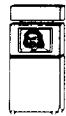
From technological discreteness...



Voice



Data



Compressed
Video



Broadcast
Video



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To digital convergence...



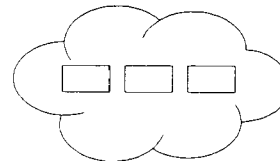
Voice



Data



Compressed
Video



Broadcast
Video

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Why Action is Necessary...

- **“The single most significant barrier to the continued expansion of the digital economy is the scarcity of digital broadband connectivity to home and offices.”**
- **“The local loop, however, remains the biggest obstacle to network convergence. The lack of bandwidth... restricts users from accessing broadband interactive content.”**
- **“The best available data indicates that new broadband technologies are available in just 10% of US counties...”**

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Why Action is Necessary...

“Right now we have no broadband networks in place. The best way to get pipes in the ground is to guarantee the industry won’t be hampered by regulation. If we’ve learned anything from the Internet, it’s that it prospered by being unregulated.”

William Kennard

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In Conclusion...

“...in the years to come, incremental differences in companies’ abilities to acquire, distribute, store, analyze, and invoke actions based on information will determine the winners and losers in the battle for customers.”

William Davidow & Michael Malone
The Virtual Corporation

Mr. TAUZIN. Thank you very much, Mr. Lenox. We, of course, were generous with time because we wanted this overview to proceed the discussion by witnesses. The Chair would also ask that you make a hard copy of the slides available for the record of the subcommittee.

Mr. LENOX. Yes, sir. As soon as possible.

Mr. TAUZIN. I thank you. I might also mention we were discussing—we saw a bumper sticker that said “Relax. It is just 1’s and 0’s.” And somebody added “And dollars.” Thank you very much.

We will now go to a discussion of what broadband is all about, what it is doing, and what its potential for telecommunications is. And we will start with Mr. Glenn Falcao—did I pronounce it right, Glenn?—of NORTEL, who has an equipment provider role and the question of data over electric lines. Mr. Falcao.

STATEMENT OF GLENN FALCAO

Mr. FALCAO. Thank you very much. It is a pleasure to be here, Mr. Chairman, honored committee members.

In the spirit of your opening comments, I would like to give you some observations from a company that is helping to build this Internet both in this country and internationally.

As I see what is going on both here and outside of this country, we are on the verge of fundamentally changing both the social and political fabric of what is generating wealth, what is generating our social economy. And the underpinning of this is that ideas are allowed to flow without bounds and this is a very fundamental issue around what the Internet is all about. And I think how what we do in the next little while and how we address this technology is

going to fundamentally affect our competitiveness in a global economy.

So what are talking about here? The Internet is allowing us to share knowledge with no boundaries, to provide higher standards of education to all who have access, including those in the rural areas, to truly have global reach for E-commerce, and have access to rich entertainment. And, by the way, it helps us to communicate in a much more profound manner.

I won't bore you with a whole lot of facts. I know that you have seen all the exponential charts and growth of the Internet, but one thing we can't get away from is that people are getting more connected and data accounts for more than 50 percent of the total network traffic today and by the year 2005, will account for more than 80 percent of the traffic. And the impact of that is that it is fundamentally changing the business models for both current customers and providing opportunities for new entrants, many of which are at the table. Much of this is a result of the deregulation that you are seeing globally and, when you look at the Internet, the fundamental open architecture of the Internet is a good example of what open competition in a free market can accomplish.

So, let me talk a little bit about high-speed access. Really what people are looking for are applications and services and not so much bandwidth and really what we need to look at is how to open up the network to provide access to those applications and services. And the bottleneck in the network today is fundamentally at the access point. So to enable rich content and applications, we really do need to look at opening up that access bottleneck. And this has to be technology agnostic. It has to be on coax, on copper, on fiber, wireless, and, yes, even power lines. And we at NORTEL Networks can deliver much of that today, but still much has to be done.

So what I see in the market today is that the increased competition is resulting in new entrants and transformation of existing players. And it is improving, it is increasing, the amount of investment that is going into the network and to both the existing networks and providing new network architectures. Competition is speeding up the introduction of new services and it is improving the overall cost performance of the existing services and the net effect of that is that it is providing much more affordable services and applications to the public.

But we have got to remember something. Much of what we are talking about today is running on the existing network infrastructure. A lot of the things that we are using to access the Internet is the existing public network. So, although we are building new network structures and overlay networks, we have to ensure that both the existing network and the new networks have an opportunity to grow in a way that is fostering the use of the Internet. Because we need both of those networks to continue this growth to prosper as we go forward. So that is—I think it is something that, you know, at some point we would need to look at in more detail.

So, in conclusion, I think what you see here is that we have provided the building blocks for this new network technology and this new engine for growth. I think the telecom and datacom industry, working with subcommittees like this can really provide the eco-

nomic engine that is going to make us competitive both today and in the next millennium. Thank you very much.

[The prepared statement of Glenn Falcao follows:]

PREPARED STATEMENT OF GLENN FALCAO, PRESIDENT, INTERNET AND SERVICE PROVIDER NETWORKS, NORTEL NETWORKS CHAIRMAN TAUZIN AND DISTINGUISHED MEMBERS OF THE SUBCOMMITTEE:

My name is Glenn Falcao. I am the President of the Internet and Service Provider Networks division of Nortel Networks. It is my pleasure to appear before you today.

I was asked to present an equipment provider's perspective on the availability of broadband solutions used in the deployment of data services and applications. My comments will be made from the viewpoint of Nortel Networks, a world leader in technology delivering network solutions for telephony and data-based, wireline, and wireless applications. As a leader in the provision of equipment and cutting-edge technology, Nortel Networks is facilitating the development and deployment of reliable and cost effective high-speed access for all data service providers—including transmission via cable, copper wire, fiber optic, and even the power grid.

Nortel Networks supports open and fair competition in the deployment of data services. The Telecommunications Act of 1996 is helping to promote competition and deregulation in the U.S. telecommunications arena. Globalization and deregulation will continue to drive broadband applications, which are critically important to the continued growth of knowledge sharing, electronic commerce, and electronic entertainment. As the Subcommittee considers legislative options in this area, we recommend that you should strive to facilitate the development of broadband capabilities and increased access to those capabilities.

Nortel Networks and The Internet

Nortel Networks is one of the world's largest suppliers of digital network solutions that facilitate the deployment of data services. And it is the most broadly diversified developer of high capacity switching, transmission, access, and optics technology. We are at the heart of the Internet. We are a global company with a presence in over 150 countries where we work with customers to build and deliver communications products and networks for voice and data that we call "Unified Networks." We are the best qualified to deliver global applications and services that merge new and existing networking elements and technologies into a seamless network.

Our U.S. presence has been steadily increasing over the past 25 years and our U.S. locations represent our single largest pool of highly skilled people. Since our recent merger with Bay Networks we are an even stronger company with a larger U.S. presence. About 35,000 of our 68,000 employees worldwide work in our U.S. facilities. Nortel Networks has an invested base in the U.S. of \$10 billion, and growing. Fifty-six percent of our 1998 revenues were generated in the U.S. Indeed, we export over \$2 billion from the U.S. each year.

Like the Internet itself, Nortel Networks is an exciting place to be right now. Early this year *Network World's* annual "Power Issue" listed Nortel Networks among the top five networking companies in the world and No. 2 among our competitors.

It is clear to Nortel Networks that our customers and the American public want reliable, affordable, and speedy access to the Internet. In these competitive times of market and technology convergence it is vitally important to be agile, ever ready to anticipate and respond to change, and to remain focused on customers' needs. At Nortel Networks, we are focused on continuing to enhance the value of our broadband application solutions—such as Unified Networks—to provide the building blocks to deliver data, voice, and multimedia capabilities for business and residential customers.

The Internet, Networks, And Broadband Services

Because of the importance of broadband services in fully exploiting the capabilities of the Internet through the deployment of data services, it is important to realize how the Internet itself relies on communications networks. What makes all Web-driven opportunities possible is the world's telecommunications infrastructure. There is no Internet without it. The public perception seems to be that the Internet runs on a separate collection of networking technologies created for some brave new world of cyber communication. Nothing could be further from the truth. In the real world, when consumers and millions of businesses access the Web, they use the existing telecom network's infrastructure and technology. So today, as firms rush to adapt Internet technology to every purpose and create the hardware and software needed to make Web communication ubiquitous, we need to remember that none of

this would be possible without the trillion dollars that new and traditional service providers have invested in their infrastructures during the past few decades.

Supporting the growth of the Internet have been some key factors that often are overlooked. The globalization of business over the last decade created much of the pressure for better communications networks, new services, and more competitive rates. These, in turn, drove what is now a global process of deregulation, which has increased competition among local and national communications network providers. Deregulation opened formerly monopoly networks to competition. In doing so, it created opportunities for new service providers to enter the market and also enriched the world's networks with new technologies.

The result has been the unleashing of both Moore's Law, that microchip processing performance doubles every 18 months, and Metcalf's Law, that the value of a network expands in proportion to the number of users connected to it. These notions explain the worldwide explosion in the use of networked personal computers, which paved the way for the rise of the Internet and contributed greatly to networks becoming the new growth engine for wealth creation.

Wireless, fiberoptic, and other high-speed access technologies have provided low-cost networks to developing regions and introduced vast new economies in long-distance services as network capacity increased. In the past five years, Nortel Networks has doubled the carrying capacity of a fiber every nine months, twice the rate of Moore's Law, and we expect to continue that for the foreseeable future. Our customers will collectively install more transport capacity in the next three years than the industry implemented in the past century.

Users are demanding such broadband capacity. Internet traffic is doubling every four months, a growth rate that over the next three years will result in cumulative traffic more than 500 times what it is today. By 2002, two million additional businesses will be connected to the Internet and 30 million more consumers will join the 130 million already online. As dial-up access speeds increase from tens of kilobits per second to thousands of kilobits per second, e-commerce will flourish.

The market changes caused by exploding Internet use require service providers to reconsider their business strategies. As the Internet and corporate intranets have grown, so has the amount of data. From virtually nothing in the 1970s, data traffic now accounts for more than 50 percent of total traffic across the average cross-section of the North American public network. Data traffic in North America grows by 30 to 40 percent a year, which means that data will account for at least 80 percent of all traffic by 2005.

Nortel Networks has undertaken four leadership initiatives that are good examples of the directions in which the Internet is growing:

- *Intranet services*, in which corporate networks and the Internet combine to create new applications and business models that leverage investments in information technology.
- *Internet telephony*, the convergence of telephony services and packet technologies. As these services develop, the existing public networks must be transformed to help wireline and wireless service providers begin the migration to next-generation packet networks.
- *The wireless Internet*. The next frontier in wireless is the networking of laptops, palmtops, and other web-enabled devices.
- *The optical Internet*. Nortel Networks is building high-speed, high-performance, IP-optimized optical backbones. We're focusing on high-speed access for the "first mile" of the network, using wireline and wireless solutions to bring "megabits to the masses."

The Need for Policies That Promote Competition

As the foregoing discussion shows, the Internet is revolutionizing communications. It offers us a portal for communication, education, commerce, and entertainment. It impacts every aspect of our private and public lives. We know our customers are facing new challenges, brought on by the Internet, deregulation of markets around the globe, changing consumer behavior, and converging technologies. These events change the traditional boundaries between service providers and enterprises, between local and global networks.

These changing boundaries present a dilemma for policymakers. As new competitors begin to catch up with or even accelerate beyond incumbents, and entrants from the cable television, wireless, utilities, and other industries vie in the lucrative data services market, it becomes increasingly difficult for policymakers to strike the proper balance to facilitate both competition and affordable access to broadband services. Although this dilemma may be difficult to resolve, the fine distinction between protecting competition and allowing individual competitors to remain competitive must be maintained. Solutions providers like Nortel Networks play an ex-

tremely important role in helping solve these public policy dilemmas by providing the means for the full, fair, and open service competition contemplated by the 1996 Act. Simply stated, it is in our business interest as well as the public's interest to see competition flourish in the provision of broadband services. We can't tell you specifically how law or regulation should treat one group of providers as opposed to another group of providers, but the result must be a competitive market. However, in a real sense, the interests of solutions providers in the development of broadband services are consistent with the public interest in promoting competition. Nortel Networks is on the side of competition. We believe technology solutions that promote competition in broadband applications and services are in the best interest of the American public. Only true competition will provide the solutions to the issues you are struggling with today.

Broadband Solutions

You are constantly hearing from all sides of the broadband access debate: the incumbent carriers, the new competitors, the Internet service providers, the cable companies, and the wireless providers—to name a few from a growing list. But I suspect you also are hearing from your business and residential constituents who want what I think we all want and need: ready, reliable access to multi-media services and applications at affordable prices that are the product of competition.

We believe that the current 64 kilobit-based infrastructure is the key bottleneck to enabling new services. Access is critical. The majority of carrier investments, between 50 and 75 per cent, are spent on access for the new networks. Residential customers need Internet connectivity at affordable prices enabled by industry leading technology like 1-Meg Modem and G.lite. Business customers need bandwidth greater than 500kb to enable Virtual Private Networks, e-commerce, and Internet telephony across a single access pipe.

Another trend we are seeing is the movement of intelligence out of the central office to the "edge" of networks. Line cards have been migrating to colocation cages for the past five years. Now the line card is being combined with DSL, wireless, cable products to migrate directly to the home or business offering great economies of scale and rich feature content.

As a major Internet equipment provider, with 75 percent of all Internet traffic traveling over Nortel Networks infrastructure, we meet our service provider customers' demands for broadband solutions so that they can, in turn, provide the services demanded by your constituents. Our customers from all sides of the broadband access issue are challenging us to meet their demands: (1) to protect their existing revenue sources; (2) to reduce the costs of operating their networks; (3) to help them start new businesses, which drive new revenue streams; (4) to help them be successful by serving their customers' needs.

By providing broadband solutions that meet our customers' demands we provide incentives for them to deploy affordable broadband access and applications to all Americans. For example, our Succession Network helps our customers transform their existing circuit-switched (voice) networks into packet-switched (data) networks without having to abandon the investment in their current infrastructure, making broadband access easier to implement cost effectively nationwide. The Succession Network helps customers to preserve their investment because it is not a separate infrastructure layered onto an existing network—it *transforms* the existing network. In our many years as an equipment provider we know that technology solutions that lower network operating costs and increase revenue from data-based services will give our customers the incentives they need to expand broadband access to their customers.

Making the best use of existing infrastructure can also accelerate broadband access to a larger base of the American public. For example, fiber optics promises to be a competitive option for the provision of broadband access, particularly when the existing fiber infrastructure is combined with bandwidth-enhancing technology, such as OPTera—Nortel Networks' Dense Wavelength Division Multiplexing (DWDM) technology. When applied to existing fiber optic networks, DWDM can greatly expand transmission capacity and can turn a traditional voice-only network into a powerful multi-media conduit delivering megabits to end users.

Let me illustrate the power of this technology. Using Nortel Networks' OPTera broadband solution, a single optic fiber could be expanded to transport the *entire 4 million-book collection* of the U.S. Library of Congress from Washington, D.C., to Los Angeles *in just seconds*. Or, using a highway analogy OPTera converts a 10-lane highway into a mega-highway of *160, 10-lane highways* stacked on top of each other. If broadband access is the goal, this technology is the solution that could provide *simultaneous access* to the Internet for *28 million households*.

Rural Communities

An even greater challenge to broadband access is the difficult business case presented by service to rural communities. Yet here, too, technology and competition are beginning to provide solutions. Companies, including Nortel Networks, are pioneering broadband technologies that can expand conduits such as power lines and the electrical wiring in buildings, to carry high-speed data. This type of broadband application is being deployed now in the United Kingdom and Europe, and in the future will surely be available in the United States.

Another possible low-cost solution for rural areas could be one that does not rely on wired infrastructure. Fixed wireless technologies, using unobtrusive antennas similar to the direct broadcast satellite "pizza dish"-size receivers, have been launched in various countries around the world, and in the United States on an experimental basis using Nortel Networks applications on an Indian reservation that previously did not have easily accessible telephone service. Wireless applications could make it possible for even the most remote areas to receive both basic services and high-speed broadband access. Of course these wireless solutions require access to appropriate spectrum, an issue we are currently addressing with NTIA and the FCC.

Bandwidth applications and solutions like the ones I have described will bring the promise of the Internet to all Americans and help telecommunications service providers and the public benefit from converging technologies. By keeping the costs low, through competition and technological advances, we can help make the dream of broadband access for all Americans, as envisioned by Congress three years ago, a reality.

Conclusion

The technological reality that I described here today should give you confidence that the telecommunications industry has the technology and the ability to place the power of the Web into the hands of each and every American. The dramatic technological advances taking place make it possible to deliver ever-larger streams of information at lower costs, making deployment of data services more affordable. In other words, the cost of technology has plummeted while its capabilities have soared.

In 1996 Congress gave the FCC authority to facilitate availability of advanced services to all Americans. Competition and technology can provide the building blocks to make advanced services available to everyone, including those in rural and hard-to-reach areas. With your help, the telecommunications industry can provide the innovative solutions, if you provide the leadership and policies that allow competition to unleash its market driven magic.

We at Nortel Networks look forward to working with you.

I want to thank the Subcommittee again for inviting me to appear before you, and I would be pleased to answer any of your questions.

Mr. TAUZIN. Thank you very much, sir.

And the Chair now recognizes Mr. Russ Daggatt, vice chairman of Teledesic, for your opening statement. Russ.

STATEMENT OF RUSSELL DAGGATT

Mr. DAGGETT. Thank you, Mr. Chairman, and members of the subcommittee. It is a pleasure and honor to be here to speak with you today. My name is Russ Daggatt. I am vice chairman of Teledesic LLC.

Like the NATO forces and the former Yugoslavia, we are fighting this battle from the sky. And I hope our vision can stay above some of the Balkanization of this debate on the ground.

As some of you know, we are in the process of building a satellite network that will provide people in every part of this country and the world with affordable, broadband Internet access.

I first joined Teledesic almost 6 years ago and it was a little over 5 years ago that we first introduced this vision to the public. And, at the time, we described our system as an Internet in the sky and the service proposition as global broadband Internet access. As difficult as it may be to recall now, 5 years ago the World Wide Web still had not made its presence felt and the Internet model was

definitely not the consensus network model. Most people's notion of broadband at the time was what many companies were articulating as video-on-demand and interactivity being a by-button on the channel remote. This was over a year before Netscape was formed. There were still no commercial browsers. Since then, we have also had to endure the push technology craze.

But our vision was based on a fairly simple one which was that the continuing improvement in the power of microprocessors was going to lead to ubiquitous deployment of computing power around the world in many forms and that the real killer application for the telecommunications networks would be networking those computers, that even phones would be computers, in effect. And that vision really required a very different network model and it is the network model that is now, I think, accepted as the Internet model.

And, without going into that model in depth, there are a few elements of it that are relevant. One is the movement of intelligence in the network from the core of the network to the edge of the networks. Another is the replacement of proprietary networks and application-specific networks by open networks where all applications are moving over a common network infrastructure. And, perhaps most critically, the move from circuit networks to packet networks. But, again, all of this required a very network infrastructure than we have in place today. In fact it is, even in relatively developed countries, it is, when it comes to a telecommunications network infrastructure optimized for networking computers, we are virtually starting from scratch.

Of course, in most of the world no telecommunications infrastructure exists at all. You have heard all of the statistics like, you know, there are more phones in New York than in all of Africa. Over half the world's population has never made a phone call. But even where that telecommunications infrastructure exists, for the most part it is 100-year-old technology: twisted-pair copper wires and a circuit-based infrastructure.

I think it is not an exaggeration to say that when it comes to building the infrastructure that is optimized for networking computers, building the networks that will provide global, broadband Internet access, that this is going to be the single biggest business opportunity on the planet over the next few decades. Estimates of the amount of capital that will be invested in telecommunications infrastructure over the next decade start at, I think, around \$2 trillion and go up from there.

Although Teledesic will be only one star in this constellation of broadband services, it will provide some unique capabilities. Teledesic's network will be a low-Earth orbit satellite network, which means a non-geostationary satellite network. Once you move out of the geostationary orbit, by definition, the satellites move in relationship to the Earth. Which means to provide continuous coverage of any single point on Earth, you have to provide, in effect, global coverage. Which means we will have a unique ability to serve customers in all parts of the world at a cost independent of location.

But the fuel that is feeding this telecommunications build-out, including novel technologies like that that Teledesic will provide is access to capital. And the capital markets require a fair degree of

regulatory certainty. The actions of this committee and the Congress have helped provide that regulatory certainty and I would encourage you to preserve the universal service principle, which has been perhaps the great social policy success of the 20th century, but also to preserve the regulatory certainty that is necessary for these investments.

Thank you very much.

[The prepared statement of Russell Daggatt follows:]

PREPARED STATEMENT OF RUSSELL DAGGATT, VICE-CHAIRMAN, TELEDASIC LLC

Thank you Mr. Chairman and Members of the Subcommittee. It is a pleasure and an honor to be here to speak to you today. My name is Russell Daggatt, and I am the Vice-Chairman of Teledasic LLC. At Teledasic, we are in the process of building a satellite network that will provide people in every part of this country and the world with affordable access to broadband communications services.

As this Committee and other organs of the government consider how to promote the development of advanced telecommunications, it is of utmost importance that you continue to support the goal of universal access by all Americans, as well as the new technologies that will make this universal access a reality. I want to emphasize to you that this is not just a matter of economic or regulatory significance, but it is of profound social import as well.

When I first joined Teledasic over 5 years ago, it was necessary to explain not only why broadband communication was important, but also what it was. At that time we described our system as an "Internet in the Sky" and our service proposition as "global, broadband Internet access." As difficult as it may be to recall now, five years ago the World Wide Web had not yet made its presence felt and the Internet had not emerged as the consensus network model. This was before Netscape was started—before there were any commercial Web browsers. Since then, various different notions of "broadband" have been put forth. We had to endure the "video on demand" period, followed by the "push technology" craze. Five years later the World Wide Web has become a daily part of most of our lives and the Internet an increasing necessity for things we associate with a high standard of living—from education and health care to economic development and public services.

As evidenced by the plethora of different companies and technologies represented on the panel here today, many of which didn't even exist just 5 years ago, clearly there is no shortage of interest in providing broadband communications. Fiber optics, coax, copper, terrestrial wireless and satellites will all play a role in serving the insatiable demand for bandwidth.

When trying to understand which technologies will be most efficient for servicing which needs, it is important to understand that in the traditional circuit-switched telecommunications model, you can break the network out into "access" or end-user connections and "transport" or backbone elements. The two elements have very different economics. In the Internet model, a third major element comes into play—"quality-of-service"—which sort of summarizes the whole. It is important to understand all three in comparing the economics of a wireline technology like optic fiber with a wireless access technology like Teledasic.

The capabilities of optic fiber are truly amazing and growing more so every day. Optic fiber is certainly in the "miracle technology" category. In point-to-point applications, the economics of fiber absolutely overwhelm any other technology. In the "transport" networks, the cost per bit of a loaded system (including all the up-front, fixed costs) will be very low, nearly infinitesimal. Unfortunately, the challenge is in extending broadband to the access networks, to make this technology available directly to end-users, infinitesimal. For this reason, distance will largely disappear as a pricing criterion in telecommunications (putting aside legacy regulatory distortions to the market). In the transport network, fiber dominates.

Unfortunately, the challenge is in extending broadband to the access networks (point of end-user interface). In the traditional circuit-switched networks the rule of thumb was that, on average, about 80% of the network cost is in the access portion. But that only takes into account those areas that have access (which does not include the vast majority of the Earth's surface and the vast majority of the world's population). With the economics of fiber coming to dominate the transport networks, with packet networks replacing circuit networks, and with the ubiquity of access increasing (or, more accurately, the lack of ubiquity decreasing), it is probably reasonable to assume for all relevant purposes that almost all of the network cost is in

the access network (especially as the Internet model redefines “access”. That is where the economics of wireline vs. wireless get more interesting.

The relative economics of wireline access technologies versus a wireless approach (including a satellite approach like Teledesic) are a function of both density and intensity of usage. The density part is pretty obvious. The cost to connect a customer with a wireline technology depends on the length the cable and the number of users it serves. That leaves most people and areas around the world unserved today. You can say that there is no demand for broadband telecommunications access in rural, remote and undeveloped or underdeveloped urban areas, but that is a bit circular in its logic. Any activity that requires an advanced information infrastructure today, almost by definition, must migrate out of those areas that don’t have such an infrastructure. It’s dictated by the economics of wireline access.

The intensity of usage determines the relative economics of access technologies. In the connections to most individual offices and homes, most of the capacity of a fiber connection would sit idle most of the time. The average residential subscriber in the U.S., for example, uses the phone for only something like 20 minutes a day. Internet applications are making usage patterns even more bursty and intermittent. It might be necessary to burst up to broadband speeds for only for a few seconds or a few minutes for a particular application, but the total number of megabytes sent and received over a day or week might still be very small. For example, I live in the heart of Seattle and have a DSL line. I work on my computer at home maybe 10 hours a week between evenings and weekends (pretty high usage). But the total number of megabytes I send and receive is pretty small (even though I want high speed when I do burst). With wireline technologies like fiber, all of that awesome capability must be rigidly dedicated to a particular end-user at a particular location, whether or not they need it at that moment. Given the very significant cost of extending fiber to individual offices and homes, i.e. using fiber as an “access” element, the cost per bit is most definitely not infinitesimal. Nor are the increases in the capabilities of fiber of much relevance—even on a neighborhood level, the capacity of the fiber is not the limiting factor in the economics of its deployment. Even at Teledesic’s headquarters, with 150 or so very data intensive users sending and receiving very big files, the company collectively bursts up to the full capacity of its T-1 line for a very few moments during an average day.

Wireless technologies, including satellites systems like Teledesic, that offer bandwidth-on-demand can provide a more economic access technology in a wide range of settings by dedicating only the bandwidth required by a particular application at a particular moment. Because demand for broadband services will generally be uneven and diffuse, it won’t be possible to justify fiber buildout for most of the world’s geography and the vast majority of its population. Even in the highly-developed urban areas, the early adopters who want a T-1 connection at their homes, for example, are likely to be fairly randomly distributed throughout each of those areas. On a neighborhood level, few areas will have the aggregate demand for two-way, interactive, broadband network connections that would justify the full area buildout that wireline technologies require. Where an existing coaxial cable or copper access infrastructure can be upgraded, the economics improve. But you don’t see many (if any) overbuilds of those existing networks, which says something about the economics of the access network.

Nonetheless, it is fair to say that Teledesic is not likely to be the broadband access technology of choice for most users in developed urban areas. Which is just as well, because any satellite system is ultimately constrained in its “capacity density”—that is, the amount of capacity it can focus in a given, concentrated area.

The Internet model introduces a third element to network economics, which I would argue, is the most important—quality-of-service (QoS). In the traditional circuit network, QoS is not an issue. For each voice conversation, an end-to-end connection is established that is dedicated exclusively to that conversation (or data session). Of course, this assures a very high service quality, but it is also very inefficient. Packet-switched networks like the Internet, however, carry traffic from multiple sources that move over the same network infrastructure, making them up to 10 times more efficient than circuit networks. The economics of a packet network kill those of a circuit network. Because packet network traffic has to compete for network resources, network congestion becomes a big factor in how efficient packet networks can be. But in a packet network traffic has to compete for network resources. Network congestion becomes a big issue. The ability to establish and enforce priorities, latency guarantees and other service quality parameters becomes the distinguishing characteristic of a packet-switched network. In fact, with the Internet today, QoS issues are a bigger deal than bandwidth *per se*.

A critical point here: QoS is an end-to-end concept. It is not enough to provide QoS guarantees only part of the way to the destination, because the connection is

only as strong (or fast) as its weakest link. It is also not enough to take the traffic from the end-user and dump it into the Internet cloud. Even fiber access is of limited value if it only connects to that Internet cloud (which, itself, includes abundant fiber). QoS is only meaningful as an end-to-end concept—it all has to be tied together with enforceable service guarantees. As a result, in the Internet world, the concept of “access” changes. In the traditional voice world, access only requires a connection from the end-user to the nearest central office where a circuit connection can be established with any other circuit network. In the Internet world, that’s not enough.

Teledesic is an end-to-end access network. Teledesic defines access in terms of the Internet model—in other words, in QoS terms. “Access” is the connection from the end-user to the nearest point of presence (PoP) that can provide the end-to-end QoS required by a particular application. In some cases, that might be only a kilometer. In other cases, it might be 1000 km... or 5000 km. Let me explain this in more detail, because it is a critically important concept.

If you want to see where the applications are going to come from for the broadband networks of the future, look to where there are broadband networks today... in the local area networks (LANs). What are the applications running over these LANs? Enterprise Resource Planning applications, SAP, Peoplesoft, SNI, BAAN, Oracle Financials, and the like. These are very demanding applications, particularly when it comes to latency. They were designed to run on LANs, not on the public Internet. Yet, increasingly, enterprises want to connect all their sites as well as their customers, suppliers, and the homes of their executives. They want to be able to run these enterprise applications not just at one isolated site, but everywhere to which their networks extend. This demands very high QoS guarantees from the network service providers.

UUNet (now part of MCI Worldcom) was the first major service provider to offer a product with a guaranteed maximum latency (of 150 ms). Others—Sprint, MCI, AT&T—soon followed with similar products. (Recent service level agreements I’ve seen have latency guarantees of 80 ms or less.) In every case, however, the service provider can only provide these guarantees where they actually control the network end-to-end. That is pretty limited availability, even for the largest service provider. MCI Worldcom, for example, only serves through its own facilities something like 40,000 sites worldwide.

This leads to another important point: It is not enough that there is *some* carrier nearby that might be able to provide a particular service guarantee. In a competitive world it matters very much *whose* network infrastructure is available. For example, Teledesic is headquartered in a suburb of Seattle. Let’s say there is a USWest PoP a kilometer away from where Teledesic is located. That doesn’t necessarily do Teledesic any good if it is a customer of, let’s say, France Telecom. If Teledesic is a customer of France Telecom its traffic might have to go 1000 km, to a France Telecom PoP in the San Francisco Bay Area, in order for France Telecom to be able to provide the necessary end-to-end QoS to the destination. In this example, “access” becomes 1000 km, not one kilometer. In other settings, in other parts of the world, “access” might be 5000 km, or more, in order to route around missing or problematic links or to connect into a unified infrastructure. Again, I would emphasize, it is not enough to take the traffic and dump it in the Internet cloud, or to hand it over to a competitor—or, more typically, to half a dozen carriers on the way to the destination.

It is not enough that there is a potential fiber connection to the customer. In a competitive world, it matters very much whose fiber it is. For example, running under the street in front of Teledesic’s former headquarters in Kirkland, Washington, there are six fiber cables. Each one of those six cables could carry more than 100% of all the traffic moving on all six of those cables. So why six cables—because competitors don’t want to rely on the facilities of their competitors. (As an aside, it is interesting to note that none of the many condominium complexes running along that street connects into any of those fiber cables. The cost to slice into any one of those cables is about \$50,000.)

Another example: Let’s say that the Swedish national carrier, Telia, has the task of connecting all of Volvo’s sites around the world, including an operation in Sao Paulo, Brazil. That Volvo site might be Telia’s only customer in Sao Paulo. It doesn’t make sense for Telia to build out facilities in Sao Paulo just to serve that one Volvo site. But it may be that the local service provider is affiliated with a competitor of Telia. Or the local service provider might be seeking exorbitant fees to provide the facilities for Telia. Or the local carrier itself simply might not have the facilities to provide service with the necessary QoS (this is most likely the case in most parts of the world today—even in most urban areas).

Teledesic is an end-to-end network. Teledesic will be able to carry traffic from any point on Earth to any other point on Earth. That doesn't mean that Teledesic *will* carry the traffic end to end in every case—rather, that it *can*. Which means that Teledesic (or its partners) can provide end-to-end QoS guarantees to any customer from any place on Earth to any other place on Earth. Teledesic's satellite infrastructure will not be the preferred technology for all of a customer's sites in all cases (or even in most cases). But it is what enables the universal guarantee.

Teledesic has unique economics that enable the provision of broadband access (with end-to-end QoS guarantees) at a cost independent of location and independent of user density anywhere in the world (including maritime and aviation applications). That ability to aggregate diffuse demand globally creates a very robust business model that does not depend on the conditions of any single market. That can make even a \$10 billion investment seem quite modest. Companies like Level 3 are spending comparable amounts just to undertake yet another fiber backbone overbuild in the U.S. The ability to aggregate diffuse demand globally makes Teledesic almost perfectly complementary to (rather than competitive with) fiber, which requires heavily aggregated demand (rather than diffuse demand) in a single point-to-point location to unleash its economic advantage.

It is not an exaggeration to say that building the infrastructure to provide broadband Internet access globally will be the single biggest business opportunity on the planet over the next few decades. In most of the world, no telecommunications infrastructure exists at all. Where such infrastructure does exist, it consists largely of 100-year-old technology—twisted-pair copper wires with a circuit-switched architecture. Even in relatively developed countries, when it comes to a telecommunications infrastructure optimized for networking computers, we're virtually starting from scratch. Estimates of the amount that will be invested in telecommunications infrastructure globally over the next decade start at around \$2 trillion and go up from there.

Access to capital is indisputable element to the current global broadband build-out. The Telecommunications Act of 1996 established the regulatory certainty needed by the capital markets to fund an unprecedented number of new competitive start-up telecommunications providers. Due in large part to the ground-rules established by the Act, in the US alone Wall Street investors have committed with tens of billions of dollars for competitive infrastructure. Therefore, it critical that Congress not take any action that could upset the capital markets that are providing the investments necessary to bring broadband services to all Americans.

Although the \$10 billion Teledesic network will only be a drop in the ocean of global bandwidth required, it will enable a unique capability to provide broadband Internet access to all those areas of the world that would not be economic to serve by other means. And—at least as important—it will provide a competitive overbuild in all the areas that do have an existing broadband Internet access infrastructure.

Mr. TAUZIN. Thank you very much, Mr. Daggatt.

And next will be Mr. Kirby "Buddy" Pickle, president and COO of Teligent here in Vienna, Virginia. Mr. Pickle.

STATEMENT OF KIRBY G. "BUDDY" PICKLE

Mr. PICKLE. Thank you, Mr. Chairman. And thank you for giving me a chance today and come talk about those new companies that you mentioned earlier, those new companies in northern Virginia that are coming about as a result of the Telecom Act.

Teligent is a unique entity in that we are trying to do a very old business in a new way. We are trying to be a communications provider of voice, data, and video using a unique twist on a very, very solid technology which is fixed microwave. And we will talk about that in just a moment.

But, before I do that, I would like to step back just a minute because Teligent is a little more than 2 years old now. And we had this idea, we had a goal. And that was that we could, in fact, be the person that brought a bundled solution to small and medium business customers. And we focus on small and medium business customers because we feel like that is the segment of the industry today that is clearly the least served. We look for small and me-

dium business people who have between 10 and 200 telephone lines. We don't serve IBM. We don't serve the government. We look for people who need help and that is what we do. I like to say that we are not a technology company, but in fact a solution company using technology to meet people's needs.

Now what we have done is interesting in that, by using this unique technology, we can actually go out to the suburbs and further out into the rural areas because we can, in fact, for a very small amount of money, build networks that provide this broadband pipe. And if you think about the economy today, most of the small and medium businesses are growing up in the suburbs. And that is what we are trying to do is serve those people.

Now Teligent has grown very quickly in those 2 years. We have service today in 28 markets. We will be in 40 by the end of this year. So we are very pleased with that. And we are investing hundreds and hundreds of millions of dollars to build these networks. And why are we doing that? Because we believe that America needs that broadband capability and we also believe we can meet the needs of a part of that.

Now in the last 5 years, you know, we have seen in this industry an unbelievable thing happen. Information has become critical to what happens in this country. Companies live and breathe with information and we want to be the person that provides that. And that is what the broadband revolution is really all about. But, in fact, the country faces some significant challenges. You know, the advent of the Internet and E-commerce is fueling a huge demand that is, in fact, outstripping the capacity of the small little copper wires that have existed for all these years in this country.

In communications jargon, I have heard it mentioned up here before we call that the last mile. So what we are trying to do is help people get access to high-speed on that last mile because we have a technology and an understanding of how to do that. Now going forward, if we don't fix this problem, businesses relying on 56 kilobits per second will literally be left in the dust on the information superhighway and that is where Teligent and others like us come in.

Now more than 95 percent—95 percent—of the communications customers in the United States, whether they are business or residential, are still served by copper loops. And that is what Teligent is all about, giving the small and medium business person access to some other type of technology that allows that broadband future to come to play. And our approach is to build a series of local networks across the country, based primarily on this new type of technology I talked about, fixed microwave. We also, however, integrate traditional broadband wireline technologies into our networks to make sure we can all for everyone.

Now to reach our fixed wireless customers—and I have brought an example because it looks very strange—we install small antennas on top of customer buildings. This is what one of those would look like. Now most people think of microwave as huge, giant drums. That is no longer the case. Now to help educate the panel, what I thought I would do is I brought a diagram to real quickly give you an idea of how a company like Teligent does what is old with something new.

[Chart.]

So if you look over here, what happens is that if a customer picks up a telephone or accesses the Internet—and that is very important because we are not a telecommunications company. We are a communications company. You pick up this particular phone and off goes a series of digits to our antennae. We send that series of digits to our switch and then, through a base station, we concentrate that information and send it to wherever it is supposed to go. This is no different than the way the country has been using communications for years, but is an example, I think, of how technology can help this country move into the next century doing things differently and better for everyone.

So, in terms of technology, we don't believe there is any one way to do it. Fixed wireless is great. DSL is great. What is important is that we allow it to flourish. Teligent is proud to be part of this. So thank you very much for the opportunity to be here today.

[The prepared statement of Kirby G. Pickle, Jr. follows:]

PREPARED STATEMENT OF KIRBY G. PICKLE, PRESIDENT AND CHIEF OPERATING
OFFICER, TELIGENT

Mr. Chairman, Ranking Member and other Members of the Subcommittee, thank you very much for giving me the opportunity to come here today to tell you a little about the part that Teligent is playing in building this country's broadband future.

My name is Buddy Pickle. I'm the President and Chief Operating Officer of Teligent, which is based about 16 miles west of this room, in Vienna, Virginia.

Earlier, I served as president and COO of the MFS Intelenet Companies, and president and COO of UUNET Technologies, Inc., following its acquisition by MFS. As you know, MFS was one of the very first companies to deliver competitive communications services to business customers, and UUNET is one of the nation's largest providers of high-speed Internet access services. Previously, I held a number of positions at Sprint, MCI, and the Southern Bell unit of AT&T, before the 1984 divestiture.

I also serve on the executive committee of the Association for Local Telecommunications Services, or ALTS, the trade association representing facilities-based CLECs. However, the testimony I am presenting here today is solely on behalf of Teligent.

Mr. Chairman, when I joined Teligent more than two and a half years ago, the company was little more than an idea. The idea was to use a new variant on a proven technology—microwave radio transmission—to build scores of new local communications networks across the country—networks that would offer a real choice to customers who wanted not only local and long distance service, but broadband data and Internet services at savings of up to 30 percent off what they are paying today.

Teligent targets small and medium-sized businesses—the most under-served, but fastest growing, segment of the business market. We offer service to businesses with as few as 5 telephone lines—businesses that simply don't have access to the large discounts or personal service that are readily available to the Fortune 500. In fact, most of our current customers have fewer than 25 telephone lines and most of the buildings we serve are not connected to fiber. I like to say that Teligent's mission is to level the playing field for these “under served five million” companies by giving them the bandwidth and the pricing that they need to compete with the biggest players in the marketplace.

Today, Teligent is offering service to customers in 28 markets around the country, and we intend to be up and running in 40 markets by the end of the year. We launched service in our very first markets at the end of last October, so I would say that we're very much off to a running start. We have more than 2,000 employees—and coincidentally, we have about 2,000 customers. Obviously we're working hard to increase that ratio, and we expect to do so in the coming weeks and months.

It's important to note that Teligent is a facilities-based company. Jargon aside, that means we are not reselling our voice and data services over existing telephone networks that were built by the big local phone companies over the last 100 years. While we don't resell the incumbent phone company's services, we do rely on them to interconnect with our network and provide the support necessary to cut over customers and complete calls that originate on the Teligent network.

Teligent is investing hundreds of millions of dollars to build our own local voice and data networks to compete with the existing telephone companies. Teligent is offering service in places like New Orleans, Louisiana; Boston, Massachusetts; Richmond, Virginia; Cleveland, Ohio; and Miami, Florida—as well as New York City, Los Angeles, Chicago and twenty other markets around the country. Together, these markets comprise more than 460 cities and towns of all sizes, and represent a combined population of more than 83 million. Eventually, we plan to offer service in 74 markets with more than 550 cities and towns and a total population of 130 million.

Our approach is to build a wholly new local network based primarily on a new type of high frequency, microwave radio technology. We also integrate traditional broadband wireline technology into our local communications networks. Through our local SmartWave™ networks, Teligent offers customers independent access to technologically sophisticated, high bandwidth capabilities and services. Because Teligent does not need to dig up streets to run wires and conduits, it avoids imposing inconvenience and expense on cities and neighborhoods in which it offers services.

With this combination of fixed wireless and broadband wireline technologies, Teligent is able to reach outside the core urban markets where most of the other new competitive local telephone companies are deploying fiber optic cable. That means we can serve emerging businesses that don't yet have the revenue or the desire to locate offices in the traditional downtown business centers.

To reach our fixed wireless customers, Teligent installs small antennas, often no more than a foot in diameter, on top of customer buildings. When a customer picks up a telephone, accesses the Internet or activates a videoconference, the signal travels over inside wiring to the rooftop antenna. An electronics box, usually situated near the antenna, digitizes all signals, and places them onto a data platform—we use ATM, or asynchronous transfer mode, for that purpose. The customer building antenna then relays the voice, data or video signals to a Teligent base station antenna.

The base station antenna gathers signals from a cluster of surrounding customer buildings, aggregates the signals and then routes them to a Teligent broadband switching center. At the switching center, Teligent uses ATM switches and data routers along with Nortel DMS switches to hand off the traffic to other networks—the public circuit-switched voice network, the packet-switched Internet, and private data networks.

It's important to note that Teligent operates at the very high-end of the frequency range—at 24 gigahertz—using spectrum licensed by the Federal Communications Commission. That means that each Teligent antenna must have a clear line of sight to the base station. The line of sight requirement creates both advantages and disadvantages for us. Because each customer building uses its own, specially-directed “beam” of spectrum, we can reach many different buildings using the same radio frequency, as long as those buildings are not too close together. On the other hand, our spectrum does not permit us to send signals through trees or around walls. That is a significant drawback when it comes to serving smaller buildings or single-family homes.

As we build our local networks, we are making significant investments in people, property and equipment. In this year alone we expect to spend \$300 million on capital equipment. For a company that has been in commercial operation for less than a year, I believe that investment is significant.

I mentioned a moment ago that when I joined Teligent, the company was little more than an idea. But that idea didn't just strike like a bolt of lightning. That idea—and through it this company—owes its life to three major developments. I'd like to take a moment to discuss each of those right now.

The first and most important factor in Teligent's genesis was the passage of the Telecommunications Act of 1996. In a very real sense, my company is a child of the Telecom Act. We wouldn't be here today if it had not been passed. Our business of providing competitive local communications services literally was illegal in many of the states in this country prior to the enactment of the Act.

The Act created ground rules, agreed to by the entire industry, which accelerated local competition and opened up opportunities for companies like Teligent. Because of the Act, which ensured that we would not be harmed by the historic, government-sanctioned advantages granted to the incumbent telephone companies, we were able to raise the capital we needed to build our business.

We now are finally near the end of a cycle of industry-wide litigation that has created uncertainty and delayed new competitors' ability to offer choice and new services to customers. If Congress were to reopen a debate over the key principles of the Act, it would only create more confusion and further delay the benefits of competition. Bluntly put, high-paid lawyers from the best law firms in Washington would tie us up for years.

The Act is not perfect, but it has set in motion an irreversible push toward more and more competition in our industry that will over time benefit all consumers. Most countries across the globe are racing to emulate the U.S. model, so their citizens and companies won't be left behind as the world moves into the information age. For that, we are very grateful to you. In a very real sense, each of you who helped shape the Act enabled us to create this company.

We also owe our existence to some dramatic improvements in technology, particularly the rapidly increasing capacity and declining cost of high-frequency radio technology. Microwave technology has been around for a long time. The military used it in World War II to develop radar defenses for our sailors, aviators and ground troops. MCI used it in the 1970s and early 1980s to create the very first competition in the long distance market. Remember, the letters M-C-I originally stood for Microwave Communications, Inc. Now we are using the latest advances in point-to-point and point-to-multipoint microwave radio technology to build competitive local communications networks in the local loop.

Until just a few years ago, the very high end of the radio spectrum in which we and other so-called "fixed wireless" carriers operate was virtually unusable for commercial communications applications. Now, advances in technology have turned that spectrum into a communications medium that is not only usable, but highly reliable and very cost effective. It's so cost effective, that we are able to offer our customers that 30 percent discount off current pricing that I mentioned earlier. So in a large measure, we owe our creation to these technological advances, which we expect not only to continue, but to accelerate.

Finally, we owe our life to a significant shift in customer needs, especially the demand for broadband services—a demand that is driving almost everything going on today in the communications industry.

I think the best analogy for what is happening today relates to the history of municipal water systems. Before the turn of the century, most homes didn't have any water pipes that connected them to the system. Demand was relatively low, and most needs were met by a well in the basement or the backyard. But with the advent of new technology—steam heat, indoor plumbing—the demand for water delivery to businesses and homes dramatically increased—and builders and municipalities began installing water pipes directly to homes and businesses.

The same thing is happening today in the communications world, albeit much more dramatically. The advent of new technology—the Internet and e-commerce—is fueling a demand for communications services that is far outstripping the capacity of the small communications pipes that serve most homes and businesses in this country.

In this case, those small communications pipes are the copper telephone lines that lead into an office building or a house. These lines were built to deliver analog voice traffic and were intended to be in use only a few minutes out of every hour. In communications parlance, these lines are referred to as "the last mile." The futurist George Gilder calls them "the copper cage."

As we move from an analog to a digital world, and from a voice world to a data world, these little copper pipes are no longer adequate to handle the surge of new data traffic coming to and from end-users. The highest data speed that most people can squeeze out of these copper pipes today using a conventional computer modem is roughly 56 kilobits per second. At that rate, it takes more than six hours to download the Encyclopaedia Britannica.

By contrast, Teligent today can deliver customers speeds of up to 45 megabits per second. At 45 megabits per second, it would take only 27.5 seconds to download that same encyclopaedia. And we expect to see dramatic improvements in that performance in the not too distant future.

Why do people need bigger information pipes?

As you know, we're not only crossing the threshold into a new millennium. We're also crossing into a new world of communications—one that's been compared to the advent of electricity in terms of the revolutionary changes that will come in its wake.

I think that comparison is right on target. It's true not only in terms of how electricity shaped the world we now live in. But also in terms of how people in the past century viewed the transition to electric power.

Back then most people couldn't easily think beyond the advantages of a gas lamp. A bigger lamp, with maybe a longer lasting wick, or better burning fuel, was viewed as quite acceptable progress. Change was conceived in increments of what existed. We're at a similar point today. But that is about to change very quickly.

Forrester Research recently predicted that the U.S. market for broadband access and Internet service is ready to—and I use their word—"explode." Just three years ago, the entire U.S. Internet services industry amounted to about \$1.3 billion. But

last year alone, the business segment of that market had already grown to nearly \$4 billion. Forrester predicts that by 2003 that number will hit nearly \$60 billion.

Datamonitor recently predicted that IP traffic will surpass telephone voice traffic sometime during 2000. That's not hard to believe when IP traffic is doubling every 9 to 12 months, compared with under 10% growth for voice.

Anecdotal experience confirms these projections. At Teligent, we're already seeing a heightened interest in data and Internet services from our base of small and mid-sized business customers. Nearly a fifth of them are ordering some type of broadband access service—a much higher percentage than we had expected.

We think this foreshadows ever-greater demand for bigger and bigger pipes. Already, more than five million businesses have created their own Internet sites. In fact, business-to-business commerce on the net is expected to blow through the \$1 trillion—that's trillion with a "T"—market in the next five years, according to Forrester.

With all that traffic pumping through the system, businesses who must rely on a 56 kilobit per second dial up connection through their local network literally will be left in the dust on the Information Superhighway.

Why do I emphasize the world "local?"

Since the federal courts broke up the AT&T long distance monopoly 15 years ago, companies like MCI and Sprint—and now Qwest, Williams and Level 3—have been building big "backbone" data pipes—analogue to the water mains in the streets—to carry high volumes of traffic across the country, across the states and across large metropolitan areas.

An article in the McKinsey Quarterly this month reckons that if all the fiber announced by U.S. operators were fully utilized, the backbone capacity of the U.S. could increase by as much as 200 times during the next 3 to 5 years. And that's great news for this country.

But what happens when you get to the neighborhood? The reality of the Information Age is that more than 95 percent of the communications customers—businesses and consumers alike—are bound by that 56 kilobit per second "copper cage" that we discussed earlier. That's the bottleneck that Teligent is trying to break—the bottleneck of copper that separates those broadband fiber "backbone" networks from the end-user.

Obviously, there is more than one company working on the problem—and there is more than one technology that can get you there.

First, of course, there is DSL—digital subscriber line technology. DSL in a sense is an attempt to teach a very old dog new tricks by using new electronics to enhance the speed and capacity of the old copper networks.

DSL technology has an important place in this new communications landscape. But it also has some limitations.

First of all, DSL can't be installed everywhere. Lines have to be "groomed," often at considerable expense, and central offices must be "DSL-ready." Some have suggested that only about half the central offices in the country will be able to accommodate DSL equipment.

DSL has distance limitations—18,000 feet is a generous estimate. There also are questions about the kind of network speeds that can be achieved in the real world—as opposed to the engineering world.

But there's an even more important point to be made about DSL limitations. No matter how you spell it, D-S-L still equals R-B-O-C. In other words, when you're dealing with DSL, you're still dealing with the RBOC networks—the copper cage. You must still lease or resell RBOC service. And we all know about the burden that exercise imposes on competitive carriers.

That's not to say that DSL doesn't have an important role to play. In fact, Teligent has found a way to secure many of the benefits of DSL technology while avoiding many of the issues usually associated with DSL deployment, including the need to co-locate facilities in LEC central offices. Two days ago, we announced that we will be combining DSL technology on copper wiring inside customer buildings with Teligent's SmartWave™ fixed wireless networks outside the buildings to provide a lower cost, entry level data service for smaller companies.

Another solution, obviously, is fiber optic cable. Fiber is terrific stuff, no question about it. But, as I've mentioned, fiber generally reaches only the highest density buildings, because, simply put, it costs a lot of money to dig up streets.

To date, only 3 percent of the approximately 750,000 commercial office buildings in the United States are directly connected to fiber. In fairness, those buildings account for roughly one third of the 60 million or so business lines in the country. But that still means that 40 million business lines cannot get a high-speed connection via fiber, because it costs too much to reach them.

What about coaxial cable? A lot of very smart people and some very big companies are betting that cable will provide an important broadband pipe to the home. Frankly, I don't disagree. But cable passes very few businesses today, including small businesses. So that need remains to be met.

Satellite? Teledesic, Iridium, GlobalStar and others have some very ambitious plans. For the larger companies that can afford these services, I think they will provide an important alternative. But I don't believe that broadband satellite services will offer a real alternative to the residential market or to small and medium-sized businesses. And that's the market that will be in the forefront of demanding new, broadband connections. So what's the answer? In terms of general principles, the most important answer is competition. If we allow the Telecom Act to do the job it was intended to do—open local communications markets to full competition—we'll go a long way toward spawning the innovation and investment that will bring the benefits of lower costs and greater choice to customers and consumers—big and small—all across the country.

In terms of the technology that will get us there, I don't believe that there is ONE answer. But I do believe that fixed broadband wireless will play a very important role as an enabling technology that breaks open the "copper cage" for the small and medium-sized business market in the United States—and around the globe.

At Teligent, we have branded it as digital "SmartWave™" technology. But whatever you call it, it offers communications providers a leg up on their competition.

What are the principal advantages of fixed wireless technology? I hope you'll pardon me for using one of Teligent's advertising slogans, but I think it sums up my point nicely: Big Savings; Big Service; Big Bandwidth.

For the target market of small to medium-sized businesses, businesses that have between, say, five to five hundred DS-0s, fixed wireless offer significant cost advantages. In fact, we're pricing our package of services at 30 percent below what customers are currently paying their incumbent carriers.

How can we do this? In the world of fixed wireless, 80 percent of our costs are associated with electronics. Anyone who has bought a computer or a stereo lately knows those costs are declining at dizzying rates.

In addition to the cost advantage, fixed wireless has a speed advantage. By that I mean both network speed—bandwidth—and speed of deployment. Most of the businesses we're targeting today don't have access to the Internet. Those that do most likely have a dial-up account using that 56 kilobit per second modem that I mentioned earlier.

In the past, they never even considered T-1 dedicated access because of the prohibitive cost of obtaining that service from a Bell company or an existing ISP. But Teligent and other fixed wireless carriers can offer them that bandwidth at a reasonable cost. And that, for the first time, is opening up a new world of e-commerce and the Internet to small and medium businesses.

We chose fixed wireless because we think it is absolutely the best way to bring bandwidth and broadband services to this tremendously important segment of the business market.

Each of us at this table is a pioneer. We are part of a revolution and part of a new solution. Our challenge is to keep our gaze fixed beyond the next quarter and into the future to continue to drive competition and to level the playing field for our customers.

We need to focus on what we do best. Keep the race fair and open to all runners. Drive innovation. Put the customer first. That's our mission. In closing, I'll note briefly how I believe Congress can help facilities-based carriers more rapidly deliver on that promise and bring the benefits of broadband services to our customers.

Notwithstanding the laudable success of the 1996 Act, some barriers to competition remain.

First, Congress should insist that all players comply with the provisions of the 1996 Telecom Act. Specifically, the incumbent local telephone companies must comply with the Act's requirement to open their local markets for competition before they are permitted to enter the long distance market. ILECs control essential facilities to which many competitive carriers require access before they can begin to offer competitive service. Even fully facilities-based carriers such as Teligent must have adequate interconnection with the incumbent so that networks communicate seamlessly and traffic flows smoothly. No matter how competitive the industry becomes, prompt and seamless interconnection with the existing local networks will remain an imperative. Shortcomings in this area are being addressed, but we are far from achieving full compliance.

Another remaining barrier—and an issue addressed by this subcommittee in its recent hearing—is the impediments that new, facilities-based competitors face in

bringing broadband services to customers in multi-tenant buildings in a reasonable and timely manner.

The multi-tenant building market is not inconsequential—about one-third of all Americans live in multi-tenant buildings and an even higher percentage of businesses are located there. When consumers decide that they want to take advantage of competitive choices, it is important that they be given the ability to do so—and the ability to obtain the competitive benefits *quickly*.

In our experience, we've found that many landlords recognize the benefits that accrue to their tenants—and frankly, themselves—by providing timely access to competitive communications carriers in their buildings. Competitive services make buildings more attractive to tenants—and more valuable in the real estate marketplace. We agree with the members of this subcommittee who believe that a fair balance can and should be struck between the legitimate property rights of building owners including reasonable, safety and security concerns and the need to bring broadband services to all sectors of the economy.

By providing for reasonable and nondiscriminatory access to customers in multi-tenant buildings, Congress can ensure that building owners and competitive carriers work together to bring more rapid development and widespread availability of competitive broadband services. Similarly, securing access on reasonable terms to the wiring inside these buildings is another critical factor, a task that is further complicated when the inside wiring is controlled by the incumbent local telephone company. I believe that Congress can and should address these issues.

Working together, Congress and new carriers such as Teligent can create a new broadband world that enables open, fair competition among all competitors, no matter how big they are. And that will make a world of difference for customers and consumers.

Thank you all for your kind attention.



Mr. TAUZIN. Thank you very much, Mr. Pickle.

And next on the list will be Mr. George Vradenburg, senior vice president, global and strategic policy, for AOL. Mr. Vradenburg.

STATEMENT OF GEORGE VRADENBURG

Mr. VRADENBURG. Thank you, Mr. Chairman. And I will comply with your injunction not to read my prepared statement. I have some notes and I would like to pick up on a number of comments from members of the committee and also represent myself as one of those employers in northern Virginia that is in fact one of those startup companies that is employing more and more people every day in our Nation's region.

First I would like to identify myself with the comments from the Chair about the need to keep a broad vision as we approach the policies that ought to govern broadband in this arena. The world has been moving from analog to digital at an extraordinary rate. It is going to continue to do so. We estimate that what we would currently call traditional voice telephony will be perhaps 1 percent of the bits that are and the traffic on the world's communication systems within the next 5 to 10 years.

And the development of these Internet developments are, in fact, transforming the Nation's economy. The value chain made up of the Internet today, the 6,000 ISPs, the Internet access providers, in the country, the scores of portals, the websites, the computer equipment suppliers, and the software suppliers, and now those components of our economy, in recent estimate, now represent \$300 billion, which is larger than the traditional local telephone, long-distance telephone, and cable industries combined. So we are talking about major transformative effects.

Remarkably, most of this growth has occurred since the passage of the 1996 act. But, in fact, has been, I think, fostered by the philosophy of the 1996 act, which was basically that the infrastructure ought to be open to competing providers of services, that, in fact, it ought to be shared, and, in fact, beyond that, service providers ought not to be regulated. And, in fact, the Internet has been largely, indeed almost with ideological devotion, maintained as a deregulated aspect of our economy, but the infrastructure on which it rides is shared.

Remarkably, the infrastructure on which the Internet rides is a single monopoly infrastructure. It is basically borrowed from the old voice telephony system. And the reason that we have been able to layer multiple levels of competition at increasing levels of the value chain on top of this monopoly infrastructure is because of the philosophy of the 1996 act, which is keep it open and keep those facilities shared.

Now I think the challenge as we go forward and we see increasing different kinds of technology platforms on which broadband might be developed, is to maintain that philosophy, which essentially says keep that Internet deregulated, keep that infrastructure shared so that all service providers can get to all customers. All service providers can invest the necessary marketing and capital needed to build out new services and new business models, but no gatekeeper or bottleneck develops in this new world. So I think the challenge is to drive all of that competition that we have seen at

every level of the value chain, now drive that competition into the infrastructure on which we are going to build our broadband arena.

Now what is the secret sauce to that? As I said before, I think it has been the openness of the infrastructure. Uniform connection requirements, non-discrimination requirements, most of the players that you have heard from today, at least so far, in fact, follow that philosophy and have been open to competitors. And, indeed, as you move downward the multiple infrastructure world, it seems to me that the government has got to take enormous care that it treats the infrastructures in a similar fashion. So that, in fact, government itself is not weighting, putting its hand, its finger on the scales as between cable, as between telephone, as between wireless, and satellite. That, in fact, the government take some great care here that it treats these infrastructures in a similar manner, that parity of government treatment of these infrastructures be similar, and that, in fact, these infrastructures be kept open and that that Internet be kept deregulated.

As a consequence of that philosophy, we have seen an absolute blossoming of competition, choice, lower prices, better service. The one thing I will refer to in my written testimony, Mr. Chairman, is the chart attached to my written testimony which demonstrates that the prices in virtually all aspects of communications-related products and services has been falling over the last several years except for one. And, as a consequence, it seems to me, Mr. Chairman, that we take some lessons that competition and deregulation is good and that infrastructures ought to remain open and shared and available to all service providers. Thank you very much.

[The prepared statement of George Vradenburg follows:]

PREPARED STATEMENT OF GEORGE VRADENBURG III, SENIOR VICE PRESIDENT,
GLOBAL & STRATEGIC POLICY, AMERICA ONLINE, INC.

Introduction

Chairman Tauzin, Ranking Member Markey, members of the Subcommittee, thank you for the opportunity to discuss the important issue of the Internet in a broadband world. I believe that this hearing marks an important step in Congress' examination of issues that are critical to the future of the American economy and society as we move further into the Information Age.

The Internet Today

Unlike any other communications technology that has preceded it, the Internet is a truly remarkable phenomenon. In only a few short years, the medium has literally transformed the way Americans communicate, engage in commerce, educate themselves and even participate in our democracy. It is a place where an untold number of new entrepreneurs have discovered that if they build something—a Website, a business or a new access service—thousands, even millions, will come. Always open for business, always open to new ideas, the Internet is perhaps the most dynamic force in our society and economy today.

More than half of American households—a total of 53 million—now own PCs. And about one-third of American households now have access to the Internet. Every month, nearly 1.5 millions Americans join the online world for the first time, bringing the percentage of the US population online from nearly zero in 1990 to over 30 percent today. Indeed, the number of online households in the United States grew by a factor of eight between 1994 and 1998. In five years, nearly 60 percent of Americans are expected to be online. This same rapid growth path can be seen throughout the world, where the number of online users is expected to reach 250 million by the year 2002. As one would expect from all of these users online, traffic on the Internet is doubling every 100 days and analysts are predicting that by 2002 consumers will spend nearly \$43 billion a year online, compared to \$8 billion last year.

The most significant aspect of this online phenomenon in many ways is the degree to which consumer choice and competition at all levels of the Internet marketplace has fueled its growth; consumer adoption rates are far out-pacing the predictions of even the most aggressive analysts only a few short years ago—and far outpace the track record of any other medium in history. Today over 6000 ISP's offer a wide variety of price, feature and service packages; over 90% of Americans have available to them competing Internet services with local dial-up connections. Competition has brought prices down, raised the quality of service and expanded the range of Internet features at all points in the Internet value chain. From the migration to flat rate pricing in the access market to rapid innovation in business models, no Internet business man or woman has been able to lose sight of competition for even a moment lest the rug be pulled out from under them.

Consumers are the drivers—and the ultimate beneficiaries—of this fierce competitive and open environment. With virtually no barriers to entry into the Internet marketplace and no gatekeepers collecting tolls from new businesses, consumers have seen their product choices expand, been granted access to a wealth of information historically available only to those with means and have been empowered to participate in civic life in ways that were previously imaginable.

The Broadband Future

In the next few years, the interactive medium will be available not only over today's "narrowband" technologies but also through "broadband" connections 100 times faster than today's access speeds.

As broadband becomes widely available, affordable and easy-to-use, it will meet the needs of consumers, small businesses and our community in new ways we have only begun to imagine.

Online shopping—and online-selling—will explode as more sophisticated technologies expand the range of products and services available online and make it possible to view, tour, test and even "try on" a range of products.

And beyond online shopping will come the home office. Telecommuting—involving everyone from typists to traders—will come into the mainstream through broadband's capabilities, benefiting cities across the country through reduced traffic and pollution. One-person Internet-based operations will compete with multinational corporations, creating whole new local industries.

As broadband expands the capabilities of the Internet, its role will expand as society's "great leveler"—putting world-class resources, the widest range of products and services, and even access to the outside world at the fingertips of anyone capable of flipping a switch or dialing a telephone.

The Future will be Multidimensional

Remarkably, today's Internet is built on a single access platform borrowed from the world of voice telephony. Tomorrow, broadband Internet may well be built on multiple access platforms—telephone, cable, satellite and wireless. Indeed, our vision for residential Internet access is one of a true "broadband tapestry."

In a multiple-platform environment, it is our view that consumer choice and competition can and should be enhanced not limited—consumers should be able to choose among infrastructures, as well as services.

In this vision, multiple service providers will offer services of varying speed and functionality to their consumers through multiple platforms. Ideally, any Internet service provider could offer consumers different applications using different access technologies—and the consumer would never have to know whether their Internet service provider was using DSL telephone lines, cable modems, or hybrid satellite delivery. Indeed, the consumer, in a fully competitive broadband world should not be aware of which access technology its Internet service provider is using—the consumer cares about service and applications, not technology. The transparency or invisibility of the technology employed by a service provider is critical to the success of the Internet as a mass medium.

It is important to recognize that despite this vision, for the next several years, two-way broadband access to the Internet for the consumer marketplace will be offered primarily through two sources, both wireline—DSL through traditional phone lines and cable modems over cable systems. In the case of DSL, telephone companies offer non-exclusive and non-discriminatory interconnection arrangements. We, and our Internet competitors, have entered into such arrangements with the prospect of higher speed Internet services and more robust applications becoming widely available in neighborhoods accessible by DSL by the end of the year.

Other broadband access technologies will also become available at some point in the future. In fact, just this week AOL announced an alliance with Hughes Electronics to help bring a hybrid form of high-speed Internet access through satellite

to consumers by early next year. As a result, consumers will be able to benefit from affordable, convenient and faster Internet service even if they live in traditionally hard-to-serve communities like rural areas. In today's Internet environment, rural consumers and those in other high cost areas have choice and flexibility in Internet access. Tomorrow's rural Internet customer should have the same choice and flexibility. What makes satellite broadband connectivity distinctive is its availability nationwide, particularly where other services are not rolling out. In the next few years, satellite systems can provide their download speeds up to 14 times faster than the standard 28.8 kbps modem, with uploads over phone lines at speeds up to 56 kbps. In the longer term, two-way, higher-speed connectivity will be available by next-generation satellite systems, such as Hughes' Spaceway,TM expected to be available for residential applications by 2003.

It is in the cable environment where we see the potential for consumer choice and competition in broadband services to be at risk. Unlike in other broadband facilities, providers, cable companies do not plan to offer access to Internet services—insisting that a customer purchase the cable-owned or affiliated service before buying or accessing a competitive service. This practice has at least three adverse consequences. First, it eliminates competition in the access market, thereby challenging the Internet model that has kept prices falling and service quality rising over the last several years. Second, it forces consumers to pay twice to get the Internet service of their choice, thus depriving moderate and low income families of cable-based Internet service. Third, it discriminates in service quality between the cable-owned Internet service providers—whose content is directly accessible—and independent Internet service providers—whose content is only indirectly available through the Internet. To make matters worse, the cable companies have even stated their intention to preclude access to content otherwise available to the consumer on the Internet, material with which the cable system does not wish to compete, including video material longer than ten minutes.

The Policy Environment

AOL believes that competition, openness and consumer choice are the essential ingredients of the success of the Internet, whether consumers access the Internet by broadband or narrowband means.

As technologies converge and all services—voice, data, video and others “are offered over traditionally distinct voice or video platforms, old regulatory classifications will not be sustainable. As a result, regulatory parity should become a clear priority, lest Congress favor one technology platform over another.

In moving toward regulatory parity, Congress must choose between the open model of the Internet or the closed model of the old AT&T and of cable.

We believe the choice is clear. As the Internet marketplace has demonstrated, competition in an open environment will deliver to all American consumers' lower prices, better services and more innovative products.

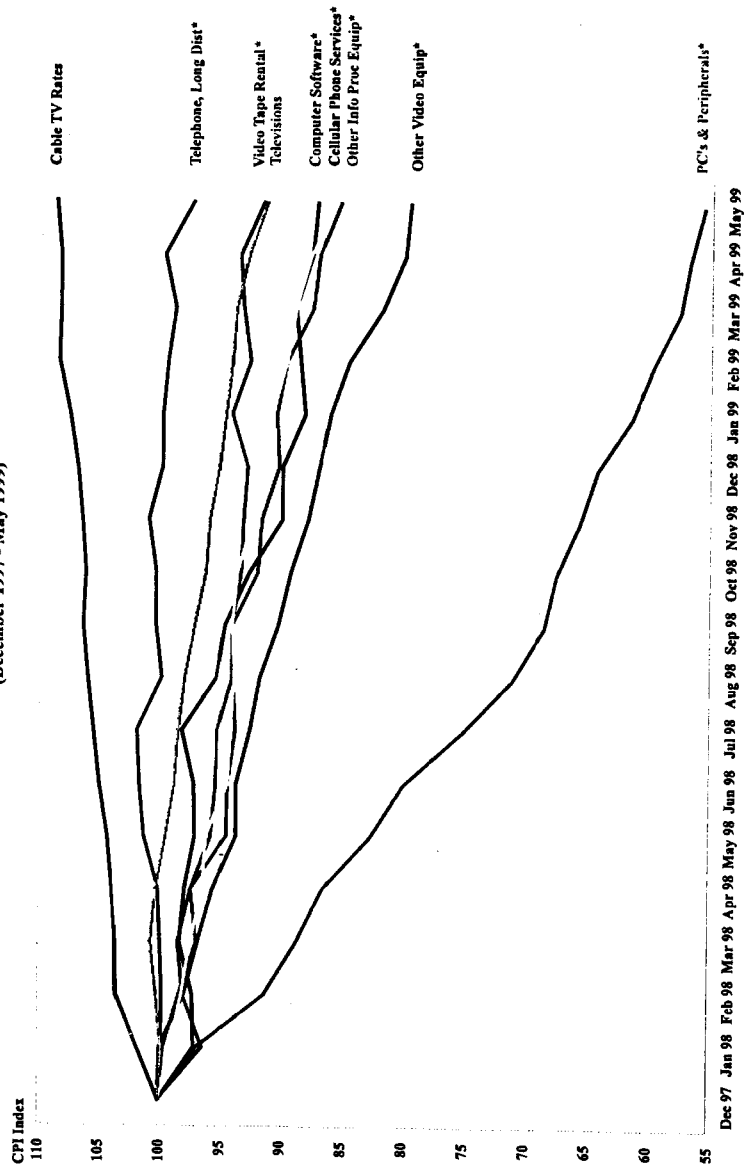
Further, the goal of Congress in this area should be to rely increasingly on the marketplace, and less on regulation. We can do that by assuring a market-oriented framework where entry costs are low and where business success is achieved by a better product and lower price, not by ownership of bottleneck facilities or more favorable government regulation.

We decided nearly 20 years ago that open interconnection and nondiscriminatory treatment of national service providers by owners of last-mile bottleneck facilities should be the cornerstone of our national and international communications policy. The remarkable developments in the Internet over just the last 5 years have proven the wisdom of that choice. The rules of the game have changed; we gave monopoly a chance and it failed; we decided to take a different, more competitive, path; and we as a nation are better off as a result. Indeed, the attached chart shows the benefits of competition across multiple communications media, only, in cable, where there is little competition have prices risen.

While Congress's role in this area should be as “hands off” as possible, you and your colleagues, have in my view, a responsibility to consumers to ensure that the benefits being delivered by the Internet marketplace are preserved and fostered in the future. It should be our ultimate goal to continue an environment of consumer choice and competition—where prices have been shooting down instead of up and services have gotten better and better. This Internet DNA of choice and competition—not the gatekeeper DNA of vertical integration—should be our guiding star. If gatekeepers want to play in the new Internet game, we should require them to play by Internet rules. We owe consumers no less.

Thank you for the opportunity to appear before you today.

Cable TV Rates vs. Other Communication-Related Industry Prices
(December 1997 - May 1999)



Source: U.S. Department of Labor, Bureau of Labor Statistics, Base Period: Dec 97 = 100
*BLS started tracking these items in December 1997.

Mr. TAUZIN. Thank you very much, Mr. Vradenburg.

And now Mr. Marc Apfelbaum, senior vice president and general counsel of Time Warner Cable.

STATEMENT OF MARC J. APFELBAUM

Mr. APFELBAUM. Thanks very much, Mr. Chairman, for inviting us. I am the general counsel of Time Warner Cable, as you said. I didn't throw away my prepared remarks because I used the back page to write some new notes.

I wanted to just mention a little bit, you asked us to talk about our businesses and Time Warner is really a content company. That is what we have always been and we have always seen technology as something to use in the service of content. But we have been on the forefront of technology in the cable business, going back to QUBE in the 1970's, which I think was the first interactive cable system. I think we were also at the forefront of developing hybrid fiber-coax. We also had our FSN experiment in Orlando where we have developed a lot of interactive services that are just really becoming to come into practice today.

On the Road Runner front, the whole service is really made possible by the upgrades that we have done with our cable plant which will allow us to offer all kinds of new digital services, not just Internet services. Road Runner is a fully integrated service. It is not just created by an ISP, as such. It is really a jointly created product between the Road Runner joint venture, which we created with Media One and some other companies, and us as the local cable operator, where we have local online editors in each of the communities we serve and they do a really wonderful and creative job of developing local content in a way that I think a lot of national companies just haven't done. They have worked with local museums, local schools, local everything and have developed some really unique work.

I guess the thing that we are trying to do is, as we go along, figure out the best way to provide these services, what is best for customers. And I think that is the most important thing that we all, everybody who is building facilities, which is in the end what provides these new services, that all facilities providers have the freedom to experiment. That if, at this early stage in the development of these services, government would come in and say here is how you have got to do it, it would all be over. So on the policy front, I do think it would be a huge mistake for government to step in and say, here is how you have got to do it and, you know, no more experimentation.

And a couple of the Congress people asked, you know, what stops us from deploying this more quickly? I would say it is a very complicated thing we are out there trying to do. It is not an easy thing on either the technology side or the business side and, again, it is our freedom to figure this thing out, as we go along, that will make it possible to roll this stuff out more quickly.

And the other thing I would say about what government can do is that we really do need a national policy on this. You know, there has been some reference to the Portland decision. It seems to us that it is simply impossible to run our business and let hundreds

or thousands of different communities decide how we should make this business work.

So, again, I would just like to thank you for having us here today and I would be glad to answer any questions.

[The prepared statement of Marc J. Apfelbaum follows:]

PREPARED STATEMENT OF MARC J. APFELBAUM, SENIOR VICE PRESIDENT AND
GENERAL COUNSEL, TIME WARNER CABLE

Chairman Tauzin and distinguished members of the Subcommittee, my name is Marc Apfelbaum and I am senior vice president and general counsel of Time Warner Cable. I appreciate the opportunity to appear today to discuss the deployment of our broadband service, known as Road Runner, and to discuss the future of broadband technology. I commend you for holding this hearing as we at Time Warner believe that the pro-competitive policies adopted by this committee in the 1996 Telecommunications Act and the policies we are discussing today to encourage deployment of broadband technologies are critical to the future of our economy and the continued development of the Internet.

Time Warner has a long history of technological innovation and leadership and has long been interested in providing advanced services to consumers over its cable systems. In the early 1980s, Time Warner developed QUBE, the first interactive programming service offered over cable. In the early 1990s, Time Warner constructed the first hybrid fiber-coaxial cable network located in Queens, New York, and experimented with a variety of new services through its Full Service Network in Orlando, Florida. These earlier groundbreaking initiatives provided the foundation for the on-line services the company is now introducing across the Nation.

Building on that foundation and as a result of the regulatory certainty created by the 1996 Telecommunications Act, Time Warner is well into the process of upgrading all of its cable systems to a state-of-the-art, hybrid fiber coaxial architecture. When these are substantially completed by the end of the year, Time Warner will have invested about \$4 billion upgrading its cable systems to provide increased capacity for both video programming and other new digital services.

To make full use of the upgraded plant, Time Warner teamed with Microsoft, Compaq, Media One, and Advance Newhouse to develop Road Runner, a new high-speed on-line service that provides local and national content. The Road Runner service is jointly created by the Road Runner venture and its affiliated cable operators. Road Runner provides an innovative mix of local and national content, as well as a high-speed connection to the Internet. The joint venture provides content on a national basis from various sources including CBS Sportsline and Barnes and Noble. Road Runner's cable operator affiliates, including Time Warner Cable, Media One and third party cable operators, provide additional local content, among other things our local on-line editors also assist schools, libraries and museums in developing their content.

The foundation of our Road Runner service is our upgraded cable fiber-coaxial network. This network provides the enhanced reliability and capacity of fiber optics and results in an increase in the delivery of content to the PC at speeds up to 100 times greater than today's residential telephone line. Customers reach our Road Runner service and the Internet over the cable system, without any need to dial in to a local telephone number and the service is "always on."

The Road Runner service allows customers to visit any site on the Internet. Nothing on the Internet is off limits to the Road Runner customer, including the sites of Internet Service Providers. As you know, most content on the Internet is free, but some content providers, such as AOL, charge for their services. If a Road Runner user has installed AOL on her computer or if her computer came with AOL already installed, she need only click on the AOL icon on her computer screen. She will obtain access to AOL, and thereby obtain all AOL content, web access, e-mail and other services. Road Runner customers similarly can reach any other ISP posted on the Net with a single mouse click.

We believe our Internet services provide subscribers with an enormous value. For about the same price as today's dial-up phone line plus an ISP, Road Runner provides consumers with Internet service that is faster and provides more immediate access to on-line services.

The development of the Internet is the quintessential example of the power of the free market. It was Congress's respect for market forces over governmental interference that allowed the market to meet the needs of consumers, to develop innovative new technologies, to grow the economy and to provide the ultimate forum for communications. No one player has the ability to stand in the way of the global phe-

nomenon that is the Internet today. For some to suggest that might be the case is nothing short of ridiculous. For although Time Warner and other cable companies are investing billions of dollars in upgrading our infrastructure, cable modem services is still in its infancy, with fewer than 1 million subscribers nationwide out of the current total of 29 million residential Internet subscribers.

At this early stage in the development of broadband services, it would be a mistake for government to choose and impose one business model on all broadband providers. Time Warner believes that cable companies and other players—be they satellite, wireless, or telephone companies—should be encouraged to invest in the development of these new Internet access services through pro-competitive policies that leave each one free to experiment and develop its own business strategy. It is our strong belief that consumers will be best served by government policies that spur the rapid rollout of high-speed broadband Internet services by multiple players and multiple technologies, rather than by government mandates about the business models such entities should employ. Those companies that have urged a contrary approach are simply using the tired old Washington game of seeking to use government to advance their own “competitive advantage”. However, as FCC Commissioner Michael Powell wisely stated in a recent speech on this issue: “Competition policy should focus on the benefits and harms to consumers, not the effect on firms.”

As I’ve stated, upgrading cable plant and developing and deploying advanced services are expensive and risky ventures. Imposing new regulation on companies as some have suggested will not only slow development but will deter further investment of private capital. Therefore, Time Warner strongly urges policymakers to resist those attempts to determine through regulation how this market might develop. Such attempts fly in the face of history of Internet regulation up until now and inevitably result in the freezing or slowing of technological development and thereby harm consumer welfare.

Time Warner also strongly believes that broadband policy must be set at the national level. As FCC Chairman Kennard and Commissioner Powell have also stated, these important policy questions cannot be answered hundreds or thousands of different ways by state and local authorities, and we therefore urge this Committee to keep a watchful eye on such developments.

Mr. Chairman, Time Warner applauds your Committee’s pro-competitive policy approach. I thank you again for giving me the opportunity to share Time Warner’s views with you and look forward to your questions.

Mr. TAUZIN. Thank you very much, Mr. Apfelbaum.

And now, Mr. Alex Netchvolodoff. And everybody calls you Netch, right?

STATEMENT OF ALEXANDER V. NETCHVOLODOFF

Mr. NETCHVOLODOFF. That is right. Just think of the great advertising campaign “With a name like Smuckers, it has got to be good.”

Mr. TAUZIN. It has got to be good. Of Cox Enterprises. Welcome, Alex.

Mr. NETCHVOLODOFF. Thank you, Mr. Chairman. The written part of my statement, which I am discarding with your encouragement, tried to make one point, which I will summarize, and then you invited us to perhaps do a little bragging about what we are trying to do within our own operations. So I will proceed to do that afterwards.

I think that the question before policymakers is this: Is Internet access going to be a competitive service or not? And what do the people that analyze this who are not stakeholders, who are neither telephone operators nor cable operators or wireless providers, but folks in think tanks in Boston and California, what do they think is going to happen with respect to Internet access?

And what they think is going to happen is that there are going to be six or seven non-affiliated, facilities-based providers of access to the Internet and the technologies that are going to be used vary. You are going to have microwave. You are going to have satellite.

You are going to have third-generation PCS. You are going to have DSL. You are going to have cable modems. And that is just the beginning. Electric utilities are also going to be involved in this.

And, therefore, the idea that government, at the very early stages of the enormous amount of investment that is teed up to occur over the next 3 or 4 years, would somehow decide it appropriate to regulate, to impose what would inevitably become, in the words of Mr. Powell and Mr. Kennard at the expert agency, a very difficult and complicated and costly cost-based analysis in order to tease apart all the business elements so that seamless access could be provided to non-facilities-based players—resellers and packagers—is just simply not an appropriate thing at this point for the government to entertain.

So the first point I would make—and it is summarized, as I say, in my written comments—is that it is way too early, I think, for policymakers to consider an intervention, a regulatory intervention.

Now, when the 1996 act was signed into law, Cox was a cable company. We simply video one way to our customers. Since the enactment of that legislation, we have spent \$4 billion literally transforming our networks so that you wouldn't recognize them today in terms of what they were at the time that the 1996 act was passed. We have activated the return path and we have done that in a way in which we have had to be very careful about noise on the network.

We have brought switches so that we can provide digital telephone service. We have invested in the enormous complexity of developing a national network, distributed network, with servers so that the people that are using our data access services can benefit from the speed of having content downloaded into servers. We started a joint venture with a firm called At Home. And all of this was done so that we could begin to offer our customers a new service at a lower cost and at a higher speed than is currently available in the marketplace.

The gating factor for us is complexity. The gating factor is not demand. Our customers want high-speed data services faster than we are willing to provide it to them because we get only one bite at the apple. Either the services that we provide, whether they are telephone or data services, work and work very well or we are out of business. The cable industry does not enjoy the kind of reputation that the regional bell operating companies do. And when we go to our customers and say try us on new technology. Try us on new services. They either work very well or we are in trouble.

So, for Cox, the concern here is, A, we have made these investments, not with a guaranteed rate of return because, as you know, under the Cable Act, we couldn't pass through any of the capital investments that we have made to the end-user in the form of our cable rates. It was prohibited under the act. So all of the investments that we made were made under the basis of being, essentially, venture capital. And, Mr. Chairman, the promise, we think, is there. By the end of next year, our original customer base, which was 4 million—it is now 5 million because we have done some consolidating transactions, but our original customer base—we would be able to provide data access, telephony, and digital video to about 85 percent of our customer base by the end of next year.

So we think that this is an enormous success. We would simply ask that the Congress be very careful to permit the incredible spending of money. I mean, I think it is hundreds of billions of dollars that are going to be spent by facilities-based providers to create Internet access and that that enormous investment ought to proceed with as little government intervention as possible. So that is, essentially, Cox's story.

[The prepared statement of Alexander V. Netchvolodoff follows:]

PREPARED STATEMENT OF ALEXANDER V. NETCHVOLODOFF, VICE PRESIDENT, PUBLIC POLICY, COX ENTERPRISES, INC.

Chairman Tauzin and distinguished members of this Committee, I appreciate the opportunity to appear here today representing Cox Communications, a subsidiary of Cox Enterprises, Inc. When it comes to deployment of data services, here's what Cox Communications is providing to its customers—fast, cheap, high quality, competitive Internet access with national and local content. And we're connecting schools and libraries to the Internet...for free.

Mr. Chairman, many industries—telephone, cable, wireless, electric utility and satellite—will be investing tens, perhaps hundreds, of billions of dollars in private risk capital in the next few years to deploy broadband infrastructure. Injecting new government regulation into the way competitive high bandwidth Internet access services are provided would have an entirely predictable result—it would slow investment and hinder deployment. Indeed, one winning strategy for government to accelerate the deployment of advanced services would be to reduce regulatory burdens not increase them.

Just consider the dynamic nature of today's marketplace. The cable industry's annual spending on two-way broadband facilities is about \$10 billion. Since the '96 Act, Cox alone has invested more than \$4 billion. For the industry, the number of high-speed data homes passed will exceed 35 million by December 31.

The phone industry is answering this competitive cable challenge by spending billions of dollars of its own to activate high bandwidth DSL capable loops. By year-end, Bell Atlantic has announced 8 million lines, SBC 8.4 million, Pacific Bell 5.2 million, and Bell South 5 million. The most current ARMIS data from 1997 reveal that almost a year and a half ago ILECs had 831,000 high-bandwidth, customer-terminated T1 lines yielding about \$11 billion in annual revenue. US West alone has told analysts that it would add 80,000 DSL customers this year to a total industry subscriber base that is growing at a substantial rate.

Sprint has plans to offer its broadband Integrated On-Demand Network (ION) in 27 major markets and, to that end, is spending hundreds of millions of dollars on wireless spectrum to create broadband access. Last month, MCI Worldcom agreed to purchase CAI Wireless to launch broadband access. Motorola and Cisco have formed a wireless joint venture to provide high-speed access. Winstar, Nextel, and Microsoft have joined this broadband parade. And certainly smaller facilities-based players are not excluded. In Seattle, ReFlex Communications and TUT Systems have formed a venture to offer Multiple Dwelling Units high-speed access using microwave spectrum and fiber optic rings.

The satellite industry is emerging as a very major part of the marketplace for broadband access. Hughes is spending \$1.4 billion to launch two-way access. And AOL has just announced a \$1.5 billion investment in Hughes. Not to be outdone, Lockheed Martin/TRW is spending \$3.5 billion.

Electric utilities are joining with RCN to offer broadband services along the east and west coasts passing 40% of U.S. households.

And finally, 3rd generation PCS broadband capability will start to be deployed next year.

I am not trying to suggest that the entirety of this business activity and the billions of dollars of venture capital that it represents will all bear fruit. But much of it will. In the last several months, there simply has been an undeniable and unprecedented amount of time, effort and money committed by dozens of unaffiliated stakeholders to the task of providing broadband Internet access. Under these circumstances robust competition is inevitable. And it is important to note that this will not be competition reliant on repackaging or reselling. This competition will result from deployment of facilities by numerous unaffiliated industries. It will lower costs for end users and provide a rich array of broadband choices specifically related to intended uses.

Mr. Chairman, the cable industry is taking on enormous risk to provide new digital services to its customers. In the case of broadband data, I can tell you that even with a carefully integrated service like @Home the details of both technology and business relationships have proven to be extremely complicated. The gating factor for Cox is not consumer demand, it's execution in a way that delivers a dependable product. From a public policy standpoint, the proposition that government should never attempt to regulate a nascent and competitive consumer product like broadband data service is apparent on its face. From an operational standpoint, such regulation can only introduce cost and complexity for the consumer into an already costly and complex offering. And from a governmental standpoint, as Chairman Kennard has noted, the imposition of seamless access regulation can only be accomplished through a prolonged and difficult cost-of-service proceeding to determine how to price the myriad network elements and business services that are involved. Such a regulatory thicket is precisely what the '96 Act aggressively discourages.

In conclusion it would be a pity if, instead of a nation of facilities-based communications providers, we became a nation primarily of resellers and re-packagers. Global competitiveness will not be furthered by policymaking that creates heavy incentives for resale instead of promoting facilities-based business strategies. As I have just noted, a highly regulatory, cost-based, rate-of-return unbundling of competitive cable Internet access facilities has no public policy or legal predicate. High bandwidth Internet access is now and will continue to be highly competitive. In this context, cable controls no essential facility. Old-fashioned regulation is the last thing needed for the Internet to continue to flourish.

Mr. TAUZIN. Thank you very much, sir. Dr. Evil would have said it would only cost \$1 million. Thank you.

We will now turn to the Honorable Tom Tauke, a former member who has served on this committee. And, Tom, I want to welcome you back to the other side of the table now representing Bell Atlantic. Mr. Tauke.

STATEMENT OF HON. THOMAS TAUKE

Mr. TAUKE. Mr. Chairman, it is good to be back. When I talked to the chairman this morning, he indicated I was a little boring. So I am going to try to liven up my presentation this morning for all of you with a couple of—

Mr. TAUZIN. You weren't supposed to quote me on that, Tom.

Mr. SAWYER. Mr. Chairman, the microphones don't work any better than they did when he was here.

If he could move it a little closer, it would help.

Mr. TAUZIN. You have got to move it a little closer, Tom.

Mr. TAUKE. This is as close as it gets. I will speak up. I will move over a little closer.

As many of the members have already indicated—or those that have testified this morning—have already indicated, the Internet is a terrific phenomenon. It is doing great things for our economy. As the Department of Commerce study pointed out that was released just this week, the Internet is fueling the growth in the economy the last couple of years and it is the hope for growth in the economy in the future.

But the infrastructure, which has also been referenced this morning, the infrastructure on which the Internet rides is an infrastructure that really wasn't built for this market or for this technology or for this use. It was an infrastructure that was, in large part, built for voice services, has been used for some simple data services like downloading text, but now is being challenged in a whole new way.

Customers are going online today not just to tap into CNN to get the news of the day. Customers want to be able to go to a furniture store, pick out a sofa, see how it looks in their room, walk around the sofa, and do all that online. That takes a whole lot more bandwidth. That takes a whole lot more infrastructure than is there today. So the challenge that we face is to get the infrastructure out there that will meet the needs of the new economy.

Well, what is the—when we think of this infrastructure, then, what should we be thinking about? I try to think of it in two terms. One is the last mile, which we have talked about. The second is the infrastructure that is around the backbone. And when it comes to last mile of the infrastructure, we have been attempting to deploy more and new technology in the last mile in order to speed up the service that people get to the home.

I have a little demonstration here that I would like Link to run, if he would.

[Slide.]

On the left, you just saw a 28.8-K modem that is the typical residential customer that is trying to download 6 pictures. They got 4 percent, a little less than a third of a picture.

[Slide.]

In the second—we didn't get the rest of it up—but the second one is the highest speed modem that we have today. You got less than the first picture.

[Slide.]

Meanwhile, if you have DSL service, the lowest speed DSL service that Bell Atlantic is employing today, you can get all six pictures during that timeframe.

So that is one of the things that we are attempting to do for the last mile.

But there is another issue—

Mr. TAUZIN. Could you redo that?

Mr. TAUKE. Sure.

Mr. TAUZIN. It went kind of fast. I want to make sure people kind of saw it. Could you back it up and do it again. All right.

Mr. TAUKE. So that is the last mile.

But you can have the greatest last mile in the world, if you don't have connection to a backbone that also is providing speed to this level, it isn't going to do you a lot of good. And when it comes to the backbone, I have personally had a lot of difficulty figuring out what is going on. I look at these maps and they are put out there and there are networks flying all over the country. I read stories about how we have all this capacity.

I have finally concluded that the backbone is a lot like a regional airport system or the Nation's airport system. You know, my own State of Iowa, you can look at a map and you see all of these flights flying from New York to Los Angeles going over Iowa and they are high-speed flights, you know, direct service. They don't do the people in Iowa a bit of good. They don't land in Iowa because if they did it would slow down the traffic.

Well, the same is true with much of the backbone. It goes cross-country. There are not stop-off points because stop-off points slow down the traffic. So, instead, you have to build a lot of regional airports to get you into the hub so you can get on the main backbone.

Building those regional airports is where the real money comes in and where the real investment is needed. We, today, have barriers that prevent us as companies from building those regional airports and other players are busy putting the resources they have into the major backbones.

So I believe that those are the two challenges: the last mile and the regional system that is part of the backbone system that allows people to get on to this new world of information. I think that if you look at what is the barrier, then, to the investment—and it is huge amounts of investment that need to be made to get that last mile and the regional system in place—a big part of the barrier is regulation. A number of the people have said the government shouldn't be in here telling us how to deploy the technology. I don't want to shout this too loudly, but that is what is happening. At least that is what is happening for the major providers of the technology, including Bell Atlantic.

Essentially, the way I look at it is this. We have a telephone market. We have a cable video market. We have telecom legislation and 1934 act and various revisions thereof that apply to those markets. But today we are taking the regulation from the telephone market and applying it to the new infrastructure and the new technology that we are attempting to deploy. And it is hamstringing that deployment; it discourages the investment. In the last mile, it makes our environment in which we are making this investment very uncertain. We don't know from day to day what the rules will be. And so, as a result, it deters that investment. We have lots of plans, but there are lots of uncertainties in the regulatory world. In the regional airport or backbone world, we can't make the investment today because of the rules that are on the books.

I would encourage the committee to look at the wireless model. When the wireless industry came forward, which, again, uses part of the existing infrastructure as this new world is using some of the existing infrastructure, that when the wireless world came forward, the Congress and the FCC said, let us set up a new regulatory paradigm for that world. Let us not regulate it. Let us instead have limited regulation so the new technology will be deployed and, indeed, that is what happened. New technology was deployed. It was deployed rapidly, much faster than was ever predicted. There has been great competition in that arena and in the wireless arena you have seen prices go down and services expand.

So I guess my last point is this. That what can this committee do to promote growth of the Internet in its infrastructure? I think what the committee can do is to try to clear away some of the regulation that is restricting and inhibiting investment. And if you are able to do that, then I think you will see the kind of speed at your homes, not just in business, but in homes, that I would like to show in this last demonstration. Demonstrations always take longer.

This is why we need speed.

[Slide.]

These are pictures that are being downloaded right now. 10 pictures being downloaded very rapidly using 7.1 megabits per second. And the point that I want to make is that with this kind of rapid downloading, you get great clarity which you don't get today. You would be able to download a novel, a good-sized novel, in 2 seconds.

You could transfer x-rays in 4 seconds. The fact is you would also have the infrastructure in place which would permit this world of E-commerce that consumers want and the economy needs to move forward. Thank you.

[The prepared statement of Hon. Thomas Tauke follows:]

PREPARED STATEMENT OF THOMAS TAUKE, SENIOR VICE PRESIDENT, GOVERNMENT RELATIONS, BELL ATLANTIC CORPORATION

Mr. Chairman, thank you for this opportunity to testify before the Committee. I am Tom Tauke, Senior Vice President of Government Relations for Bell Atlantic. I am before you today to tell you that, without changes in the regulatory architecture, the deployment of high speed Internet access will be significantly impeded, to the detriment of all Americans.

Mr. Chairman, the Internet is a wonderful tool that has developed far faster than anyone could have imagined. But its continued development and evolution into a technology that can handle any form of communications and any type of service from educational to medical is threatened.

The current infrastructure on which the Internet rides is insufficient to handle the explosive growth, and the danger is that we won't recognize the scope of the problem until it seriously impairs our economic growth. Policy makers must avoid applying old regulatory models to an entirely new, competitive technology. The consequences of inaction are very serious. The entire Internet economy rests on the ability of businesses to reach consumers. Without BOC broadband deployment many local communities will never realize the promise of high-speed Internet, and Internet companies will not be able to reach their markets. This will have a serious impact on the value of the Internet economy itself—the sector that everyone agrees is driving economic growth.

If we slip into using policies for the Internet and broadband services that were intended for a local voice telephone market, we will slow deployment of broadband, inhibit competition and risk slowing investment at the very time when we need every possible player involved to help advance the capabilities and capacity of the Internet.

The State of the Industry

A few short years ago, the Internet was something that only serious researchers and computer jockeys knew about. Electronic commerce was not part of our vocabulary. In 1995, revenues generated by the Internet were a mere \$5 billion. Since then, the growth of the Internet has been astounding, far outstripping the predictions of most experts. Last year, Internet revenues rose to an astronomical \$301 billion.

With this growth, there has been increasing demand for bandwidth and speed. The 14.4k modems that were state-of-the-art a few short years ago are the slowpokes, with 56k being the top speed achievable by most mass-marketed dial-up modems. As more and more people use the Internet and more complex information and bandwidth-intensive applications appear, it is clear that 56k just is not fast enough.

Consumer surveys demonstrate that speed is a very important issue to users. But so is quality and capability. The Internet's problems are only partly related to the need for more capacity. It is an end-to-end system based on hundreds of connections between different networks. At the top of this system is the Internet backbone which links together thousands of web sites and Internet providers and takes traffic back and forth at high speeds across the U.S. The faster data can get on the backbone and the more backbone capacity there is, the better the connection and the higher the quality of the data transmitted.

There are vast areas of the U.S. that simply have no nearby backbone connections or hubs. The three largest backbone carriers—MCI/WorldCom, Sprint and Cable and Wireless with AT&T coming up fast—have little incentive to connect their systems with smaller carriers or locate hubs away from major urban centers. And the level of concentration is increasing rapidly as the major backbones acquire or displace smaller players. Even where backbone exists, such as in major urban centers, it is often congested. Many Internet providers have no way to get their data traffic to the backbone efficiently and without numerous back-ups and delays. Many are simply located too far away from convenient backbone connections. And when they do get to the backbone, they find that the lack of adequate capacity slows their customers' service.

If a consumer's data—a web page being transmitted to a person's home for example—is slowed at any point in the transmission, data can be lost, the connection may drop and some of the more exciting applications for education and telemedicine involving video, for example, will simply be impossible. The current lack of competition in the backbone market and the threat of telephone style regulation of broadband connections deployed by incumbent telephone companies threaten to slow the improvement needed in the Internet. We need competition and investment in the Internet from end-to-end—from the local connection to the nationwide and global backbone. Whole new industries based on a more advanced Internet will be stymied and the continued development of our high tech and computer industries will be slowed. The Internet has driven the growth of the high tech sector. There is a very real danger that if the Internet does not advance to a new level, one capable of providing higher speed, higher quality connections, the growth our economy has enjoyed because of the explosion of information technology could well be undermined.

The information superhighway is exploding while driving at 56k, imagine what will happen when we allow consumers to drive at 10 or 100 times that speed.

Today, the two most promising landline technologies to provide residential consumers with high speed Internet access at a reasonable cost are Digital Subscriber Line (DSL)¹ services, and cable modem services. Only one of these services, DSL, is subject to significant federal regulation. Even worse, only certain providers of DSL—the Bell operating companies (BOCs)—are so constrained as to not be able to provide data services across LATA boundaries.

If consumers are to get widespread deployment of high speed Internet services from competing providers, it is necessary for DSL services to be deregulated. Current regulation hampers significant DSL deployment and denies consumers benefits.

To Regulate or Not to Regulate, That is the Question

The question before Congress is “Why should companies that are best able to bring broadband to all Americans be constrained from doing so by an antiquated regulatory structure?” Bell Atlantic thinks they should not.

The high-speed data business of today should not be regulated like the telephone network of yesterday. In most urban areas, there are several companies vying for the high-speed data business. Cable companies are upgrading systems to be Internet-capable with high-speed cable modems. New entrants, such as Covad, Northpoint, and Rhythms NetConnections², provide DSL services to business and residential consumers. And unlike the voice markets, local telephone companies are not the dominant providers of residential high-speed data services—cable companies are. They already serve 80 percent of the residential customers buying high speed Internet access.

Even though there are several willing providers of the service, there is still precious little deployment of high-speed Internet services. The players who can make the financial commitment to widely deploy DSL services, and can help new entrants in their deployment of the services, are being held back by the regulatory regime in place today.

Bell Atlantic and other Bell operating companies (BOCs) are prohibited from carrying data traffic across LATA boundaries. That means that a Bell Atlantic customer must rely on other providers to reach the Internet. It also means that Bell Atlantic cannot operate Internet backbone services.

To provide customers reliable end-to-end data services, a provider must be able to move data from one end of the country to the other, and overseas. Sprint, MCI, and AT&T all have this capability today. Cable companies and the nascent DLECs are not prohibited from providing these services. The only companies not allowed to provide this service are the BOCs.

Remember that the reason that AT&T was split into local and long distance components was the threat that AT&T would use its market power in one market to harm competition in another market. At that time, AT&T had a monopoly over the local exchange market. There is no current monopoly for high-speed data services.³ In fact, out of the nearly 100 million Internet users, there are only 70,000 total DSL customers nationwide. There are seven times more high-speed data customers using cable modems (500,000) than DSL.

¹There are different types of DSL services. The most popular today is Asynchronous DSL, or ADSL. DSL technologies are generically referred to as xDSL.

²These companies are sometimes referred to as data local exchange carriers, or DLECs.

³Without a change in the regulatory treatment of DSL services, however, cable may become a de facto monopoly provider of high speed Internet services.

Bell Atlantic may not even provide its Bell Atlantic.net customers direct Internet access. Instead, Bell Atlantic.net must contract with a third party to provide the Internet portion of the Bell Atlantic.net service.

There is very little justification for the FCC's protection of AT&T and MCI from Bell Atlantic's pro-consumer entry into the data business on an equal footing. These mammoth companies have the capital and know-how to compete for data customers. Even the start-up DLECs are in an excellent financial position. These companies have been the darlings of Wall Street, in spite of the fact that most of these companies have only started to build their customer base. NorthPoint Communications has a market capitalization of \$4.5 billion, in spite of the fact that its revenues in 1998 were less than \$1 million. Covad's market capitalization is \$3.1 billion, with 1998 sales at \$5.3 million. Rhythms NetConnections market capitalization is nearly \$4 billion, on 1998 sales of \$500,000.

There are other existing regulations that handicap Bell Atlantic's provision of DSL. The FCC is busy working on applying Section 251 unbundling and resale requirements to Bell Atlantic and other incumbent LECs. Bell Atlantic is committed to providing unbundled DSL-compatible loops to competitors. Any other unbundling of the DSL service or the provision of DSL-capable loops is unnecessary and can harm deployment of DSL.

The FCC is currently considering a proposal to require spectrum unbundling, also called line sharing. Under this proposal a competitor would be allowed to use only a portion of the capacity of the loop for free to provide DSL service and the incumbent LEC would still be required to provide the underlying basic telephone service and cover the full cost of the loop. To split the capacity of the loop, however, is bad public policy. Line sharing deters the development of competition for local voice services by "stranding" voice and discouraging competition for voice services. Line sharing discourages CLEC investment in local voice services by giving the new DLEC competitors a "free ride" on the ILEC's voice service, which is priced below cost. Competing carriers do not need to share the unbundled loop to offer advanced services. They are already free to offer advanced services over an unbundled loop or to invest in other technologies, such as wireless technologies. Like the ILEC, they can recover the cost of the unbundled loop by offering voice and other services over that unbundled loop.

The FCC is also in the midst of determining whether LEC DSL services should be subject to the resale discounts provided under Section 251. Bell Atlantic has filed a tariff at the FCC to provide DSL service on a wholesale basis to ISPs such as AOL and to competing carriers. CLECs claim that ISPs are the end-users of that service, and therefore CLECs should be able to obtain an additional discount from the ISP tariff price. What they are trying to do is give themselves a better deal for DSL services so that it is impossible for ISPs to compete against carriers in the residential mass market. But that makes no sense from either a legal or policy perspective. First, as a legal matter, the Section 251(c)(4) discount applies only to services that are provided "at retail" to "subscribers" of those services. The xDSL services provided to Internet service providers (ISPs) and other carriers, however, will be used as an input to their own retail Internet services and resold to their own subscribers. It is the ISPs and other carriers that purchase under this tariff that will perform the retail functions of marketing, advertising, billing and customer. There are no further retail costs that Bell Atlantic would avoid by providing these same wholesale arrangements to carriers and therefore there is basis for applying the avoided cost discount that is normally applied services offered at retail.

Second, as a policy matter, imposing a wholesale discount requirement on wholesale xDSL services would make it impossible to provide ISPs the lowest possible price. If any price made available to ISPs, no matter how deeply discounted, automatically would have to be available to CLECs at a further 20 percent discount, the simple fact is that carriers will be unable to offer ISPs as significant a volume discount. And ISPs will be unable to compete in the residential mass market against carriers that are getting the same service, but at a significantly lower price.

With the proper deregulation in place, DSL deployment will increase significantly. A rising tide will raise all ships, as the standard speed for Internet access increases by a factor of 10 or 100, every high-speed data provider will benefit. Deregulation often provides consumer benefits in deployment, prices, and choices.

The Cellular Experience

There are some parallels between what happened in the cellular industry and what is happening in the high-speed data marketplace. The slow roll out of cellular service, and continuing regulation of the service has cost consumers and the economy billions of dollars. Significant deregulation, however, has increased subscribership and lowered consumer costs.

In 1968, the FCC initiated its first inquiry into reallocating UHF spectrum for mobile telephone service.⁴ The Commission issued its first report and order in 1970.⁵ Several decisions and reconsideration followed, and the first experimental cellular system finally became operational in 1979 in Chicago. In March 1982, the FCC issued its Report and Order creating the commercial cellular service.⁶ Commercial cellular service finally began in 1983, even though the technology was developed and ready for market more than 10 years earlier. According to one estimate, this delay in cellular licensing cost the U.S. economy a staggering \$86 billion.⁷

Moreover, no one predicted cellular's fantastic growth. In fact, at the time of the breakup of the Bell system, it was unclear as to whether AT&T or the BOCs would inherit AT&T's cellular spectrum licenses. AT&T had predicted that cellular subscription levels would reach one million by 1999. In reality, cellular subscribership reached that level in 1987, and at the end of 1998, there were 69,209,321 wireless subscribers in the U.S.⁸

Wireless growth was actually very slow at first. By the end of 1988, there were approximately two million cellular subscribers in the U.S.⁹ The FCC made an effort to significantly deregulate cellular service in 1988.¹⁰ This first of two significant deregulatory events in the cellular industry help make wireless telecommunications the ubiquitous service it is today.

In December 1988, the average monthly cellular bill was \$98.02 for the two million plus subscribers. Within four years of the FCC's deregulatory effort, cellular subscribership reached 11 million, while the subscriber's average monthly bill dropped by nearly 30 percent.¹¹

The second major deregulatory effort was undertaken by Congress in 1993. In the Omnibus Budget Reconciliation Act of 1993 (OBRA 1993)¹², Congress, to a great extent, deregulated the cellular telephone industry. From 1993 to 1998, wireless telephone subscribership has risen from 16 million to 69 million, while the average monthly bill has dropped by nearly 50 percent.¹³

OBRA 1993 allowed states to petition the FCC for continued rate regulation. During the pendency of these proceedings, the Cellular Telephone Industry Association filed a study with the FCC detailing the effects of state cellular regulation.¹⁴ The study, performed by Jerry Hausman, concluded that cellular prices in regulated states averaged 17% higher than the prices in unregulated states. He also found that cellular penetration and cellular growth is lower in regulated states than in unregulated states.¹⁵

The inescapable conclusion is that the cellular industry benefited greatly from deregulation. In a deregulated environment, subscribership rose and prices dropped.

The high-speed Internet market is in a similar position today as the cellular industry was more than ten years ago. Of the nearly 100 million U.S. Internet users, only 500,000 access the Internet via high-speed cable modem, and a scant 70,000 use xDSL technology for high-speed Internet access. Adoption of deregulatory measures, such as those contained in the Tauzin-Dingell draft bill will permit telephone companies to provide xDSL technologies at a more rapid pace, hopefully with the same results as deregulation of the cellular industry: more consumers accessing the technology for lower costs.

⁴Ten years earlier, the FCC chose to grant additional spectrum in the UHF band to broadcasters, rather than mobile radio.

⁵First Report and Order and Second Notice of Inquiry, Docket No. 18262, 35 F.R. 8644 (1970).

⁶Report and Order, 86 F.C.C. 2d 469 (1981), modified 89 F.C.C. 2d 58 (1982), further modified 90 F.C.C. 2d 571 (1982).

⁷Estimate of the Loss to the United States Caused by the FCC's Delay in Licensing Cellular Telecommunications, National Economic Research Associates, Prepared by Jeffery H. Rohlf, Charles L. Jackson and Tracey E. Kelly, released November 8, 1991 (revised).

⁸CTIA Semi-Annual Wireless Industry Survey Results.

⁹Id.

¹⁰Amendment of Parts 2 and 22 of the Commission's Rules to Permit Liberalization of Technology and Auxiliary Service Offerings in the Domestic Public Cellular Radio Telecommunications Service, Report and Order, 3 FCC Rcd. 7033 (1988), recon. in part 5 FCC Rcd 1138 (1990).

¹¹CTIA Semi-Annual Wireless Industry Survey Results.

¹²Omnibus Budget Reconciliation Act of 1993, Public Law 103-66.

¹³CTIA Semi-Annual Wireless Industry Survey Results.

¹⁴Letter to Reed Hundt from Thomas E. Wheeler, President and CEO, CTIA, March 10, 1995, in PR Dockets 94-103, 94-104, 94-106, 94-107, 94-108, 94-109, and 94-110.

¹⁵The Cost of Cellular Regulation, Jerry Hausman, McDonald School of Economics, MIT, January 3, 1995.

Give the Consumer a Choice

With AT&T providing high speed Internet access over a closed system, whereby the consumer using AT&T's cable modem must pay for AT&T's ISP of choice—(At Home), consumers will want a different provider to give them a choice of both the high speed pipe and the ISP. Bell Atlantic's DSL will allow consumers to choose from many ISPs, including Bell Atlantic's own ISP. Bell Atlantic will not condition the deployment of DSL on the requirement that a customer use Bell Atlantic's own ISP.

Customers want choice. Some customers are very happy with their current ISPs. Bell Atlantic would like to provide those consumers with a high-speed Internet option using their ISP of choice. This is good for the consumer and good for the industry.

Data Services Are Different

Congress must make the FCC recognize that the high-speed data business is separate and distinct from the voice telephony services business. The FCC seems intent on applying the Title II common carrier regulation of voice services on telephone companies' providing data services, and applying the Title VI cable regulation, or lack thereof, on cable operators' providing the same service. A company's parentage should not determine that company's regulations in a different business. This is a classic case of regulatory disparity—those customers purchasing high-speed Internet access service from a BOC have their service restricted by regulation, while those purchasing similar high speed Internet access service from AT&T's cable system have no such regulations.

Rather than impose additional regulations for data provision by cable operators, the FCC should not be regulating data services under Title II, Title VI, or any other provisions of the Communications Act. Congress gave the FCC the opportunity to set the proper deregulatory environment for high-speed data services by including Section 706 in the Telecommunications Act of 1996. Unfortunately, the FCC failed to take advantage of the opportunity and continues to constrain the deployment of advanced services to all Americans through its imposition of a regulatory scheme designed for voice services. Clearly, consumers will benefit from deregulation where there is competition as there is for data services.

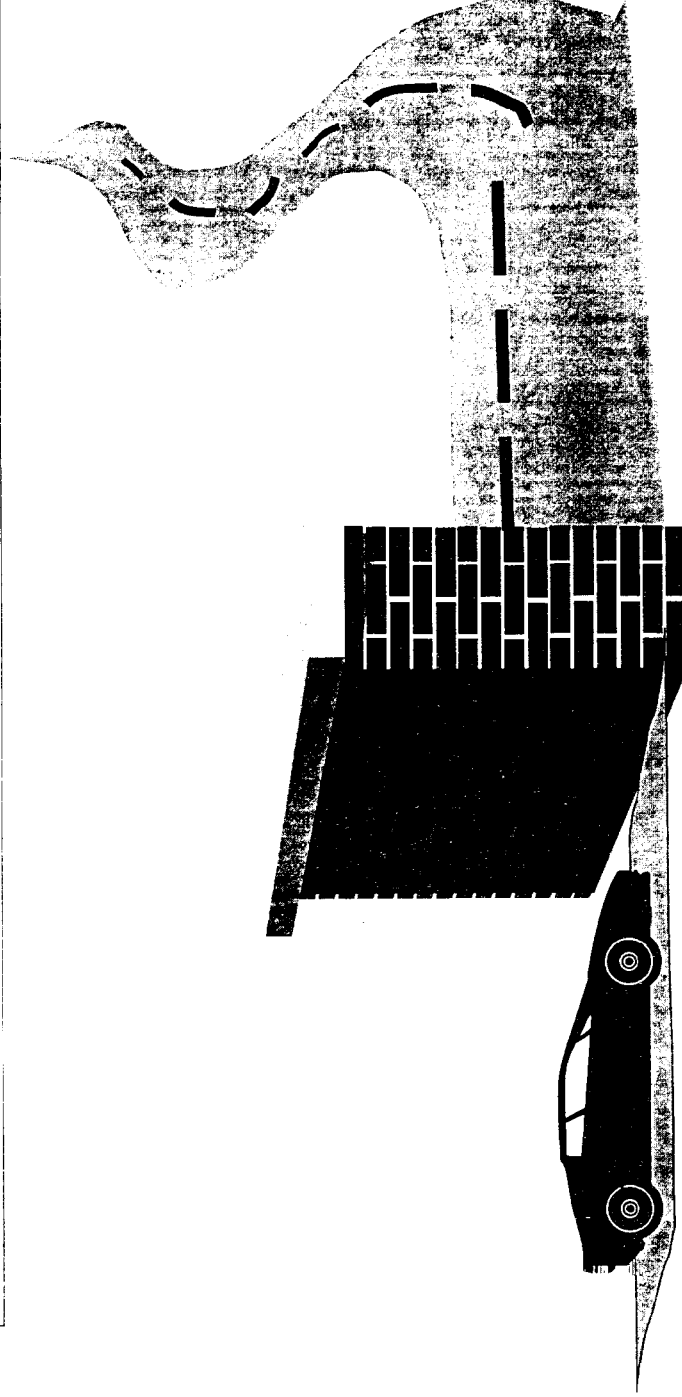
Some have argued that providing interLATA data relief is a back-door way for the BOCs to enter the interLATA voice business. This argument is a red herring. Bell Atlantic will not provide interLATA voice telephony until it gains the approval to provide that service pursuant to Section 271. Bell Atlantic is committed to opening its local telephone network, and gaining approval to provide long distance services in every state in its region.

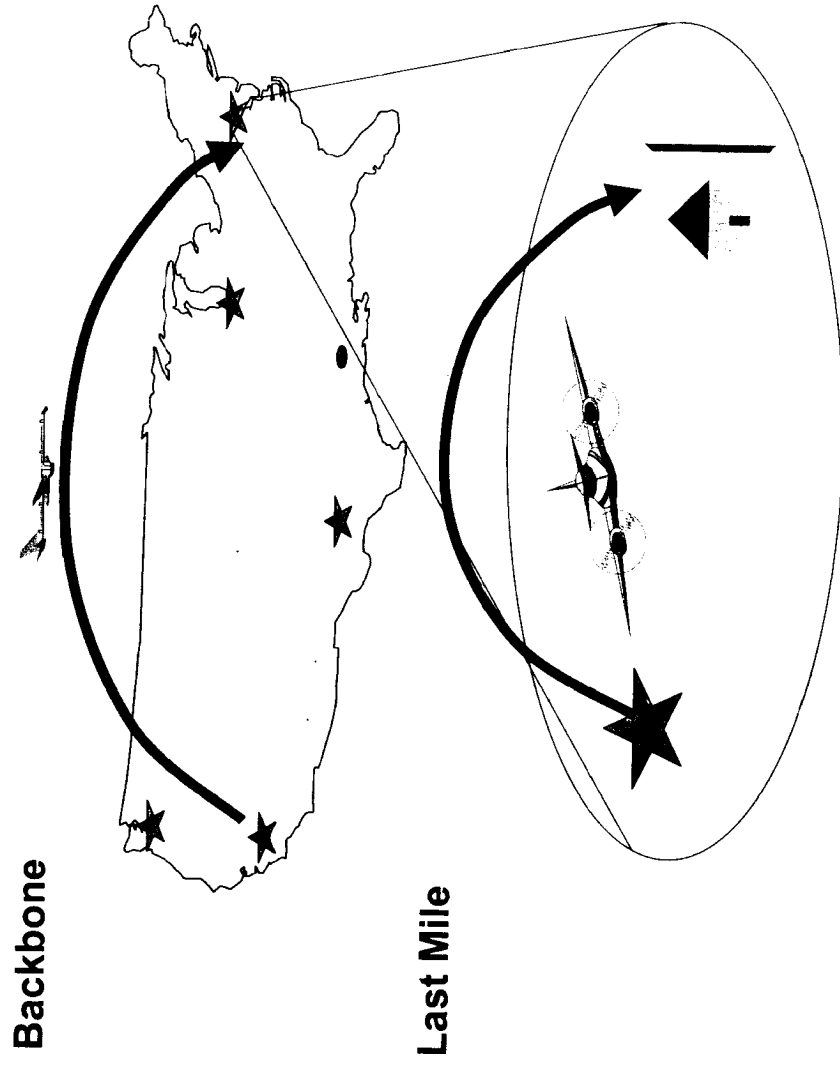
Congress Should Adopt an Open Competition Policy for Data Services

The policy that will most benefit the consumer and the Internet is an open competition policy. Congress should adopt a policy that permits all data service providers to provide Internet backbone services. Congress should encourage last mile broadband deployment. Finally, Congress should ensure that regulation is only instituted where there is a clear market failure.

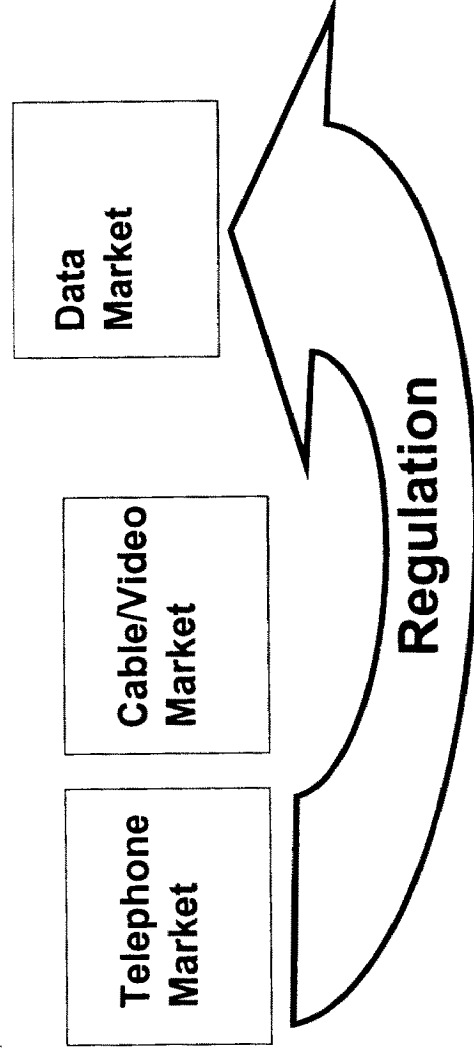
Overlaying existing telephony regulation to the Internet will not work. Bell Atlantic urges Congress to adopt legislation that deregulates the provision of data services and does not favor one provider over another. The legislation should empower consumers with choice. Bell Atlantic believes that the Tauzin-Dingell draft legislation meets all of these policy objectives, and Bell Atlantic respectfully urges Congress to take immediate action in passing such legislation.

Current Infrastructure is Inadequate for Future Internet Growth



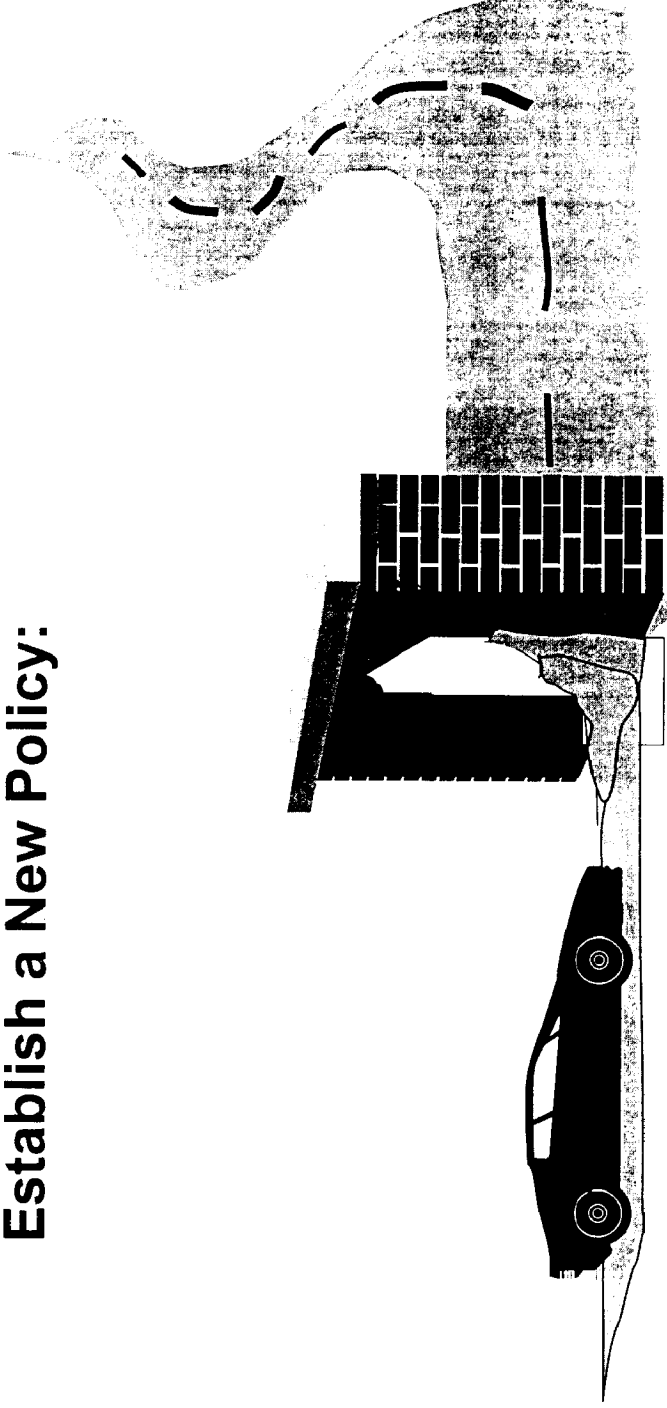


Regulation Constrains and Stops Investment



**Old regulations must not
migrate to the new market**

Establish a New Policy:



71

- Don't apply telephone regulations on broadband
- Permit investment in Internet backbone

Mr. TAUZIN. I thank the gentleman.

And next will be the senior vice president of One Sprint strategic development for Sprint Corporation, Mr. Al Kurtze. Al.

STATEMENT OF ARTHUR KURTZE

Mr. KURTZE. Thank you, Mr. Chairman. And I too will be mindful of your admonition not to—

Mr. TAUZIN. Microphone. Let us crank it up again. We have to download this stuff over here. You know, that is how it gets to—

Mr. KURTZE. I spent the last 4 years in the wireless world, so I keep clicking. I thank the chairman for the opportunity to speak here and I will be mindful of not dragging in our written statements. And I see that the Congresswoman has had to step out, but I would thank her for the kind words she said on our behalf at the opening.

Mr. Chairman, I have been in the communications industry for 33 years now. In fact, we started just down the street here in an old building at 1225 Eye Street with what was then C&P Telephone Company and I can tell you that the changes that the committee is wrestling with are significant and I know very complicated from what I have observed over that period of time. I would like to also apologize in advance if I get accused of a little bit of advocacy here. And I will talk a little bit about Sprint's experience in deploying new networks and it is one that we are very proud of and I would like to think it gives us at least a point of view on the challenges of deploying new technologies and new networks over the years.

Sprint is well-known for its deployment of the first fiber-optic, a long-distance network, now over 15 years ago. And learned a lot in the challenges of deploying that technology, new technology at the time, of stringing fiber-optics across the country and continues to benefit from that experience.

More recently, we have deployed the first all digital, nationwide PCS network over the last 4 years. Which was my specific assignment at the time. And I can tell you, the challenges there of building almost 15,000 cell sites in various communities throughout the country were significant and varied and really does open your eyes as to the demands of various communities, the specific circumstances when it comes to deploying those technologies, always dealing with local citizens who have their own points of view and trying to do what they think is best for their communities.

Right now, Sprint is on the verge of deploying its new integrated on-demand digital network. That network will ride on a substantial backbone of which Sprint has invested throughout the country in new ATM technologies. What it does, in fact, when it comes to reaching out to individual consumers, residential consumers, if you will, in the short-term depend on technologies that would be available from other suppliers of the last mile service. The contemplation of constructing new facilities to each individual home is one that we will eventually get to, but do now depend on existing carriers to provide those services.

Sprint is investigating and working with new types of technologies. We have recently acquired rights to companies that have spectrum previously designated as MMDS spectrum that was origi-

nally thought would be used for alternate forms of distribution of television, which we think hold great promise for delivering broadband data, but I would tell the committee that that is probably a year and a half away in terms of implementation, if not longer. Those are new technologies that are just underway.

We are also experimenting, as was commented earlier, with our PCS spectrum in new forms of data transmission. We have just introduced low-speed data, low-speed relative to Internet type speeds, 14.4 kilobit data, with any PCS phone, but we are pushing the edge of that envelope and looking at new technologies. But I would also say that the broad use of that technology is probably a year or 2 away in terms of faster data.

So I think the issue of the last mile is one that has to be dealt with at least on a transition basis. It would be inappropriate, I think, for the committee to assume that there are many choices available today for companies that want to go in service today and we must look at the transition for what might be and what we expect will be technologies at some point down the road, but are not available in the marketplace today.

I would say that Sprint has a long record of cooperating with many of the companies, in fact, that are represented here and we look to continuing to do so. But we hope it is an environment that allows that evolution from where we are today to where we would like to be. Thank you, Mr. Chairman.

[The prepared statement of Arthur Kurtze follows:]

PREPARED STATEMENT OF ARTHUR KURTZE, SENIOR VICE PRESIDENT, ONE SPRINT
STRATEGIC DEVELOPMENT, SPRINT CORPORATION

Thank you Mr. Chairman and members of the subcommittee, for the opportunity to present Sprint's views on the deployment of broadband and high-speed data services.

My name is Al Kurtze. I am Senior Vice President for One Sprint Strategic Development at Sprint Corporation, a position I have held for the past four months. Prior to that, I was the Chief Operating Officer of Sprint PCS for four years, where I had responsibility for construction and operation of the nation's first and only all digital nationwide PCS network. Prior to that, I was Senior Vice President and chief of staff for Sprint's local telephone division and was also an executive at Centel Corporation. During my thirty-three years in the telecommunications industry, I have been fortunate to be in the forefront of technological innovation, and I can assure you that the topic we are discussing today is as important as any topic to the future of telecommunications. Broadband access, and particularly broadband to the home, is the last roadblock inhibiting many Americans from enjoying the benefits of the telecommunications revolution. I applaud the subcommittee for taking a hard look at broadband technologies because proposals before Congress would have the unintended effect of fortifying and perpetuating that roadblock.

Sprint is uniquely suited to address broadband issues because we are a technological leader. We changed the paradigm for long distance service by building the first nationwide all-digital, fiber optic network in the United States, which allowed us to bring "pin drop" clarity and "dime a minute" long distance calls to America. We also spent billions of dollars to buy licenses from the government and build Sprint PCS, the only nationwide PCS wireless network. Concurrently, Sprint has shown its technical leadership by Synchronous Optical Network (SONET) and Dense Wave Division Multiplexing technologies in its backbone network.

Sprint has considerable experience in packet switching technology. In fact, both Sprint's core long distance network and its PCS network utilize packet technology extensively. In these networks voice and data traffic are both transmitted in packets and are often indistinguishable.

While we are proud of these achievements, our most exciting technological breakthrough is a new service Sprint announced about a year ago called Integrated On-Demand Network, or ION for short. ION is a family of broadband-based services for both business and residential markets. ION provides all distance, voice, video, and

data services, using a transmission facility over Sprint's network. Sprint ION service replaces multiple access networks from multiple suppliers and provides the opportunity to offer a package of multiple services over a single network.

For small business and residential customers, the basic ION package will include four virtual voice lines, each equipped with caller ID and voice mail, two high-speed data connections that can be used for Internet service, and virtually unlimited local and domestic long distance voice service. If a customer wants a different configuration, the change can be made quickly by the customer. All of this can be provided over one access connection through the Sprint ION broadband network. This will eliminate the need for multiple "plain old telephone" lines when customers needed to use the Internet at the same time they needed to make a voice call. With Sprint ION, everything is available at once over one connection.

Sprint ION is an elegant service in large part because it is capable of using multiple last mile access technologies. This fact has led Sprint to state that ION is "access technology agnostic." Sprint ION can use broadband capabilities provided by wireless solutions, dedicated special access circuits, normal telephone lines upgraded using xDSL technologies, and communications enabled, broadband cable plant.

While multiple methods of access may be used and Sprint is aggressively pursuing several of them, the reality is that there are only two technologies currently available and generally deployed to reach most American homes—the telephone line to the house and the cable line to the house. Thus, Sprint's ability to provide ION to businesses and residences depends in most cases on either the phone company or the cable company making its facilities available. And, that's a serious problem.

The Bell Companies and GTE have successfully stonewalled to date in making xDSL capable facilities available on reasonable terms. Now they are urging Congress to change the law to remove the current legal obligation to provide access to their needed facilities. The cable companies have adopted a similar stonewall approach, with AT&T trying to buy up cable companies or tie them up in exclusive arrangements and then denying access to competitors such as Sprint.

In an effort to get around this "last mile" roadblock, Sprint has begun a massive effort to collocate Digital Subscriber Line (xDSL) equipment in many Bell and GTE central offices. Unfortunately, Sprint and other companies have had well documented problems in obtaining access to broadband capable local loops. In nearly 20 per cent of the Bell and GTE offices where Sprint has requested collocation for the placement of broadband equipment, that critical collocation has been denied.

Further, many local loops are not broadband capable for use by Sprint and others. The phone companies have placed so-called "pair gain" or Digital Line Concentrator (DLC) remote equipment in neighborhoods rather than install copper wires directly from central offices to individual customers. These DLC devices, while cost effective for the ILECs, make it impossible to gain a broadband capable loop at the central offices for connection to the xDSL equipment Sprint is deploying. In order for xDSL to work, there must be copper wire from the xDSL equipment to the subscriber. The placement of DLCs breaks this discrete copper connection between the customer and the xDSL equipment that is installed in a central office.

Because the RBOCs and GTE continue to install new DLCs in their networks, Sprint believes that soon more than 50 per cent of the ILEC local loops will not be capable of supporting broadband services offered by competitive carriers through collocation in ILEC central offices. In order to provide competitive broadband services such as Sprint ION to customers behind ILEC DLCs, Sprint and other competitors will need access on a line-by-line basis to the bandwidth created by the ILEC-deployed xDSL facilities and packet switching, something the Bells and GTE have been unwilling to provide.

In another attempt to circumvent the roadblock, Sprint is in the process of purchasing rights to companies holding licenses or lease rights to frequency spectrum in the Multichannel Distribution Service (MMDS) band. It is Sprint's hope that by utilizing this spectrum with equipment that is still under development Sprint can provide broadband last mile facilities to at least a portion of the market. Unfortunately, this spectrum, originally intended for television signals, is in short supply and Sprint can cover only a small portion of the potential market through MMDS spectrum. Further, even in areas where Sprint has MMDS spectrum available, not all businesses and homes can be reached because MMDS requires line-of-sight between the transmission tower and a unit on the side of the customer's home. This means that hills, trees and buildings can block a signal from being received.

MMDS technology is also essentially untried for two-way data transmission and will require significant buildouts. These buildouts will involve many of the same siting and zoning issues encountered by the recent PCS construction activity. While Sprint is optimistic that a cell-based, fixed wireless broadband network can be constructed, and has backed up that optimism by spending hundreds of millions of dol-

lars to obtain rights to spectrum in parts of the country, it's probably at least 18 months before service can be offered on a meaningful basis. And, there are major parts of the country not covered by Sprint's acquisitions at all. For example, Sprint's acquisition of MMDS licenses does not cover many of this Subcommittee's Congressional districts. For example we do not have licenses for Louisiana, Massachusetts, Georgia, Mississippi, Virginia, Tennessee, or Los Angeles.

Some may argue that broadband wireless spectrum in both the geostationary and low earth orbit satellite (LEO) bands is available. However, geostationary satellites are at such a high orbit that signal delay caused by the distance signals must travel creates significant voice and real-time two-way video problems that make use of geostationary satellites inappropriate. While geostationary satellites may work for surfing the Web, they do not work well for services requiring real-time two-way communications. When voice services were offered over geostationary satellites about 15 years ago, the market rejected these voice services because of the degradation in quality caused by the signal delay. LEO applications conceptually hold some promise, but the economics of LEO service appear to make practical broadband consumer service impossible in markets with any significant density.

Sprint PCS operates a nationwide, state-of-the-art second-generation mobile services network. So-called third generation (3G) technologies that are likely to become available for use in PCS mobility networks are likely to increase network efficiency and enable Sprint PCS to provide new services and capabilities to the public. While 3G technologies are complex and involve many components, two features deserve attention. First, 3G aims at facilitating the evolution from incompatible second-generation systems towards systems that will offer users genuine global roaming and interoperability. Second, with 3G, carriers will be able to extend additional bandwidth to consumers to satisfy diverse mobile communications needs including access to email, the Internet, and potentially, in certain circumstances, even interactive multimedia such as video telephony. The mobile wireless industry has agreed to three general ranges of data rates: (1) improved data transmission (64-144 Kbps); (2) medium multimedia transmission (384 Kbps); and high multimedia transmission (1-2 Mbps).

These data speeds agreed to for 3G technologies appear to provide PCS a seat at the broadband table. It is important to emphasize, however, that 3G is still at the early stages of spectrum allocation and standards setting. In fact, carriers only began deploying second generation networks a few years ago. While 3G capabilities will be implemented sometime in the future, at what time and at what prices is unknown and will largely be governed by market needs and customer requirements. It is difficult to predict the data needs of mobility customers in the future because mobile networks carry very little data today. It is likely that mobile access to the Internet will complement more robust broadband offerings such as Sprint ION, as mobile voice telephony today complements wireline voice telephony. Due to expected capacity limitations of spectrum available to PCS carriers and the economics of deploying 3G networks, Sprint does not believe that broadband mobile services will substitute for the types of broadband access needed by Sprint ION and other high-speed data services.

There are also several broadband wireless carriers offering service to medium and large business customers. These companies operate generally in the 24-38 GHz range. These services do not envision and are not designed to provide service to individual subscribers. Moreover, these systems only appear economical when there is a reasonable density of demand.

Sprint believes that broadband wireless services available to the mass market, provided by multiple competitors, could be created through the availability of additional spectrum for this purpose and encourages that such spectrum in useful bands be made available.

In conclusion, Sprint has innovative and currently available advanced telecommunications, broadband products whose performance will thrill customers. However, Sprint, lacking last mile broadband facilities to most of the nation, is stymied in offering these products to many potential customers. The sad fact is that the Bells, GTE, and the cable companies, are not only denying access to their broadband facilities, they are slowing the availability of robust integrated broadband products such as Sprint ION in most regions of the country. Perhaps in five to 10 years there will be other alternatives to the phone company and the cable company lines to the house. Until that time, Congress should be demanding greater access, not deregulation of the monopolist's essential facilities.

Mr. TAUZIN. Thank you very much, Mr. Kurtze.

We have three more witnesses and we are being called to a 15-minute vote followed by a final passage vote which will occupy us,

I am sure, for the next half hour. If it is acceptable with you all what I would like to do maybe is take a little break. Let us take a 45-minute break. That will give you a chance to catch some lunch, perhaps. We will go and vote, take care of our business, and we will reassemble here at 12:30. So the committee stands in recess until 12:30.

[Brief recess.]

Mr. TAUZIN. The committee will please come back to order.

We will ask someone to catch the doors and ask our guests to be seated. And we will proceed to hear from the last panelists. And then offer members a chance to dialog with you.

Next will be Mr. Dave Scott, president and CEO of Birch Telecom, Incorporated, of Kansas City, Missouri. Mr. Scott, you are on, sir.

STATEMENT OF DAVID E. SCOTT

Mr. SCOTT. Thank you very much, Mr. Chairman. And I want to say it is a distinct privilege for us. This is something that we rarely get a chance to do, being a small company. We don't have the resources to typically do this and so we really want to thank you for the opportunity to make our point of view known on this very important topic.

Mr. TAUZIN. One day, Mr. Scott, we will be able to reach you in Missouri on the Internet and do this sort of interactive.

Mr. SCOTT. Just do this virtually.

Mr. TAUZIN. Virtually. Thank you, Mr. Scott.

Mr. SCOTT. I guess I want to say I like to think that Birch was the kind of company that you had in mind when the Telecom Act was passed in 1996. We are a startup. We acted immediately after the passage of the act to begin the foundation of Birch.

And Birch was established in early 1997 and immediately began providing service. And not the way it had typically been done by competitors to large businesses. Our mission wasn't to serve big business. Our mission was to serve, as fast as we could, consumers in small to mid-sized businesses. And we have done that. We have been working very hard since we founded that company over the last 2½ years to establish a real presence in the industry. And I think we have had some real success in that area.

I won't give you a long drawn-out discussion of what the company does, but I will focus on what this subcommittee is taking a look at and that would be advanced services, data services, and Internet. We really feel like that is something that Birch has to do to survive in this business. We have to be innovative. We have to do it at a very rapid rate. We have to do things better than they have been done before and bring those services to our constituents. And we have done a good job of that.

We have a product that we have just recently launched which is called the integrator. It combines both voice and data service on the same line and we deliver that to very small businesses, businesses who could not afford dedicated Internet access before.

We also have a line of services called the Internet complete line where we are taking both equipment and the line and the Internet services on the other end, packaging those together, and making them very easy and convenient for businesses who don't have in-

house experts to deal with programming a route or trying to maintain that. We actually make the equipment at the customer's premise a part of the network and manage that. And we are finding that is really tapping into a need out there. This technology is new. It is complicated. It is relatively confusing for the small businesses who don't have the in-house resources to become experts in it. And so we have found a tremendous of demand for that.

We have also deployed an ATM network, which is state-of-the-art switching facilities. We have ATM switches in Kansas City and in St. Louis and Wichita and are starting to deploy them in Texas. And that is the foundation for our ability to provide high-speed access to our customer base. And we are also using and trying to solve the last mile problem through a partnership that we have recently announced with another 2-year-old company, Northpoint, using DSL service to provide high-speed connections over the existing copper facilities.

I think there is one thing I would like to point out is that I do think it will be impossible in the future to distinguish voice and data. I know there has been some debate over whether the regulations should apply to just voice services and not to data. From our perspective, we think that is a practical impossibility, that voice and data are already being combined in the network and that manufacturers are working hard on equipment that will make voice and data services equate to the same thing.

Since we started providing service, it has been a struggle, quite frankly, to build a complicated business in a complicated industry and one of the things that has been of a great help for us is knowing what the framework or the structure for competition would be, as defined by the 1996 act. And so I think a lot of the benefits have been provided already, especially in the data services area where all the competitors are in a competitive frenzy right now to provide these services. And I think one of the reasons that we have been able to do that is because the competitive framework has been nailed down.

I think that is important in terms of raising capital for the business. It is important as companies such as Birch Telecom plan to do things. And, frankly, it has been, for us, more of a struggle on the voice side to get things down, to nail down some of the rules.

When you look at the level of competition in the industry, I think that one of the real bright points of the 1996 act truly was what has happened in the data services field where you have small companies, you have large companies, you even have the incumbent Bells were all racing against time, against each other to deploy new services throughout the marketplace. And so I think, as we take a look at ways that Congress can help do this, I think we need to focus on measures that will reinforce the competitive framework that is already in place.

Thank you very much.

[The prepared statement of David E. Scott follows:]

PREPARED STATEMENT OF DAVID E. SCOTT, BIRCH TELECOM, INC.

Mr. Chairman and members of the subcommittee, I am Dave Scott, president and chief executive officer of Birch Telecom, Inc. Birch is a small but growing competitive local exchange carrier headquartered in Kansas City, Missouri. I am testifying today on behalf of Birch and the Competitive Telecommunications Association.

Thank you for inviting me to testify before the subcommittee today on issues regarding the deployment of data services. The prompt and widespread availability of internet and other data services is of vital importance to Americans throughout the Nation.

There is no longer debate on whether such services have revolutionized the way we conduct our personal and business affairs. The debate now centers instead on what policies will best promote the prompt availability of data services to all our citizens, including those in rural as well as urban areas.

The good news is that data services already are being rapidly deployed. Dial up internet access via a local phone call currently is available to more than 95 percent of the population and carriers and internet service providers around the country are focussed on how to serve that remaining 5 percent.

Higher speed access to the internet and other higher speed data services also are being deployed at a rapidly accelerating pace. Competitive local exchange carriers, such as birch, are using unbundled network elements in conjunction with their own equipment and facilities to provide digital subscriber line ("DSL"), asynchronous transfer mode ("ATM"), frame relay and other high speed data facilities and services to residential and business customers. The growth in high speed data services provided by cable television companies and satellite carriers also has been rapid. The stimulus of all this competition spurred by the telecommunications act of 1996 has also had a positive effect on the bell companies. The Bell companies, in response to these competitive stimuli, are aggressively rolling out DSL services that use their investment in ubiquitous copper line facilities.

This rapid expansion is, however, potentially threatened by proposed legislation that may inadvertently disrupt the competition-fueled progress made to date. Such legislation would (1) exempt the Bell companies from their current obligations under the Telecommunications Act of 1996 to make their data facilities and services available to CLEC's and (2) allow the Bell companies to provide long distance data services before they open their local exchange markets to competition.

Although the goal of these bills is the laudatory one of spurring the deployment of data services by the bell companies, particularly to rural areas, I am convinced that the bills, if enacted, would not serve their intended purpose. To begin with, the Bell companies, by design, do not serve many of the Nation's rural areas. Further, as noted above, the Bell companies in response to the kinds of competitive pressures contemplated by the 1996 act already are aggressively deploying data services.

Finally, I am greatly concerned that the practical effect of such legislation, if enacted, would be to position the Bell companies to re-establish themselves as monopoly carriers in both the local and long distance markets for both voice and data services. The public interest would be ill-served by such a result. I believe the better policy is to encourage competition among data service providers within the framework established by the 1996 act. Such a policy will far better serve the interests of the American public.

Before I turn to my specific reasons for urging you to adhere to the policies established by the 1996 act, it may be helpful if I provide you some information about Birch.

About Birch

Birch initiated local service in march 1997 and now serves approximately 50,000 access lines. We employ 650 people, including 220 at our headquarters in Kansas City, and 225 employees in Emporia, Kansas where our customer service and call center is located.

We serve customers primarily in Missouri, Kansas and Texas. In Missouri, we operate in Kansas City, St. Louis and St. Joseph, and have customers located throughout the state, including Carthage, Chillicothe and Springfield. In Kansas, we have customers in every county and have substantial operations in Wichita, Topeka, Manhattan, Lawrence, Emporia, Salina and Dodge City. In Texas, we recently began operations in Fort Worth, Beaumont, Waco, Tyler and Houston.

We offer a menu that includes local and long distance services, high-speed internet access services and customer premises equipment to residential and small and mid-sized business customers. Forty percent of our customers are residential customers.

In addition to our voice-oriented circuit switches in Kansas City, St. Louis and Wichita that route local and long distance calls, we are deploying an ATM packet switching network. Packet switches initially are being installed in Kansas City, St. Louis, Wichita and Fort Worth. These data-oriented packet switches will be linked by high-speed ATM transport facilities. For reasons I'll explain shortly, I want to emphasize that we plan to use this packet switching network to carry voice as well as data traffic.

We provide our services through our own switching equipment and, pursuant to provisions of the 1996 act, through use of leased network facilities and resold services obtained primarily from Southwestern Bell.

Southwestern Bell is also our principal competitor. Although it has been a struggle, and although we still are a small company, we have grown into one of the larger CLEC's in the territory served by Southwestern Bell.

That's who we are today. Tomorrow, if we continue to work harder and smarter than our competitors, and if the rules of the game remain fair, we expect to emerge as a major regional provider of data and other telecommunications services to small and mid-sized businesses and residential customers.

The Rules of the Game

The rules of the game were set by the 1996 act, a law which several of you on today's subcommittee were instrumental in fashioning. Overall, I believe the act established a reasonable balance between the interests of incumbent local exchange carriers and competitors, such as Birch, who want to enter local markets. Most importantly, the act recognized that because incumbent carriers have strong economic incentives to maintain their de facto control of essential bottleneck facilities, both a stick and a carrot will be required to open the local exchange market.

The stick and the Carrot

The stick is the mandate of sections 251 and 252 of the act requiring incumbents to open their markets to new entrants by making available interconnection, access to unbundled network elements and resale on just, reasonable and nondiscriminatory terms. Access to such facilities and services is absolutely essential to CLEC's such as Birch. Incumbents must be held to strict accountability under the act, and the fcc must be willing to assess fines and award damages when incumbents fail to comply with their obligations to competitors.

Equally important, incumbent carriers that do not comply with the act must not get to eat the carrot. The carrot is the offer in section 271 to allow the incumbent local carriers into their in-region long distance markets once they have opened their monopoly local markets to competition. To date, based on their behavior, the Bell companies have not been strongly drawn to the carrot of long distance voice service. Perhaps that is because prices and profit margins for long distance voice traffic have been plummeting since the passage of the act.

It's a different matter for long distance data traffic. That's a carrot over which the incumbent carriers have started to drool, and they are searching for ways to enter that market without having to comply with the obligations or seek the incentives of the 1996 act. For several reasons, I urge you not to let that happen.

Voice Traffic Can and Will Flow Over Data Networks

If the bell companies are allowed to establish data networks on an interlata basis, it won't be just data traffic flowing over those networks. There will be voice traffic as well. I am aware that the proposed legislation contains a ban on any bell company using the internet or other packet switching networks to carry voice-only traffic until it has satisfied section 271 requirements. As a practical matter, that ban is ineffective.

Even if the ban could be enforced, which it cannot, it applies solely to "two-way voice-only" traffic. This leaves a gaping loophole that would allow incumbent carriers to carry voice traffic on trunks as long as some nominal percent of the total traffic on the trunk were non-voice or one-way voice.

As I mentioned earlier, Birch is in the process of deploying packet switching networks. We know how such networks operate. When fully deployed, packet switching networks are equally capable of supporting both high bandwidth applications and traditional voice calls. Because packets from the same communication will travel over a number of different paths simultaneously, it is impossible to limit users to data traffic or to police effectively the transmission of voice calls over such networks. "Leakage" of voice traffic would be uncontrollable, even in the unlikely event the Bell companies were motivated to police their customers' traffic.

Allowing the Bell companies to provide interlata data services now would blow apart the central premise of the 1996 act: that the Bell companies be allowed into long distance service only after opening their monopoly local markets.

Birch's experience with Southwestern Bell

Even with the obligations and incentives the 1996 act imposes on and offers to the Bell companies to open their local exchange markets to competition, Birch's experience in dealing with Southwestern Bell has been, and still is, an exasperating

one. I have attached to this testimony as exhibit 1¹ and exhibit 2,² testimony that Birch has presented in state proceedings that discusses some of the Bell tactics Birch has encountered. To summarize just a few of the areas (details are provided in the exhibits):

Collocation: Southwestern Bell has imposed unreasonable conditions in terms of price (recurring and non-recurring), construction requirements, application and specification requirements, delivery dates, and premises access, the cumulative effect of which is to deter potential local competitors, such as Birch, from entering the local market. These conditions strike Birch particularly hard, as we serve the market broadly. If we wanted to limit our customers to big businesses in downtown areas, the number of collocation arrangements would be few. But Birch believes that small businesses and residential customers deserve the benefits of competition too, and in large cities they are served by dozens of different Southwestern Bell central offices, multiplying the effect of these policies.

Collocation Revisited: On top of imposing unreasonable collocation practices, Southwestern Bell then makes it very difficult to compete without accepting unreasonable terms and conditions. For example, Southwestern Bell does not make available without unreasonable charges in Missouri or Kansas a combination of the unbundled loop with a multiplexer and transport to create a single unbundled network element, known as an "extended loop" or "enhanced extended loop" ("EEL"). The EEL makes it possible for CLECs to collocate at one central office which then provides access to several others. Once again, these policies constrain the geographic area that Birch can afford to cover.

Arbitration delays: Southwestern Bell has refused to execute an interconnection agreement reached as a result of an arbitration order. Southwestern Bell is trying to force a renegotiation of the agreement despite efforts at compromise.³

"UNE-P": "UNE-P" allows a competitor to purchase a complete package of network elements combined to provide service to the competitor's customer. Even though Southwestern Bell has signed agreements in Texas and Missouri allowing UNE-P, Birch cannot get Southwestern Bell to provide the service in Kansas without unreasonable charges.

Resale: Southwestern Bell refuses to allow Birch to resell customer specific arrangements or contract arrangements at the standard resale discount. In fact, Southwestern Bell even refuses to allow Birch to assume the liability on those contracts and resell them to Birch's customers with no reduction in the amounts payable to Southwestern Bell. Rather, Southwestern Bell takes the position that any attempt to convert the service covered by the contract requires the customer to pay large termination fees to Southwestern Bell.

Operational Support Systems: These systems simply are inadequate and fail to provide competitors such as Birch the ability to provide their customers the same level of service as Southwestern Bell representatives are able to provide Southwestern Bell customer's using Southwestern Bell's internal systems, as required by the statute. Details are provided in exhibit 2.

Directory Listing: Since 1997 Birch has from time to time found customers that had listings in the Southwestern Bell Telephone Directory omitted after they converted to Birch. In late 1998, Southwestern Bell admitted that a problem had been found and reported that it had been fixed. Just this past Monday, June 21, 1999, another omission was found. How long must we work before this problem is fixed? What incentive does Southwestern Bell have to fix this?

Locking in customers: Southwestern Bell's Customer Choice Protection ("CCP") is a service offered to Southwestern Bell end users that allows a customer to prohibit a change in the customer's interLATA and/or local service provider without the customer's consent. Birch believes such anti-slamming procedures have become necessary. But Southwestern Bell put its system in place with inadequate mechanisms for a customer to remove the CCP so the customer could

¹Direct Testimony of David E. Scott on Behalf of Birch Telecom Of Missouri, Inc., *In the Matter of the Application of Southwestern Bell Telephone Company to Provide Notice of Intent to File an Application for Authorization to Provide In-Region InterLATA Services Originating in Missouri Pursuant to Section 271 of the Federal Telecommunications Act of 1996*, Case No. T0-99-227.

²Direct Testimony of Richard L. Tidwell on Behalf of Birch Telecom Of Missouri, Inc., *In the Matter of the Application of Southwestern Bell Telephone Company to Provide Notice of Intent to File an Application for Authorization to Provide In-Region InterLATA Services Originating in Missouri Pursuant to Section 271 of the Federal Telecommunications Act of 1996*, Case No. T0-99-227.

³Request of Dunn & Associates, Inc. d/b/a Boulevard Phone Company to Reopen Arbitration, Docket No. 97-BCSC-546 ARB (Kansas Corporation Commission). Dunn & Associates is a subsidiary of Birch.

change his or her service to a Southwestern Bell competitor. Only after several months of prodding by Birch and the intervention of the FCC did Southwestern Bell put these procedures in place. As yet, they are not fully functioning. As a result, it is a struggle for many customers to attempt to convert to Birch.

Early Disconnection of Service: In several cases Southwestern Bell has disconnected the customer's Southwestern Bell service before the specified time for conversion of the customer service to Birch and left the customer without any telephone service. This has happened to business customers. The end result is that some customers are now afraid to move their service.

Coordination on installation of new UNE loops: The systems and procedures Southwestern Bell has in place to provide unbundled loops make the service much more complicated and provide for many potential problems upon conversion. Problems such as poor loop quality, missing cross-connections, and lack of coordination at cutover are all common problems encountered.

Billing Issues: Southwestern Bell ignores due dates and deadlines. Over the last year Southwestern Bell has repeatedly failed to deliver billing information which Birch must have in order to bill our customers. In the last 10 days, Southwestern Bell has again failed to provide a group of monthly billing records and information. Southwestern Bell's failure to provide the billing records in the proper manner has forced Birch to suspend its own billing, bringing Birch's cash flow to a halt. Yet, Southwestern Bell demands prompt payments.

Birch as an agent of the customer: Upon receiving written agreement from the customer, in the form of a "Letter of Agency" in the form required by Southwestern Bell, Birch may act as the customer's agent, and should be treated in exactly the same manner as the end user by Southwestern Bell. This is generally not the case. For example, Southwestern Bell provides information to a retail end user directly within an hour of the request. When Birch requests the same information the response normally takes several days. It has recently become Southwestern Bell's practice to "white out" any retail pricing information before the information is sent to Birch.

There are many other examples. But I will end this discussion by mentioning one of Southwestern Bell's most effective tactics. Southwestern Bell continues to under-resource its CLEC account teams. For example, for many years the interexchange carrier account teams have been assigned a technical representative to deal with the many operational issues. We know the account teams have requested this technical support and yet Southwestern Bell management has not allocated the required resources. This results in service disruptions and delays in providing services for companies like Birch, who are competitors of Southwestern Bell.

Southwestern Bell's tactics are a replay of the types of resistance MCI and other competitive carriers encountered in opening up the long distance market to competition. I first entered the telecommunications business in the pre-divestiture days of the early 1980's. Back then, MCI and others referred to AT&T as the 800 pound gorilla.

With Southwestern Bell, Birch feels like it's dealing with a 1500 pound mule. Even with the stick of sections 251 and 252, and the carrot of 271, we're having a hard time getting it to move.

The 1500 Pound Mule

Southwestern Bell's behavior reminds me of a quote attributed to Lyndon Johnson when he was President. One afternoon, after the protests against the Vietnam war had begun to intensify, the President, who had grown up in the hill country of Texas, assembled his beleaguered staff. "Boys," he said, "we've got to hunker down like a jackass in a rainstorm."

I feel like that same guidance must have been offered at Southwestern Bell headquarters following the passage of the 1996 act. Certainly that's how we perceive southwestern bell's behavior. They're hunkered down, they're big and they are tough to budge.

I'm from Missouri and I know something about mules. Mules are not only stubborn, they are intelligent. A horse will work or run itself to death. A mule won't. It generally knows what's in its self interest.

The same is true with Southwestern Bell. It knows that the longer it hunkers down, the longer it will be able to keep competitors from getting into its local exchange market. Every day Southwestern Bell can stop or hinder its competitors is another day it can retain the level of its monopoly revenues.

Getting Southwestern Bell to move requires the stick (a two-by-four if necessary) of sections 251 and 252 of the act, and the carrot of section 271. Given the powerful economic incentives Southwestern Bell has to maintain its bottleneck position, both methods are essential.

The Bell Companies, as well as CLECs and other providers, will deploy broadband services rapidly

If there is one area where the Bell companies' behavior is not mulish, it's in the deployment of advanced broadband services. Now I know they say they need a special set of rules " or exemption from existing rules " before making an investment in broadband facilities.

Actually, the Bell companies are already making the investment, and at a fast pace. They and other ilecs have to deploy broadband services quickly or they will be beaten to the marketplace by CLEC's, cable companies and other service providers. Southwestern Bell today is aggressively marketing its DSL product and pricing the service at such low levels that CLEC's using unbundled network elements cannot match, much less beat, the Southwestern Bell price. Other Bell companies around the country are doing the same.

Indeed, it is this competitive pressure from the cable industry and the CLECs that has forced the bell companies in some states to finally begin making genuine efforts to satisfy section 271 conditions so they can enter the in-region interlata market. They will move in that direction because, and only because, they want to get into the interlata data market and know they will not get that carrot unless they open their monopoly local exchange markets to competition.

The Right Incentives

If you had an opportunity to review the biography I submitted, you may have noticed my interest in deregulation. This interest stems from my graduate school days at the University of Chicago where I studied under Professor George J. Stigler.

Professor Stigler was the 1982 winner of the Nobel Prize in economics for his work on the economics of regulation. His work helped establish the principle that regulation often fails to achieve the public policy goals that give rise to the regulation in the first place. Instead, competition is almost always more effective in achieving those same goals.

But competition can only work when there are no bottlenecks in the marketplace. My fear is that if the Bell companies are allowed into the long distance data market before they open their local markets, they will be positioned to re-establish themselves as monopoly carriers in both the local and long distance markets. The result would be that we would have turned back the clock to the pre-at&t divestiture days.

The Congress set economic incentives in place in the 1996 act that will soon lead to a truly competitive telecommunications marketplace. Deregulation will follow in due course. I urge you not to tamper with those incentives by prematurely allowing the Bell companies into the interlata data market or by exempting them from their obligation to provide critical bottleneck facilities and services to CLEC's.

That concludes my remarks. Thank you for inviting me to participate in this hearing.

Mr. TAUZIN. Thank you very much, Mr. Scott.

Next will be Mr. Stephen Gray, president and COO of McLeodUSA Incorporated of Cedar Rapids, Iowa. Mr. Gray.

STATEMENT OF STEPHEN C. GRAY

Mr. GRAY. Good afternoon, Mr. Chairman. And thank you. If I may beg your indulgence just to begin with, since Tom left Iowa—our headquarters is in Cedar Rapids—we built a couple of airports, we bought four planes, and I think we built about 3,000 miles of fiber. So we are doing okay there these days.

A little bit about who McLeodUSA is. Mr. Chairman, we have been in business a little over 5 years, which, quite frankly, was 2 years prior to the act itself. Today we serve about 260,000 customers, of which two-thirds of those are residential customers and about one-third small business customers. And, unlike Buddy, our small business customers are about five lines. We also operate in 20 States, all 14 of the US West markets as well as 4 of the 5 Ameritech, current Ameritech, markets, serving 500 cities with an average population of less than 60,000.

But with all that said, I think what we think is more important is what is going to happen in the future. And our perspective kind

of is this. Currently, there are 150 million access lines in the United States. By our projections, that should grow at about 6 percent per year or be a little over 250 million access lines within 10 years, or customer connections. In addition to that, we believe that there is over 5 million miles of fiber, copper, coax currently deployed in the United States. With over 5 million distinct network elements managing that network.

Well, if that weren't complicated enough, we have to make sure that that network works. When something is wrong, we need to know what is wrong with it. And then we need to know how to fix it. Well, if that weren't enough, then you have got the customer who is involved. And the customer, in our opinion, over the next 10 years, will have to change out every element of their telephone and data equipment, which will be rendered obsolete.

Well, at the end of the day, I happen to agree with Dave, we believe it will be a kilobit business where there will be a pipe to each home and each business where these artificial distinctions of voice, data, wireless, wireline, local, long-distance will all go away. It will be much like the electricity business where, when Thomas Edison invented electricity, he didn't know about the microwave oven and he didn't know about the television. It was to power a light bulb. So there are going to be kilobits coming into and out of the homes much like kilowatts.

The keys to our success, quite frankly, will be technology, the efficiency and the economics associated with that technology. Two, our ability to find and keep great people. Our company has created 5 jobs per day for the last 1,000 calendar days. And if you look at the unemployment in most of our States, one of the biggest challenges we will have is providing a great environment for those people. And last but not least, access to capital markets.

So the so-what of all of that, if I could beg anything of you, Mr. Chairman, and this group is please understand that this is going to take a little bit of time. To rebuild, overbuild, or overlay this network, it takes a crew an hour to build 1 mile of network. The access right-of-way permitting issues, whether you are going through fields, sidewalks, up on towers, or through the airways and the ability to find crews, equipment, and real estate are all challenges that companies like ours face on a day-to-day business.

Second, the access to the capital markets. If you fundamentally think about this 5 million mile network that is going to need to be replaced in today's dollars, that is in excess of \$500 billion to rebuild or overbuild. I have to have access to the capital markets in order to survive. And in order to have access to the capital markets, from a public policy perspective, we need stability. We absolutely need stability at the Federal, State, and local level. The Supreme Court began giving us some of that stability and guidance just 6 months ago. So we like to talk about how the act is 3½ years old, but, for all practical purposes, there wasn't much just clarity until a few months ago. And we need to give it some time to provide that guidance to the States and the local governments as well.

So thank you very much for your time.

[The prepared statement of Stephen C. Gray follows:]

PREPARED STATEMENT OF STEPHEN C. GRAY, PRESIDENT AND CHIEF OPERATING
OFFICER, McLEODUSA INCORPORATED

On behalf of McLeodUSA, I would like to thank the Subcommittee for the opportunity to talk with you today. I would like to accomplish three goals today: first, provide a high level overview of McLeodUSA; second, summarize our concerns with providing broadband data "relief" to the RBOCs; and third, emphasize Wall Street's predictable reaction to providing data "relief" to the RBOCs.

I. McLeodUSA Overview

Clark McLeod and I formed McLeodUSA, headquartered in Cedar Rapids, Iowa, in 1992. This is not our first foray into telecommunications. In the early 1980s, Clark formed Teleconnect and built it into the fourth largest long distance company in the United States. In 1990, MCI purchased the company, then named TelecomUSA. McLeodUSA is a member of the major trade associations representing the competitive telecommunications industry, the Competitive Telecommunications Association (CompTel), and the Association for Local Telecommunications Services (ALTS).

In 1992, desiring to bring competition to the local telephone industry, we what today is called McLeodUSA Incorporated. Our primary focus as a company has been to serve small business and residential customers in the Tier 2, 3, and 4 markets in our target states. As a result (as of March 31, 1999), we provided competitive local exchange services to about 91,000 residential customers, and about 53,000 business customers, in the 11 Midwest and Rocky Mountain states. (We have targeted an additional 9 states for expansion in the near future). Our average business customer subscribes to 5.6 lines.

McLeodUSA's corporate team, with over 250 years of experience, is recognized as one of the strongest management groups in the telecom industry. Strong because of our breadth, and strong because of our depth.

McLeodUSA has already become the leading facilities-based Integrated Communications Provider (ICP) in our market area, providing local, long distance and Internet services. And due to a series of recent and dynamic events, our market opportunity has more than doubled to \$80 billion in 2009.

McLeodUSA derives its revenues primarily from the sale of telecommunications services and the publication of telephone directories. McLeodUSA has developed one of the largest competitive white and yellow page directory companies in the United States. In fact, McLeodUSA Publishing will print and distribute nearly 21 million directories in 22 states over the next 12 months.

The opportunity for our employees is incredible: one third of our stock ownership resides with employees. This is an important linkage for our investors, and gives our employees a major stake in our success.

McLeodUSA's three-part phased execution is success based. First, building local line market share by resale and by leasing Bell facilities...concurrently expanding our brand presence.

Second, building the platform, with inter-city fiber connecting regional gateways.

And third, our current phase, migrating customer traffic on-switch/on-net, which involves constructing intra-city fiber which connects our customers with our regional gateways.

This execution allows us 100% access to build customer share, while capital is efficiently and effectively deployed.

In our first phase of building customer share, we have leased RBOC central offices, which allows us to sell to 100% of the customers in our 400 cities. In addition to pervasive coverage, this service is relatively easy for the Bells to provision and is generally a transparent switch over. Once the switch has occurred, we control many of the features for the customers through on-line provisioning terminals.

Our recent data strategy announcement will add new revenue opportunity from our collocations and XDSL technology.

Concurrent with building customer share, we have executed the 2nd phase of our strategy and deployed the most advanced platform in our region. Nearly 7,800 miles, both intra-city and inter-city, high-density fiber, SONET ring topology, with incredible capacity, is capable of supporting all our voice, data and video applications.

For the last 5 years, McLeodUSA has been focused primarily on the voice market; however, the data opportunity is explosive. Data revenues will surpass voice revenues in 2009. And the bandwidth required to capture data will require companies to own or control high capacity networks. McLeodUSA is positioned for these opportunities in several key areas.

First, the market position. Our customers conveniently have only one number to call for customer service, and one bill provides the best value proposition—one company, simple and complete.

Second, our customer service is World Class. Our goal is to have a real person answering calls within 20 seconds, 24 hours a day, 7 days a week, with one call resolutions. Great people providing great service. McLeodUSA has proof. Since 1994, we have averaged 0.5% business customer churn, the lowest in the industry.

Finally, from a platform position, we can pick the best solution for the customer and the company. Our collocations connect to local access rings, which connect to 500 mile backbone rings, which then attach to high capacity regional gateways. This design is a low cost way to serve 1st, 2nd and 3rd tier markets with one regional center, robust capacity, and functionality. It also allows us to use both our network and the Bell network to optimize the economics.

Our results through 1998 have been incredible.

Directories: 1998: 14 million. 1999 industry estimates: 21 million

Local Lines: 1998: 400,000. 1999 industry estimates: 650,000

Network: 1998: over 7,000 miles. 1999 industry estimates: 9,000 miles

Revenue: 1998: \$600 million. 1999 industry estimates: \$900 million

II. Concerns about providing data “relief” to the RBOCs

Based on the progress that McLeodUSA has made in bringing competition to its markets, it is tempting to conclude that all must be going well in the world of emerging telecommunications competition. This optimistic conclusion, however, ignores the reality faced by McLeodUSA every day: that the incumbent RBOCs upon whom we depend for inputs are doing everything in their power to limit our ability to serve our customers. Those companies, at every turn, make use of each opportunity to introduce delay, uncertainty, and unnecessary expense into our business relationship.

This situation reveals an important fact about the relationship between emerging competitors like McLeodUSA and established incumbent RBOCs: the grossly unequal commercial power between those entities. Typically, when two companies negotiate a commercial agreement, both parties have something to gain and something to lose; and that situation leads both parties to seek a result where there is mutual benefit. In such a case, because either party can seek a better bargain elsewhere, both parties seek a compromise solution that maximizes their mutual gains. In contrast, our relationships with RBOCs show clearly that those companies believe they have nothing to gain by dealing with McLeodUSA. As a result, we typically find that compromise is not possible, and we are told that, if we disagree with an RBOC position, we will need to seek regulatory relief.

An example of this type of conduct is instructive. We have had a dispute with an RBOC about the charges that we pay when we order unbundled loops; not the recurring “monthly” charge (which we also believe is generally too high), but simply the one-time charge to have the loop supplied at all. We are sometimes charged thousands of dollars when the RBOC supplies these loops for ISDN service, even though there is *no charge at all* when the same ISDN service is provided to the same location by the RBOC for its own end-user customer. We know that this is the case because, when these charges have made it financially impossible for use to serve the customer ourselves, that customer has ordered the same service from the RBOC and not been charged for such “special construction.”

Under the forward-looking TELRIC pricing standards used to determine rates for unbundled loops, we believe that loop costs should already include the ability to “unbundle” loops like ISDN loops. Even if this were not the case, however, there is certainly no reason for competitive carriers to be charged by the RBOC when the RBOC would *not* charge its own end-users. We believe this situation is a clear example of discrimination against companies like McLeodUSA. At least one state commission—the Michigan Public Service Commission—has agreed, and has refused to allow such “special construction” charges for unbundled loops.

Of course, the RBOC has appealed that decision to court; and when we have attempted to use the reasoning of this Michigan decision in the RBOC’s other states to convince them to change their position on this issue, the response we received was a flat “no,” with the notation that we were free to litigate before the other state commissions if we so desired.

This result plays into the RBOC’s long-term strategy in two ways. First, by requiring new competitors to expend their resources litigating issues multiple times before regulatory agencies and in subsequent court appeals, they are effectively diverting the competitor’s resources away from the goal of providing competitive services to customers. Second, by simultaneously attempting to convince state legislatures and the Congress that regulatory oversight must be reduced, they are trying

to close the only channel available to us to obtain fair treatment. And that brings us squarely to the subject before the Subcommittee today.

It is clear to me in my job as President of McLeodUSA that the RBOCs with which we deal are not committed to allowing competitive markets to develop in their historical monopoly territories. Instead, it appears that these RBOCs are committed to finding a way to enter markets which are "off limits" under the Telecom Act while preserving their local exchange monopolies essentially intact. Deregulation of data services is an integral part of that strategy.

News reports, industry analysts, and assorted pundits have all noted the "convergence" of voice and data technology in recent years. My company firmly believes in such convergence. Given this phenomenon, it is not at all clear why policy-makers should spend the effort required in an attempt to develop separate *legal* frameworks for voice and data. The Telecommunications Act itself defines "telecommunications" to include any "information of the user's choosing." This definition on its face includes voice, data, video, and all other sources of "information." If the data services were not to be included within the procompetitive framework of the Act, it would have been a simple matter to specify that telecommunications included only "voice" services; yet the Congress did not do that when the Act was passed in 1996. Existing law makes no artificial distinction between voice and data services; both are considered to be "telecommunications." This is a wise course, and it should be maintained.

In fact, attempting to develop separate frameworks is bound to result in an artificial situation which is more complicated, less efficient, and ultimately does not serve the needs of our customers. In the long run, there will be no reasonable distinction that can be made between voice and data as it is carried over telecommunications networks. Even now, much of the voice traffic carried on existing telecommunications networks is carried in digital form. Since digital information is nothing more than a string of binary digits (carried either electronically or in optical form), there is no way to distinguish digital voice signals from other digital signals once the conversion to a digital signal is made. Thus, a legal distinction based on differences between "voice" and "data" is bound to fail.

The only way this traffic can be practically separated is before digital conversion. Yet, we will increasingly see digital conversions taking place at the home, or within the telephone network prior to switching. As a result, by the time the digital signal is ready to be switched, it will already be in digital form, ready to be placed onto a packet-switched network. There will be no distinction to be made between voice and data in such a world.

The structure of the Telecommunications Act is not based upon specific technologies or traffic patterns. Rather, that structure is based upon an immutable fact: for the foreseeable future, in most circumstances, new competitors will have no alternative but to use the existing loop distribution plant (the "copper wires") of the incumbent RBOCs. The Telecommunications Act makes those copper wires available for lease by competitors not because they are necessary to provide voice service, but because they are necessary to provide *any* service to the household served by them. Those wires constitute a bottleneck which the RBOCs will use to stifle the drive toward competitive local markets unless prevented by regulators and legislators from doing so. A drive to "deregulate" those bottleneck facilities simply because they are used for data transmission is exactly the wrong response if we want competitive markets to fully develop.

RBOC control of that bottleneck will be just as damaging to the development of competition for data services as it has been for voice service, if control of the bottleneck facility is not held in check by regulatory oversight. Even if one attempts to distinguish between voice and data service, it is clear that those wires are just as necessary for data as they are for voice. Increasingly, consumers will use those copper wires to transmit both voice and data, with little distinction between the two. Constructing differing regulatory regimes for each will only confuse customers and hinder our pursuit of the ultimate goal of competition in all telecommunications markets.

III. Wall Street's reaction to RBOC data "relief" proposal

Finally, if high speed data services and facilities are deregulated, confusion about ultimate goals will *not* be limited to customers. Our company is acutely aware of the need to maintain investor confidence in the national goal of bringing competition to the telecommunications marketplace. That confidence has been bolstered by the clear commitment to the 1996 Telecommunications Act, and the efforts of the FCC, to reach that national goal. Legislation which would carve out data services from the procompetitive goals of the Act could only be seen in financial markets as a retreat from that national commitment. As a result, the ability of new entrants to

raise the capital needed to bring true, facilities-based competition to all telecommunications markets could be placed in jeopardy. Thus, the drive toward competition could be slowed even though that is not what was intended by supporters of such "data deregulation."

IV. Conclusion

The Telecommunications Act is working to bring competition to telecommunications consumers in all areas of the country. While that competition is not progressing as rapidly as many would hope, the delays have resulted not from inadequate legislation, but from a failure of the incumbent RBOCs to fulfill their duties under that legislation. Attempting to impose an artificial distinction between data and voice services will only serve to delay the deployment of advanced services and the development of competition in general. This result will disadvantage consumers, and delay the goal of providing faster, better, less expensive telecommunications services to all Americans.

Again, I thank the Subcommittee for the opportunity to appear before you today, and would welcome any questions that any of the Members might have.

Mr. TAUZIN. Thank you very much.

Finally, Ms. Mary Beth Vitale who is the president and COO of RMI.NET in Denver, Colorado. Ms. Vitale.

STATEMENT OF MARY BETH VITALE

Ms. VITALE. Thank you, Chairman. And thank you, members of the committee, for allowing me to share information about RMI.NET.

Mr. TAUZIN. I want you to know I resisted the urge to introduce you as the femme fatale.

Ms. VITALE. Well, I am glad you saved me for last. I would like to just first start with a little bit about who RMI.NET is and what types of products and services we offer. Congressman Boucher talked the 5,000 ISPs out there. Well, we are one of the 5,000 ISPs that exist. We started back in 1994 as really a dial-up type of Internet access provider. And once the act was signed in 1996, the expansion really started to grow. Besides offering dial-up the dedicated access services to consumers and small and medium-sized businesses, we offer web hosting, E-commerce capability, long-distance, high-speed data access for our customers along with voice-over telephony, just to mention a few of the products.

We also have purchased a backbone network. We purchased a company in December called Data Exchange. And with that we have a nationwide backbone network that, with that particular company, has allowed us to resell products and services across the United States and make us a national provider for all of the products to consumers and to small and medium-sized businesses.

A couple of our plans. Our plans for growth. One is organic growth, which we do from our sales, our marketing, our packaging of products and services together and bundling them to the consumers that we have in our area and nationwide. But, most importantly, we are also doing it through acquisition. And we have purchased, just even last week, we purchased 3 new companies and we have purchased about 15 so far in the past year and hope to purchase 20 in the year of 1999.

Those acquisitions have been companies that are located in small, rural areas, many of them. And, for example, we have services in Huntsville, Utah, to Steamboat Springs, Colorado, and, most recently, in Bloomington, Illinois. We bought a little company called Dave's World. And, yes, the owner's first name was Dave.

And Dave's World serviced very small, rural communities. In fact, this is rural America. Farmers and, in fact, I think, just not long ago they got their first Pizza Hut in Dave's World.

But I think the most important thing about that is that we have lots of choices and options in order to service them with high-speed data access. Right now some of the witnesses have mentioned companies like COVAD or Northpoint. We will be able to, in just next year, be able to offer DSL service in Bloomington and throughout that network, which is really what I think this is all about, to be able to have ubiquitous access for everybody to high-speed data.

We have people like COVAD and Northpoint banging down our doors in order to purchase the DSL services from them and then to offer them to our consumers. So we have been fortunate. And just most recently, the RBOCs and GTE have now stepped up to the plate to be able to offer those services for us to resell. And so they have been able to do this in the environment that we currently have and we have them as a choice of our services to resell.

I wanted to at least, last, to explain the reason why the growth has happened and has occurred for us is that we have had open access to unbundled local loops. We have been able to do that. And we have been able to grow because of that. We have also not had access, which I think is important, and we have not access, is to the cable modems that we want to be able to have access to all the technology that is out there.

I would like to make just one reference to a chart that is here to my right. And it talks about the growth. And this chart is dated in July 1998, but I think I will hopefully explain really where the growth has been. If you look first to the left, the first map talks about where the cable modem providers were for that particular access, if you move to the right, it talks about the CLECs where there distribution is. But, today, that particular chart, you would have to put five times more blue dots on that because of the COVADs and the Rhythms of the world. It has expanded.

And, because of that, in the lower left-hand corner, the RBOCs and GTE have had to respond to the competition. So they have started to respond and have their DSL service available. And then the last map gives you the overlay of what is there, but keep in mind, as of July 1998, and you just need to write about 5 times, and that is happening today. So all that I would leave the panel with is that I really would think that keeping the—what the act has done for us, keeping access open and available to both existing technology and the new cable technology that is going to be available shortly in all areas. Thank you.

[The prepared statement of Mary Beth Vitale follows:]

PREPARED STATEMENT OF MARY BETH VITALE, PRESIDENT AND CHIEF OPERATING
OFFICER, RMI.NET

Good morning Chairman Tauzin, Ranking Member Markey and Members of the Subcommittee. My name is Mary Beth Vitale and I am President and Chief Operating Officer of Denver-based RMI.NET. On behalf of RMI.NET and the Competitive Telecommunications Association or CompTel, I appreciate the opportunity to appear before the Subcommittee today to help illuminate the competitive issues related to the deployment of advanced data services. These are critical issues. Virtually all of the services RMI.NET provides to small and medium-sized businesses and consumer end users are dependent on our ability to acquire and interconnect to high-speed or advanced data communications services.

I would like to tell you about the role of RMI.NET and other competitors in the industry, then make three points about the deployment of broadband in this country. First, the competitive industry is doing a good job of deploying advanced data services, even to high-cost rural areas. The business plans of RMI.NET and many others like us are proof of that. Second, claims by the Regional Bell Operating Companies or RBOCs that deployment of advanced services cannot be fully realized without special regulatory relief are overblown. As a former US West employee, I have heard all of their justifications for requesting data relief. I find those justifications disingenuous and aimed more at expanding their market than at bringing relief to consumers. It is, in fact, possible to foster the development of advanced data services in today's environment. In fact, spurred by competitors, the RBOCs and GTE are deploying new data services without special regulatory exemptions. Just as competition has pushed the RBOCs and GTE to finally deploy advanced data services to densely populated areas, competition will push them to deploy to more rural areas. Third, legislation that alters the competitive landscape created by the Telecommunications Act of 1996 would actually be destructive, as it would undermine the position of competitors and the positive force they exert on incumbents. Ironically, legislative proposals to exempt the RBOCs and GTE would remove competitors from the equation, thus eliminating the pressure on incumbents to deploy and endangering the price competition and choice that are critical to consumer welfare. Allowing the RBOCs special interLATA relief now, when they have demonstrated their antagonism toward competition, will kill the promising—but nascent—competition that exists in the market for advanced data services. RMI.NET and CompTel would strongly oppose any such proposals.

RMI.NET provides convergent e-business and packet-based communications solutions for small and mid-sized companies. At the most basic level, RMI.NET has been offering dedicated and dial-up Internet access services to businesses and consumers since 1994. Currently, we provide access in 90 of the nation's top 100 market areas via a combination of points of presence that we own ourselves or lease from others. RMI.NET recently purchased DataXchange Network, the sixth largest national Internet backbone provider, giving us the capability to provide access at speeds up to DS-3 in New York, Chicago, Atlanta, Washington, Dallas, San Francisco and Los Angeles. DataXchange's network is based on a dual OC-3 fiber optic ring, and interconnects via peering arrangements with all significant backbone providers at multiple network access points. We also provide website hosting, and competitive local exchange, long distance, and Internet protocol voice service.

Over the years, our Internet Service Provider, or ISP, business has expanded through both internal growth and acquisitions, many of which are focused on small markets and rural areas—the very areas that are at the center of the drive to deploy bandwidth. RMI.NET recently acquired Dave's World, an ISP headquartered in Bloomington, Illinois, which serves a number of downstate Illinois communities, including Peoria. We have also added Internet Connect, based in Salt Lake City, Utah. Internet Connect serves the small mountainous communities of Heber, Morgan and Huntsville, Utah, in addition to the relatively larger communities of Salt Lake City, Ogden and Provo. Within our home state of Colorado, we offer Colorado Mountain Net, headquartered in Steamboat Springs, which brings service to scattered communities in northwestern Colorado.

The Internet access business is particularly competitive; there are more than 5,000 ISPs in the U.S. Although we are the largest locally based ISP in Denver, we face competition there, and in every major market we serve, from national, regional and local ISPs. Even in the smallest cities and towns, there are almost always several ISPs vying for consumers' accounts. It is estimated that upwards of 90 percent of the U.S. population has local dial-up access to more than one ISP.

The fact that RMI.NET and other competitive companies are quickly and efficiently deploying advanced data services to smaller and even rural communities makes evident the fallacy of RBOC and GTE claims that consumers can only realize the full benefits of these services if the Telecommunications Act is altered to provide special incentives for them. One hallmark of RMI.NET and other competitive ISPs is our extensive use of broadband transmission capacity to provide our service offerings. The sources and availability of broadband capacity do vary somewhat from route to route and city to city. As a general rule, the longer competition has existed in a market, the more plentiful the supply of bandwidth and the lower the cost. On interstate and interLATA routes, where competition was first authorized, there is ample broadband capacity available. Ultra-high speed digital links capable of carrying the vast quantities of voice and data traffic that the American information economy generates are readily available from the major long distance carriers (AT&T, Sprint, GTE and MCI WorldCom) as well as from several newer national network providers, such as Qwest, Frontier and Level 3.

Within the major metropolitan areas, the sources of broadband capacity began to multiply with the emergence of competitive access providers; in the three years since the barriers to local competition were removed by the Telecommunications Act, the pace has accelerated and fiber rings have been, or are being, deployed in first, second and third tier markets throughout the country. Just look at the markets we already serve in Western states. And look at other CompTel members like ITC DeltaCom, a competitive local exchange carrier and backbone provider offering services in the Louisiana communities of Lafayette, Lake Charles, Monroe, Shreveport, and West Monroe, as well as in Baton Rouge and New Orleans. RMI.NET and ITC DeltaCom are representative of the many competitors deploying advanced services in large and small communities across the country. Over time, we fully expect that this process will continue, at an accelerated pace, as companies expand their operations in smaller cities and towns to attract workers and to address the quality of life issues facing many employees. In light of present and future deployment by competitors, RBOC claims that consumers will not enjoy widespread access to advanced data services do not recognize the true status of the market. The competitive market is, in fact, addressing the broadband infrastructure needs of the nation.

Second, although slow to react as usual, the RBOCs nonetheless are deploying broadband—and without regulatory relief. From my experience with US West I can tell you that it was because of competition, not in spite of it, that US West has finally deployed broadband services in its service area. The benefits to consumers are clear, as more widespread, better, cheaper services have become available.

We are already beginning to see the effects of competition in the broadband access market. An example can be found in the contrast between two of our ISP markets, Denver, Colorado and Bloomington, Illinois. Within the past few weeks, a start-up company called Rhythms NetConnections Inc. announced the availability of high speed data services (using DSL technology) in several Western markets, including Denver. US West, which had initiated a similar service offering in Denver and other markets nearly a year earlier, almost simultaneously announced a nearly fifty percent reduction in its basic DSL rate for residential subscribers. In Bloomington, Illinois, there is still only one facilities-based DSL provider (the incumbent LEC, GTE), and prices remain substantially higher than in those markets where competition exists.

US West and other RBOCs, unfortunately, have done little to improve the competitive landscape. Although US West currently offers advanced services to 5.5 million households in 39 cities in its region, it has earned an extremely poor record over the years in terms of delivering on its promised data services to competitive providers. For example, RMI.NET has been waiting months for US West to install DS-3 lines in areas where there is not yet an alternative supplier. US West is capable, from a regulatory and a business point of view, of providing this service now, but refuses to do so.

This brings me to my third and final point. The robust and growing competition that now exists in the data market would be a thing of the past if the ability of competitors to access broadband data facilities were compromised as a result of legislative proposals now under consideration. While RMI.NET and other competitors provide some of our own networks, and to a large extent have been successful in deploying services to both rural and urban areas, the fact remains that the RBOCs and GTE control vast local networks that cannot readily be duplicated. Thus, we must rely on incumbents for access to these networks, just as competitive local exchange carriers must rely on access to voice networks. The very existence of a competitive market for advanced data services is made possible only by the unbundling, resale discount and interconnection requirements of the Telecommunications Act. Particularly in more rural areas, competitors need access not just to loops, but also to the other elements of incumbent networks in order to make network extension feasible. For example, in the absence of unbundled network elements or resale (both denied under pending RBOC proposals) competitors would be forced to “collocate” their own equipment in incumbent LEC end offices—more than 23,000 of them nationwide—and, in many cases, remote terminals, which number in the hundreds of thousands. This will cripple broadband competition in rural America where thin population densities will make it economically infeasible for more than one local provider to install the necessary equipment. Clearly, fortifying the incumbent’s advantage is not the answer. Instead, we must ease the way for competitors to push the incumbents to serve new areas. If the basic pro-competitive requirements of the Telecommunications Act are obliterated through legislative fiat, the competitive market will die as quickly as it was born.

In addition to threatening the very elements of the Telecommunications Act that competitors rely on to provide communications services, some proposals would strip the FCC and the state public utility commissions of their authority to regulate the

provision of broadband data services. These proposals would slow competition and ultimately disadvantage consumers by giving incumbents the green light to favor their own services. If freed from existing legal obligations to refrain from unreasonable discrimination, incumbents would doubtless give priority service to their direct customers. Companies such as ours, that purchase broadband services from the incumbents (and others, where it is available), could face even greater delays and potentially higher costs, particularly over the short term. Consumers, and competition, would suffer.

Finally, I would like to highlight that there is a loophole in the current data relief proposals. These proposals fail to recognize that data networks could be used to provide prohibited long distance voice traffic as well. It is an error to assume that voice and data can be treated differently. Today, and for more than a decade, both circuit-switched voice traffic on the public switched telephone network and packet-switched data traffic on the network of networks which comprise the Internet, are transformed into the ones and zeros characteristic of a modern digital network. This was true when the Telecommunications Act was enacted, and it remains true today. As a practical matter, there is no way to limit the breadth of these proposals to relieve the RBOCs of their obligations under the Act. Proposals to allow RBOCs to provide interLATA data services should be rejected because they may lead to untimely relief from the market opening provisions of the Telecommunications Act that are prerequisite to RBOC provision of interLATA voice traffic.

The Telecommunications Act is working, as evidenced by the explosive growth of the Internet and e-commerce. Hundreds of billions of dollars have been invested in companies that have been created, or that have diversified their business activities, to take advantage of opportunities provided by the Act. Preservation of the current framework, including the unbundling and resale requirements, is essential to the continued growth of this vital sector of the U.S. economy.

Thank you.

Mr. TAUZIN. Thank you very much. And that wraps up our panel's opening statements. Let me make a couple of announcements for the purpose of the panel and particularly for the membership. In July, CATO is sponsoring a retreat for our committee, which I urge you to all attend. We will focus on the knowledge we are gaining on broadband and the policy issues attendant to that knowledge at that retreat and hopefully get into some of the real fights that lay ahead in terms of who is right and who is wrong about what policy we should adopt. Today I want to thank you for keeping away from that and for concentrating more on what you are doing and what you see is happening in the world of broadband.

I also wanted, second, to commend to all of your attention if you haven't seen this yet a little book entitled *The Victorian Internet* which is absolutely fascinating—a book by Mr. Tom Standey—it compares the arrival of the telegraph to the arrival of the Internet and makes some incredibly startling comparisons of the two. For example, when the telegraph first hit, a fellow by the name of Claude Crappy invented it, the quote in a poem written in tribute to Samuel Morse was: We are one, said the nations, and hand met hand in a thrill electric from land to land.

It details in great detail the incredible parallels where scam artists found crooked ways to make money by manipulating the transmission of stock prices and results of horse races using the telegraph. And it was setting up fake fronts, just as they have done on the Internet. And people worried about inadequate security so codes were developed and encrypted messages were employed and eventually there were telegraph weddings and telegraph divorces. And the phenomena spread around the world and it was predicted to change the way we did business and did life.

And in one ominous parallel, Claude Crappy is depicted as not too happy a fellow because he had pretenders claiming to have in-

vented the telegraph—his invention and he sank into a great depression, increasingly paranoid, and on January 23, 1805, killed himself by jumping into the well outside the Telegraph Administration Building in Paris. He was buried, by the way, under a tombstone decorated with a telegraph tower, showing the sign for at rest.

It is an incredibly interesting little book and has a great deal about the Internet in it in relation to the development of the telegraph. I would commend it to you for research. Pretty good tutorial.

Let me now recognize members for 5 minutes and the Chair will begin with the 5-minute session. Let me first acknowledge something Mr. Scott said, that we know broadband is going to deliver, as Mr. Tauke pointed out, pictures in real-time, video in real-time. And just as we see 1,700 radio stations now broadcasting on the Internet, we can assume there will be video broadcasters on the Internet as the Internet merges with the television set as the predominate monitor in our homes.

We also know that data includes voice and so telephony may be a part of the integrated package of services. We know that Cox is delivering telephone service, standard telephone service, right now competitively in communities in America. But we also hear of something called IP telephony, Internet protocol telephony. I take it that is packet-switched telephony. But I need to know more about it. Mr. Falcao, would you give us an idea of what is IP telephony as opposed to ordinary telephony? What is the state of it now? When is it really going to pose a policy problem for it? When has it really arrived, in effect?

Mr. FALCAO. I will be glad to do that, Mr. Chairman. So let me characterize the different. IP telephony, essentially, is delivering your suite of voice telephony services on a packet network. And, in this case, an IP network. So, fundamentally, as was explained how the Internet differs from the existing network, everything is packetized in data format, the IP telephony is delivered in that type of network. So that is the difference between IP telephony and the existing telephony.

Now you asked an important question of where is it today and when will it be ready for prime time. IP telephony has made a lot of advances in the last I would say year where it has moved from being a very exploratory science project type offering to something that can now be rolled out in the real world. I believe it still has a little way to go from a quality of service perspective to deliver the type of public network telephony that you would like to deliver on a public network. However, IP telephony in an enterprise, in a business environment, is actually very good today. And I would suspect that you could probably not tell the difference between current telephony and IP telephony in a business environment, in a closed-network environment.

Mr. TAUZIN. Well, let me ask, anyone could come back now. When do Americans—when are we likely to see a day when we turn our television and, with a touch of few buttons, dial up a friend and see our friend's picture on the television and communicate with them, really with technology like IP telephony, when is that likely to arrive for Americans or citizens in general? Is that

close upon us? Is that a year away, 2 years away, 3 years away, 5 years away? Where is it? Anyone? Please?

Mr. FALCAO. Take a guess?

Mr. TAUZIN. Yes.

Mr. FALCAO. So, you know you can actually do some of that right now.

Mr. TAUZIN. You can do some of it now.

Mr. FALCAO. You can do some it right now. The problem we have is it is not ubiquitous. It is not available to everybody.

Mr. TAUZIN. So that it will—the answer is, when there are networks available and the technology has reached the right stage.

Mr. FALCAO. Yes.

Mr. TAUZIN. Predictions on it? Three, 5, 10 years?

Mr. FALCAO. I would hope it would be in the 3 year range.

Mr. TAUZIN. So those things are going to be happening pretty fast, I take it.

Mr. FALCAO. With one caveat. So I think a lot of the things we talked about today is going to be very dependent on the decisions you make as a committee to enable those networks to be built. So there are things that need to get done to ensure that those networks do get built.

Mr. TAUZIN. Now, Mr. Vradenburg, you and I have had some conversation about this. Maybe you want to come back. I mean, if some of us want to join in. But timing seems to be an issue about when things are laid out and when these networks are built and when all this service is available to people from different pipes, different providers. Can any of you kind of lay out to me when you think systems like Teledesic are going to be really available and when they will be fully competitive with landscape technologies? Mr. Daggatt, you want to try and I will get Mr. Vradenburg?

Mr. DAGGATT. Mr. Chairman, you raise a good point about IP telephony because it brings out one of the big issues with the Internet model and that is quality of service becomes a critical element. The ability to provide and enforce service quality guarantees through the network. In the traditional circuit network model, you have a pair of copper wires exclusively dedicated to a particular connection. Quality of service isn't an issue. In the packet model, where you have traffic from a lot of sources competing for network resources, it becomes a bigger issue, probably a bigger issue than bandwidth, per se.

And, whereas in the traditional model, you think of access and transport as being sort of the two major network elements, in the Internet model, quality of service comprehends both of those. And, in fact, I would even redefine access as being not just the connection to the central office, but the connection from the end-user to the nearest point of presence that can provide the end-to-end quality of service that is required. And that could be a kilometer. It could be 1,000 kilometers, because, for the most part, you have to have a carrier, some service provider, that can actually put all those elements together with those service quality guarantees.

So it is not just a question of when do you get a broadband connection, but when are you able to connect all those network elements in a way where you can enforce those quality of service guarantees. And that is probably going to take quite a while. We

expect to have the Teledesic network up and operational in 5 years. At that point, we would be able to provide an end-to-end service guarantee from any point on the planet to any other point on the planet.

Mr. TAUZIN. The point I was trying to get to is that we do have a timing problem for all of this to be laid out, connected, and those last miles problems solved. Mr. Vradenburg, what I am getting into is the questions of what policy we have to engage in, can you just sort of teach us a little bit about how you see that happening and how AOL, for example, is going to be delivered and by what pipes and when?

Mr. VRADENBURG. Mr. Chairman, I think it is very important, as we discuss timing, to distinguish between the business marketplace and the residential marketplace.

Mr. TAUZIN. Okay.

Mr. VRADENBURG. Because in the business marketplace, a number of these services are beginning to be delivered today with good quality of service and with a variety of choice because perhaps 40 percent of our businesses in major urban centers already have broadband connectivity, both either internal or among their major offices and major urban centers. So at the moment, some of these new services are being rolled out today among businesses or within businesses in major urban centers.

The great challenge, it seems to me and the timing question in terms of when we can get broadband delivery into the marketplace is residences and smaller businesses and businesses in rural areas. And that challenge, it seems to me, goes something like the following. Cable is beginning today to roll out a cable modem service in certain communities in larger urban areas. DSL is beginning to get rolled out. We ourselves have deals with Bell Atlantic and Southwestern Bell, plan to have more, which will begin to roll out DSL to consumers, a high-speed AOL service to consumers, beginning at least in test this summer and then in quantity by this fall.

We have also announced a satellite ability, a one-way, broadband capability, which will be broadband down and the telephone return path that will begin to roll out to rural areas or to areas of the country that don't otherwise have access to DSL or cable modems. Again, probably early next year.

So we are going to begin to see these services in the residential marketplace now, but rolling out, increasingly, over the next couple of years. But in the business marketplace, it will move a lot faster. So I do think, as important, as you think about the policies in this area, is are you focusing on business-to-business, are you focusing on residential, are you focusing on urban, are you focusing on rural areas. Because the answer in terms of the timing of these different technologies, particularly as they are being delivered in quality-of-service standards, as has just been discussed, is quite different in those different areas.

Mr. TAUZIN. Anybody else want to respond before I move on? Yes, sir.

Mr. NETCHVOLODOFF. I am not a technical person, but our engineers tell us that IP telephony, with respect to the Cox systems, is at least 2 years, perhaps more, away.

But the more interesting piece is the economic analysis that goes into what makes a business. If IP telephony is to be a lifeline service, that is, if people are going to use it as a dependable telephone service, just as they use their telephone service today, then the economic advantage of IP telephony begins to disappear because you have a powering requirement. In our business analysis and technology analysis is not so sure that, in fact, utilization of the cable platform may be just as economic in terms of telephone service by continuing with the digital service that we are providing normally under title II.

Mr. TAUZIN. Thank you. Anyone else? Yes, Ma'am, and then the two of you and then I will move on to you, Mr. Boucher. Yes, Ma'am.

Ms. VITALE. Just briefly. In respect to IP telephony, we deliver IP telephony right now. We have customers that are using that product. We give them a very good price for it and they are willing to pay that price for possibly not the most perfect service that you—

Mr. TAUZIN. Is that commercial or residential?

Ms. VITALE. Residential. So we have that right now.

Mr. TAUZIN. And Mr. Tauke, finally.

Mr. TAUKE. As you know, I am not a technician either, but I have been involved in a planning group within Bell Atlantic on the issue of Internet telephony or IP telephony and we are of the view that it will not make a major presence in the marketplace as a substitute for traditional telephony for the next 5 years. There are a variety of reasons for that. Some are issues such as numbering and how you handle those kinds of issues.

But a lot of it has to do with reliability of networks. A lot of people will use IP telephony as a supplement to the existing networks, but there is a robustness in our current networks dealing with the powering of the networks, of the electricity can go out and you still make a phone call, and a variety of duplications of networks and so on that we expect will not be present in the Internet arena, at least over the next 5 years. So it will be in the marketplace, but as a full substitute for the current telephony, no, not for 5 years.

Mr. TAUZIN. Thank you very much. The Chair, Mr. Boucher, I notice Mr. Dingell has arrived. Do you want to yield? The Chair will now recognize the ranking member of the full committee, Mr. Dingell, for a round of questions.

Mr. DINGELL. Mr. Chairman, I thank you for that and I commend you for holding these hearings. I believe they will be very useful to us and I want to thank our panel for being here with us to discuss the matters before the committee.

As I would recall—and this question is directed particularly to Mr. Apfelbaum—the central premise of the Telecommunications Act of 1996 was to regulate or not to regulate like services in a like manner. We believed that was the best way to give truly competitive services to the American people. We have heard a lot about technological changes and they have been enormous. And, as a result, advanced telecommunications services are now being or soon will be provided by a myriad of companies.

There is no question these companies currently are subject to a wide dichotomy of regulation at the Federal and State levels, de-

pending on what their original mission may have been. It is interesting to note that the practical result of this is that the differences in regulation may imbalance the competitive opportunities in the different forms of services and the impact that it would have on the opportunity of the citizen to have freely competitive services available to him.

Now, Mr. Apfelbaum, can you tell me, is there any good policy reason to regulate advanced telecommunication services provided by cable companies such as yours differently than similar services offered by telephone companies, satellite companies, land-based wireless companies, broadcast companies, or any other company, for that matter, who may or may not have a shared mission to yours?

Mr. APFELBAUM. Our view has always been that we have advocated a deregulatory approach for anyone who is offering advanced services. I think different approaches have developed, historically, because these business have been distinct, historically. How you go forward from there, you know, there are a lot of issues for you all to decide, especially when some companies have been regulated, the issue of how to let them out of existing regulation, you know, can be a complicated one.

But our basic view is that deregulation is the way to go for all of these advanced services and, unlike some of our competitors, we have not tried to use the congressional process to gain a competitive advantage. In the recent Satellite Act, for example, we didn't oppose at all the ability of DBS providers to be able to provide local broadcast services. So our view is that there should be a deregulatory approach for all of these services and that is how we would see things going forward.

Mr. DINGELL. Now, Mr. Tauke, do you want to give a comment on that?

Mr. TAUKE. Well, as you know, Mr. Chairman, there has been a migration of regulation from the telephone market to the new Internet data market. And so when we begin to deploy the new infrastructure that would deliver high-speed data services, we are subject to unbundling of some of that technology. We are required to resell those services, things which no other provider of those services must do. We are prohibited from providing any kind of backbone service or full Internet service to a customer, so we cannot provide the service in some instances and in other instances we have to take apart pieces of our network or resell the services that we offer in a way that no other competitor does.

Mr. DINGELL. Mr. Vradenburg, do you want to make a comment?

Mr. VRADENBURG. Yes, Mr. Dingell. We very much believe that, in fact, we have to approach these different, historically different, structures with a common mindset. Now whether or not that results in a common scheme or not obviously depends a little bit on history and technology and the like. But at least with a common mindset—and the one thing that I think you are hearing out of everyone on this panel today is that in the future, the similar kind of digital transmission techniques offering a wide variety of voice data and video services are going to be offered over exactly the same technology and the same sets of infrastructures.

And it seems to me unconscionable for us to proceed into the 21st century with a regulatory system that makes those distinctions. That, in fact, we ought to look at these systems to see how we can move toward a closer regulatory paradigm across all these infrastructures and that the main message ought to be keep the Internet deregulated and keep the infrastructures open to all service providers.

Mr. DINGELL. The point, I gather, that the three of you gentlemen are making is that the result of this regulatory approach is to essentially pick winners amongst technology on the basis of a regulatory scheme and also to pick the companies who would prosper greatest through the regulatory process rather than through the competitive prowess of the company or the particular desirability from an economic or technical standpoint of the particular kind of service used. Is that right?

Mr. VRANDENBURG. I think, Mr. Dingell, that you have hit it right on the head. The government ought not to be picking winners and losers. A product or service ought to win in the marketplace based upon its merits and not on whether the government favors it or whether you own the wire.

Mr. DINGELL. Now, Mr. Tauke—and, by the way, welcome back to the committee, old friend. Glad to see you. I was interested to note in your testimony a discussion about the role of Internet backbone networks in making sure consumers have access to the information superhighway at the highest speed and the lowest cost. Would you describe how concentration can develop in these networks and what the implications of this concentration could be on prices consumers pay for Internet access.

I am particularly interested and concerned about the historic role of so-called peering arrangements in which, I understand, traffic is exchanged between these networks free of charge and the potential exists for these agreements to break down if full competition is not maintained. Is there a danger here for us to concern ourselves with?

Mr. TAUKE. We believe that there is a danger to be concerned about relating to the what-have-been traditional peering arrangements in the Internet world. Just for purposes of those who may not be familiar with the term peering, in the Internet world, peering is like interconnection in the telephony world and, essentially, if you have a network and I have a network, you send traffic to my network. I send traffic to your network. We have, traditionally, we have exchanged that traffic free of charge.

What has been happening over the last couple of years in the Internet world is that we have had some concentration of ownership in the backbone arena that was addressed parenthetically by the Department of Justice in the MCI Worldcom merger and, as a result, there is some concern that those who have garnered great power in the backbone world are changing that peering structure and essentially saying to the smaller carriers, if they are bringing a small amount of traffic on the backbone, they are saying, instead of peering with you, you will be paying us when you deliver that traffic.

The other thing that is happening is that the quality of some of the networks is in question and so, therefore, some major compa-

nies and ISP providers are, like At Home, which recently announced they are going to build their own proprietary network nationally so that they can ensure quality but also then they are not involved in the peering arrangements. Going back to my regional airports story, in essence, they are saying they are building a regional airport, but only for their planes, not for other players.

And so both of those phenomena are having an impact or straining this traditional notion of peering. So one of the longer term issues for the Congress is how do you ensure that there is free and open interconnection, if you will, in this new arena.

Mr. TAUZIN. The gentleman's time has expired.

Mr. DINGELL. I noted that, Mr. Chairman. Thank you.

Mr. TAUZIN. I thank the gentleman. It is likely that we have time to do another round if members would like to do that. So if you would like to stick around and do another round, we will probably have a chance. The gentleman from Illinois, Mr. Shimkus, is recognized.

Mr. SHIMKUS. Thank you, Mr. Chairman. As you saw, I had my family here. Competing interests, so I appreciate your being patient.

In my opening statement, I commented about the rural areas. And I know other members are very concerned about that. And excuse me if this question has been asked before, but also my focus in my opening comments was the need for competition and the belief in competition. What do we need to do—I guess is the question I want to ask—what needs to be done to ensure that the competitive marketplace comes to rural America, in other words, a competitive marketplace where there is a choice between competitors? And how can we help that occur?

That is an open question. I guess the best way to do this with so many panelists is just who wants to try to answer that first and we will bounce back and forth.

Mr. VRADENBURG. Let me try first, Congressman. I would say, first, that we ought to look at what has happened to date. In the narrow-band world, what we have seen is that between 90 and 95 percent of American households have access to the Internet via a local dial-up phone number. As a consequence, we have in, for example, Blacksburg, which I know Mr. Boucher is from, 376 ISPs. Now Blacksburg is not a major community, but there are multiple Internet service providers in that community.

Now why is that the case, because there is only one phone company? We are only using one set of wires. It is because the phone company, in essence, is obliged to interconnect and to sell its facilities to, in Blacksburg, 376 independent service providers. And, in fact, those people called up, ordered business lines, set up modem banks, and began to offer service in Blacksburg. So we have a great deal of competition in the existing environment because of the openness of the telephone system.

Now as we move to broadband, we have to continue that same framework and not only have our ability to offer DSL service and those 376 Internet service providers in Blacksburg offering a high-speed service through DSL, but also get competition in the infrastructure itself so that, in fact, those 376 ISPs can get access to the local cable system and use whichever system is most accessible to

a household and also be able to service their particular customers using whichever infrastructure is best suited to the applications that they want to deliver.

Now we also have this in satellite and we have announced a deal with Hughes, we have got to recognize that cable is only going to be able to serve maybe 60 percent of the American public, even at total build-out. DSL and current technology is probably only going to be able to reach 40 percent to 50 percent of American homes. So we are still going to need additional services and additional capacity infrastructure to reach all of America. And, hence, satellite, at the moment, seems to be the best opportunity to do that. So we will need competition as well and open access inside satellite systems to ensure that, in fact, multiple service providers are having access to that portion of the country that is not serviced by either cable or by telephone.

Mr. SHIMKUS. Yes, sir.

Mr. GRAY. Yes, sir, if I may. I am Steve Gray with McLeodUSA. In your particular State of Illinois, if I may. We serve 144 markets in Illinois; 1,500 employees; and we have deployed almost 3,000 miles of fiber in the State of Illinois. None of those statistics include the city of Chicago. We acquired Consolidated Communications about 2½ years ago. Our plan over the next 5 years is to build and deliver broadband pipes to every home and every business, either through the construction of our own facilities or partnering with Ameritech and utilizing the copper and providing DSL over the copper itself.

Mr. SHIMKUS. Okay. We are trying to do two things at one time. Thank you. I am glad you brought up the issue of direct satellite, because cable is not everywhere in America and it is not everywhere in my district. So the direct satellite is going to be a big player in this. Will there be needs from us at the Federal level to provide tax incentives, capital investment? Again, can it be done by just easing the regulatory burden and staying out of the way, is that enough to encourage the capital investment to go out to these small, rural regions? Yes, Ma'am, go ahead.

Ms. VITALE. I think on two points, in terms of addressing your issue on the capital investment. Yes, it is very helpful in order to do that. We purchased a company in Opelika, Alabama, which is a very rural territory. And the Federal and both State areas have given us capital funding in order to expand—thank you—to expand that particular area in a very small, rural town in Opelika. The closest town of any size is Auburn. So I think we look at it from that angle, yes, that has been, you know, beneficial.

But I think as far as what I would share with the committee that would be critical is to take the Telecommunications Act of 1996 and continue with what the progress has happened. I mean, it has allowed us to have access and grow because of having access to the local lines in order to deliver our services. So that would be something I would stress.

Mr. TAUZIN. The Chair will recognize Mr. Boucher. I recommend the other members go out and make the vote. Mr. Shimkus will return and continue the hearing. So if you would like to leave now and make the vote, your call. Mr. Boucher will be the next to be recognized. Mr. Boucher.

Mr. BOUCHER. Thank you very much, Mr. Chairman. Chairman Tauzin was asking a series of questions directed toward a prediction on the general availability of telephony using the IP protocol and we got some interesting answers from the panel concerning that.

I would like to follow that series of questions with questions directed toward determining when we might expect general availability throughout the country of both DSL and cable modem services. Now we have seen a number of projections, all varying, I might add, for when these services will generally be available. This is a panel of experts who are well-qualified to talk with us about that.

And so I would like to ask for projections here. Let us just take a date. Let us say by the end of the year 2000. How many DSL subscribers will there be? How many cable modem subscribers will there be? Today, we start with a base of 70,000 with DSL and about 500,000 with cable modem service. Where are we going to be at the end of the year 2000? Mr. Apfelbaum.

Mr. APFELBAUM. I couldn't predict a number. I could tell you that we are trying to roll out the service as quickly as we can in all of our service areas. And, you know, a lot of that depends on the policy that is set here, whether we are fettered with unnecessary regulation or left free to develop our business the way our business people think is best to serve customers.

Mr. BOUCHER. Do you have any estimate at all? Take one case and the other.

Mr. APFELBAUM. Well, you know, it is also hard to say what the numbers are because with all of these new services being developed, I think they are all going to be rolling out and they are all going to be getting customers. We would like to get a large number of them, but, you know, I predict a number for—

Mr. BOUCHER. Mr. Netchvolodoff, do you have a prediction for us?

Mr. NETCHVOLODOFF. Well, I can only speak for Cox, but by the end of the year 2000, we would expect in excess of 80 percent of our total customer base to have access to all 3 digital services: video, telephony, and high-speed data. With respect to the phone companies, the only thing that I can comment there is the public pronouncements that have been made by the phone companies that by the end of this year they will have activated over 25 million DSL lines and I would presume that by the end of the year 2000 that would accelerate, not decelerate since activating DSL lines involves defense of their core business.

Mr. BOUCHER. Mr. Tauke, would you care to comment on that? Offer a projection for us with regard to DSL?

Mr. TAUKE. An independent third party, International Data Corporation, says that there will be, they estimate that there will be 6 million lines of DSL services in operation by the year 2002, which is not the year 2000 figure. I can speak for Bell Atlantic. By the end of the year 2000, we believe we will have DSL capability for 14 million homes of the some 30 million residential customers we serve.

Now that projection, however, has a lot of caveats. For example, just to give one, we anticipate that we will be able to deploy DSL services over some fiber. In order to be able to do that, you have

to have remote terminals in your network. The question arises: Will we have to unbundle the remote terminals? Will we have to provide co-location in those remote terminals? If the FCC would come forward with those kinds of rules or a State commission, for that matter, that might throw way off the kinds of projections that we are making.

So we believe, right now, given the current state of affairs, 14 million homes would be passed, have it available. How many will take it, I don't know.

Mr. BOUCHER. I have one other question and then I am going to have to go to vote as well and so will the chairman.

The discussion about whether or not transport platforms should be open so that the consumers of transport services have a choice of Internet access providers has both technical and policy components. Chairman Dingell was discussing some of the policy implications of that decision a moment ago. Let me focus on a technical question. We have heard from some of the cable companies that if they are required to open their platform to Internet access providers other than the one with which they are affiliated, that significant technical barriers are raised. And that, in fact, it may not be possible to accommodate more than one Internet access provider on a given cable platform.

I read with great interest last week about a demonstration by GTE and AOL concerning a cable platform that now can accommodate multiple Internet access providers. And Mr. Vradenburg, I would like to give you an opportunity to comment about that demonstration and about the technical feasibility of accommodating multiple ISPs on a single cable platform. And, at the same time as you are describing that demonstration, if you would, tell us if, in your opinion, based upon that experience and your other research, there is any practical upward limit on the number of ISPs that can be accommodated on a cable platform.

Mr. VRADENBURG. Thank you, Mr. Boucher. We did do a trial in Clearwater, Florida, on a GTE cable plant. Actually, it was GTE's trial in which they utilized access to our service as well as to two other ISPs. And what they were able to do was to demonstrate was that there is a simple technical solution to this problem of multiple ISPs. They demonstrated it with a routing device that they have modified but is essentially off-the-shelf equipment that has been used in the multiple ISP DSL world that, in fact, for roughly a one-time capital investment of \$1 per home that, in fact, it is not only feasible but relatively straightforward to provide multiple ISP access for households.

There are also off-the-shelf software management systems which enable a cable MSO to continue to manage the data traffic on that network to assure there aren't data hogs and to provide that, in fact, the data is effectively moving through those systems. In fact, they have demonstrated that by stacking those routers, they don't see a natural upward limit on the number of ISPs that can be supported. What they have determined is that, in fact, the scaling issues inside the cable plant are a product of the number of subscribers, not the number of ISPs.

Mr. BOUCHER. Thank you, Mr. Vradenburg. Let me give our friends from the cable industry an opportunity to comment on that

question if they desire to do so. And I am afraid I am going to have to be impolite and leave. I won't hear the answer to your question. I assure you I will read it in the record.

Mr. APFELBAUM. Okay. We have never taken the view that it was technically impossible to have multiple ISPs. We have really approached it from the policy end. But we think the technical end is a big component of the policy end. And the question is what do you get out of the resources it takes to configure a system to allow multiple ISPs? If your goal is to have multiple ISPs, you can do that. If your goal is to serve consumer welfare and give consumers what they want, I don't think you would build your system that way. It increases the cost tremendously. It increases the inefficiency tremendously.

And I did read the LA report that came out the other day and they seem to very quickly answer the technical feasibility answer by saying if you put two engineers in a room, they can do anything. And they quoted that old NASA line that with enough thrust, you can make anything fly. We don't leave two engineers alone in a room very often in our company because they can do anything and oftentimes they want to do everything, but if we let them make these decisions, the cost of cable service would probably be about \$1,000 a month.

So there are all kinds of other competing considerations that go into this. And, again, the question I think also is do you want to pick one business model now and require every facilities-based competitor to follow that model? Our view is it is better to encourage the deployment of facilities-based competitors by allowing them to be free to develop the business models that work best.

Mr. SHIMKUS [presiding]. The Chair recognizes himself for a second round of questions. And the first one I have is to Mr. Scott and Mr. Gray. If you are able to get unbundled network elements to compete for business in the voice market, but you cannot get unbundled network elements to compete for the business in the data market, what will this do to your company's incentive and ability to enter markets that lack the population density to justify the installation of your own facilities? Pretty complex.

Mr. SCOTT. No, I think it is pretty clear. If we did not have access to unbundled elements for data service, that would be crippling to our ability to do that. And that becomes more important as time goes on. We started by mainly providing voice services, but rapidly we have been pulled by customer demand into providing voice and data services. So we would absolutely need access to those elements for the provision of data services to remain competitively viable, regardless of the size of the community. That would apply in a large market or in a small market.

Mr. GRAY. I directionally agree with Dave. I will come at it just a little bit differently. A, I still submit that it is an artificial distinction, from a consumer's perspective, to differentiate voice from data. All I know is that our consumer customers want a service that works all of the time and when it breaks they need to call us and whether they have the same line for Internet or telephony, they don't draw that distinction so I shouldn't be able to.

With respect to the ramifications, if premature Bell operation company entry is allowed into the interLATA data business, Dave

and I, I think, lose access to the capital markets. We are losing—I am losing \$200 million a year and will need sustained access to the capital markets for a while in order to support our emerging efforts. So I think the consequences are somewhat grave. I also would remind you, Mr. Congressman, if I may, that we are in an open registration period with the SEC, so please nobody run out and buy or sell our stock based on anything I have just said.

Mr. SHIMKUS. And I am going to go to Mr. Tauke, but I want to follow up before I do that. Why is this more critical—again, you understand my focus is on the rural areas—why is this even more critical in the rural areas versus the urban?

Mr. GRAY. If I may go first—and I will speak specifically to US West and, with all due respect to Mr. Tauke, the fact of the matter is, the quality of the service is declining from the incumbent local exchange company. And, two, they are not investing in those rural markets. And, three, one could read into the tea leaves with all that is going on with either Quest or Global Crossing that they may further forget where Pierre, South Dakota, or even how to say Peer, South Dakota, what that really is.

So I think if we send the wrong message in 14 of those States and if I go out of business and US West starts investing in international markets, what are the alternatives for rural companies in those areas?

Mr. SHIMKUS. Mr. Scott, did you want to follow up?

Mr. SCOTT. Yes, I will follow up.

Mr. SHIMKUS. And then I am going to go to Mr. Tauke.

Mr. SCOTT. I will follow onto Mr. Gray's comments. For us it is very important. I mean, there are a lot of people in our markets who are clamoring to provide Internet services, high-speed Internet services in St. Louis, in Houston, and Dallas. But, as far as I know, we are the only ones who are eager to do that in Topeka, Kansas. And so we may be the only one out there who is ready to stand by and provide service, high-speed Internet services, in those communities. So I do think that access to those unbundled elements is critical for relatively quick delivery of such services to small markets.

Mr. SHIMKUS. Let me just follow up one more question. To what extent is certainty important to the ability to raise capital?

Mr. SCOTT. Central to it. I couldn't agree with Mr. Gray more on that. And, in fact, McLeod is an older company that we are and probably has better access to the capital markets than a company such as Birch. I will guarantee you that when people look at investing in Birch, we spend most of the time discussing the regulatory scheme at the Federal level and at the State level and discuss the contingencies that might be brought to bear on the availability of unbundled network elements. So capital for companies such as Birch could dry up overnight.

Mr. SHIMKUS. And now, Mr. Tauke, thanks for being patient and have at it.

Mr. TAUKE. Happy to be patient. I think it might be worthwhile to take just a moment to say a few words about unbundling and the network element issue that you raised. The first point is that I basically agree with my two fellow witnesses here that for rural areas and for competition in rural areas, that it is relatively impor-

tant that these companies have access to unbundled network elements, have access to the loop, they are not, in the near-term, going to be building loops to the home—that they have access to be able to co-locate in our central offices in order to be delivering services. And I want to underscore that Bell Atlantic is not asking that we be given relief from those requirements to make our loops to the home available or to avoid co-location or any of the other section 251 requirements.

The second observation that I want to make is we are also not asking that any of those requirements be imposed on the cable industry. Although we believe in the notion of regulatory parity that Congressman Dingell offered, we are not suggesting that those requirements which have traditionally been imposed on us be transferred to somebody else, because they are pretty onerous requirements.

What we are suggesting is, as we deploy new technology, such as DSLMs, that we not have to unbundle the DSLMs, that any of the new companies can purchase that technology as well, use our network, and deploy those services on our network and be able to compete with us in the high-speed data market as well as the voice market.

So I just want to be clear. We believe that the unbundling is important for competition. We are willing to live with that for the existing network. But we do not believe that it should be extended to all the new technology.

Mr. SHIMKUS. Thank you. And I want to follow up with Mr. Gray and Mr. Scott on a question of why isn't US West investing? Could it be that their incentives are lacking, given the requirement that they are unbundled, that they unbundle the new services? Because we have heard in cable companies, they strongly suggest that a similar requirement on them would remove the investment incentives.

Mr. GRAY. I personally do not think that is a fair argument. In fact, if you look at the State of South Dakota, for example, to Mr. Tauke's point—who, by the way, I am very much aligned with that position as well. An unbundled network element, the pure copper itself, is \$28 per loop per month in the State of South Dakota. The retail rate for business services is \$30 and for residential service \$14. So the cost of the loop itself is 2X times what the residential unbundled loop is—I am sorry, the residential retail line and almost the equivalent of the business line.

So we have failed to see the merit of that argument. In fact, their access charges are \$.06.5 a minute in South Dakota. So I fail to see the economic merit of that argument.

Mr. SHIMKUS. Mr. Scott.

Mr. SCOTT. I can't comment about US West because we don't provide service in US West's territory, but I will make comments about Southwestern Bell. And we would not seek to imply that Southwestern Bell is not investing in its basic network plant, especially in metropolitan areas. We are also seeing that independent telephone companies are using their access to universal service funding and subsidies to continue to invest in the infrastructure in small towns and in rural areas.

So we think that, currently, there is strong incentive for phone companies to continue to invest in their plant and the market-based incentives where cable companies and providers such as Birch are using and employing our own technology are creating a competitive environment where they must continue to invest very aggressively in advanced services. And you are seeing that today. Southwestern Bell, in particular, unveiled earlier this year an aggressive DSL roll-out throughout their entire region with the projections of having hundreds of thousands or even millions of DSL lines in service in a very short period of time.

So we do see that the current competitive environment is driving all players in the industry to invest significantly in these facilities.

Mr. TAUZIN. The gentleman from Tennessee is recognized for a line of questions.

Mr. GORDON. Thank you, Mr. Chairman. Again, thanks for having this very good hearing today. I have a couple of questions just because I am not that informed, I would like for you to help me with.

One, we have talked about the different vehicles of which people are going to be plugged up. But electric wasn't one of those. Are we going to have some kind of a supercharged electric additional wire into the house that can be a part of this competition? That is one of my questions.

And the other is we have talked about the various elements to get service and get people hooked up. I am interested in what kind of combinations we are going to have. I assume that wireless has to be a part of the finished product if you are going to have universal service. But as we look into the future, in terms of price and quality, is cable and telephone, are they going to be comparable? Or are we going to have winners and losers there? I mean, ultimately, does one, because it is more efficient, better quality, less expensive, is it going to beat the other out? So where are we going to wind up in the future here?

Let me start first with the is electric wire, is that out of the picture?

Mr. FALCAO. Certainly is not out of the picture. We are currently deploying Internet access using the power facility in Europe and we have at least one trial in North America and there are other companies that are trialing that as well. So I believe you will see the power utilities using their electric infrastructure as an access technology.

Mr. GORDON. Does anybody disagree with that? Is it going to be economically and technically viable?

Mr. VRADENBURG. Mr. Gordon, I think it is very difficult to predict the future and I think if you sat here and tried to predict what was, in fact, going to win or lose in a technology environment, you would have missed the Internet, you would have missed a lot of things. I came to AOL when there were a lot of busy signals going on and the company was going under and that was a little over 2 years ago. So I think it is very difficult to predict the future.

I do think what is important to try and do is to try and maintain a framework for these businesses in which the technology either will deploy effectively because, in fact, there is a utilitarian quality to it, in fact, it in terms of cost and reliability of service that it,

in fact, succeeds in the marketplace. And the fact that if, in fact—the electric utility is an interesting example earlier mentioned that, in fact, if the electric utility only, in fact, wants you to buy their light bulbs, that ought not to be the way that the business is being done.

So that, in fact, all service providers have access to all of these access technologies. Allow them to compete on their merits and allow the American people to get services through which everyone is successful. But I do think it is very difficult to be predictive yet.

Mr. GORDON. Your whole message today—and I understand that—and certainly you are not a soothsayer to know what the future is. But I am trying to get a technical question answered to the best of this, you know, widely talented group here. So let me, if I could, go back to is the power companies, are they going to be a player in this both in terms of the quality and economics? Does anyone think they are not?

Mr. KURTZE. I think the actually perfectly technical answer is it depends. And, as it often is in these technologies, the capability is there for some technologies and some power companies to be able to do that, but it will depend, I think, on the configuration of their individual networks. All power grids are not built identically. All customers are not located essentially the same.

Within Sprint, we are trying to do some things that would mix a lot of technologies—wired, wireless. We would love to have the power companies as an alternative source of access. We wouldn't be launching our ION network in the fall as we are in three cities—Kansas City, Denver, and Seattle—without using currently unbundled network elements from the incumbent carrier. But we would love to have these alternatives. So we are going to pursue those.

So I think the precise answer to your question, Congressman, is it is difficult to come up, but I would expect the answer is in many cases, yes, but it won't be a ubiquitous yes and it won't be equal in all parts of the network.

Mr. GORDON. Mr. Falcao, what are your thoughts?

Mr. FALCAO. So I absolutely agree. I believe it is not going to be a technology issue here. It is going to be very much a business focus issue. And I know there are a number of utilities today that are considering this an additional revenue stream, additional methodology of capturing customers, but it is very much on their business model. It won't be a technology issue.

Mr. GORDON. Mr. Falcao, you are somewhat unbiased, I guess, in the terms of your product. You want everything, you know. Are there technical and financial advantages to either the telephone line or the cable line or the wireless that is going—with the knowledge that we have now—to make one appear to be a superior being that is going to win this battle?

Mr. FALCAO. I think the answer to that is not—again, it is going to be an economic answer. So if I look at the investment required to get them all to the same place, I think you are going to find very different investment patterns that are required to get everyone to the same place that they are all equal. So the way I can answer that is that if you want to everyone to equality, it is going to re-

quire very different investment streams in each one of those technologies you talked about.

Just to give you an example, today cable and the wire, the copper telephone lines, are growing very rapidly and the copper wires are pretty much ubiquitous. So getting to copper wires to deliver high-speed access is not going to take as much as possibly building a different cable infrastructure. However, there is no reason that they can't all deliver the same quality of service.

Mr. VRADENBURG. May I take a shot, Mr. Gordon?

Mr. GORDON. Sure.

Mr. VRADENBURG. Let me describe how, first you have got the difference in footprint of DSL and telephone wires because of the technical constraints in the current technology, probably can only reach about 50 percent of American homes. The cable probably can reach somewhat more, albeit the footprints aren't going to be overlapping. But let us assume that you are in a geographic area in which both access technologies were available to a home.

It is our view, our vision of how this would work, is that AOL would offer a higher speed suite of services to its customers and that a customer would order up, either for an additional \$10 or \$20 or \$30 a month, what they wanted in terms of speeds and applications. And that the customer would never know whether we delivered that service through the cable modem or through the high-speed telephone wire. And that the high-speed telephone wire may be better for some applications and the cable plant better for other applications.

So that, in fact, we see a world in which both could coexist and which the customer basically can order up the kind of service with the kind of application they want and never would know what was the nature of the access technology that we employed in order to get that service to their home. So if the customer were truly interested in a high-speed, just brute strength, download capability and was less interested in upload, it could be we would deliver that via the cable plant. If they needed some symmetrical quality to the transmission because they were in a home office or something, we might use the telephone plant because its architected differently. So that, in fact, the consumer may never know.

So my own judgment on this is that these, even in areas where they both coexist, will coexist because they will be better for different applications and the service providers, the 6,000 ISPs, will end up picking one or the other or both for different sets of applications and both will coexist.

Mr. TAUZIN. The gentleman's time has expired. The Chair will now recognize the gentleman from Florida, Mr. Stearns, for a round of questions.

Mr. STEARNS. Thank you, Mr. Chairman. Mr. Apfelbaum, this is a question for you. The architecture for cable broadband is much different than DSL technology because cable broadband will require the sharing of cable lines between residents, rather than a dedicated line that a telephone company could provide. How does this fact complicate the ability to offer open access to cable? If we mandate open access to cable, would the regulations resemble the common carrier regulations that telephone companies must pro-

vide? And what effect would that have on the roll-out of broadband cable services?

Mr. APFELBAUM. I do think that the architecture is very different and that that would make unbundling a very complicated thing for us. And I think I said earlier—you may have been out of the room—is that that kind of regulation, while it might be feasible or it might be possible to do, is very costly and very inefficient. If we were required to do that, I think it would make our lives much more complicated and really interfere with our ability to offer the services that we think consumers want.

And the networks that we build are not only shared in the sense that customers share them to get services like Internet services, but it is one network that we use to provide everything we do, including providing video programming, providing telephony, and providing these new services. I think sometimes some of the people who advocate open access act as if we were kind of irrelevant to the thing and they can say, well, we will use phone for this. We will use cable for that. And I guess, you know, their view is that whatever demand they choose to make, our system will somehow magically respond.

But our view is that all of this is a very delicate process and that we are the ones in the position to meet consumer demand and try to build a service that will be something customers want. If we had this unbundled open system where all of these ISPs would say, well, I want this much of your capacity because I have signed up this many customers. I want that many. I don't think it would work very well, from the consumer's point of view.

And I do think that the goal of policymakers should be to encourage the deployment of facilities and that the best way to do that is to leave the facilities companies free to make their own decisions about business models. And I think, as we have heard today, there are so many different companies doing so many different things, let those people go out and experiment and let the marketplace decide what the best business model is.

Mr. STEARNS. Let me ask Mr. Vradenburg from AOL if he has any comments to the comments that Time Warner just gave.

Mr. VRADENBURG. Yes, sir, Mr. Stearns. Two or three points here. First, the demonstration that we made in Clearwater, Florida, demonstrated that a \$1 per home, one-time cost is a simple and straightforward solution to offering multiple services over the same cable plant and that off-the-shelf software can manage this. It is not only feasible, but it is a relatively low-cost, inexpensive solution so that, in fact, customer choice and competition can, in fact, be built into the cable plant as well as the telephone plant.

It seems to me that to allow the facilities provider to basically choose the services that is offered over their system has several disadvantages. First we have known the cable system's track record in terms of price and service quality in this country and that is the product of the fact that they are local video monopolies, basically relying on government-granted exclusive franchises for their position. As a consequence, not only is the price higher and the service quality less in that particular environment, we are also seeing that the service that they delivered for competitive services or for content over their plant is different, depending on whether it

is there's or somebody else's. If it is there's, it is cashed. If it is somebody else's, they get access to the Internet.

The third thing I think you will see in that particular business model is that they basically limit the amount of video content that will come through the wire. So, basically, in a model in which the facility is the only service provider over that system, you have less competition, less consumer choice, and, in fact, you have constrained services that are being offered. And this is not a matter of technical feasibility. It can be technically opened up, both feasibly and in terms of cost efficiency, and so that it need not be so.

And we have seen in the Internet as a whole that it is a network of networks, all interrelated, all interconnected, and it all works responsively behind the scenes and it is totally and transparent and invisible to the consumer.

Mr. STEARNS. Mr. Chairman, I just have one more question.

Mr. TAUZIN. The gentleman may proceed.

Mr. STEARNS. In my opening statement, I talked about the decision in Portland, Washington, and you and I just talked briefly, you might indicate what AOL's reaction is to the Portland decision.

Mr. VRADENBURG. Well, we have been hearing a great deal from the cities recently and they seem to be saying to us that they are hearing from their local constituents that constituents are angry about the lack of choice in cable-delivered services in their communities. The cities think that they have a legitimate interest here because they own the rights of way over which a cable plant is built and they traditionally have had a responsibility for protecting competition in cable-delivered services in their local markets.

They are, in a sense, on the front line of this particular issue in terms of what the consumers are thinking and they are telling us that consumers want choice and competition. In a sense, the cities here are laboratories of democracy. I do think that, through time, we are going to see other cities pick up this issue because they are responding to local constituent pressure for consumer choice and competition in cable-delivered cities in their communities.

Mr. STEARNS. Thank you, Mr. Chairman.

Mr. TAUZIN. Thank you, Mr. Stearns. The Chair is pleased now to welcome and recognize the gentleman from Massachusetts, Mr. Markey, for a round of questions.

Mr. MARKEY. Thank you, Mr. Chairman. In the old days when telecommunication and finance was one great glorious subcommittee, I could go to a banking meeting, which I just had to do because that bill is coming up next week, on our own schedule. But, unfortunately, we don't have that luxury any more and I have got a privacy amendment I am trying to make to that bill that required my presence to all of you.

Mr. TAUZIN. My dad used to talk to me about the good old days, too, until I looked at them. They weren't so good.

They were old.

Mr. MARKEY. Well, you were a Democrat in those days.

Mr. TAUZIN. Like I said they weren't so good.

Mr. MARKEY. Mr. Tauke, in your testimony, you state that the notion that Bell companies would use interLATA data relief as a back door for interLATA voice relief is a red herring. And you state that Bell Atlantic will not provide interLATA voice telephony until

it gains the approval to provide that service pursuant to section 271, the checklist. Are you stating that when you get section 271 relief in New York or Massachusetts that such relief will only cover voice and that to do interLATA data, you would need some other relief?

Mr. TAUKE. When we receive 271 approval in the State of New York, we could begin to offer some data services to consumers in the State of New York. But, as you know, the way networks are constructed and the way the Internet works, it is very difficult to know precisely where traffic is going and so on. And so, as a result, while we can provide certain services to the State of New York, it does not permit us to enter the Internet and data markets in the way we would like until we have the ability to gain 271 relief in all of our States. So, in order to be a player in the market, we really need to go through the 271 process in all of our States if the 271 process is required for us to haul data across LATA lines.

Mr. MARKEY. But you will move quickly in other States, as well?

Mr. TAUKE. We are trying to move just as quickly as we can through the 271 process. And we could have a whole hearing on the 271 process and, after we finish the process in New York, I could even talk more freely about the 271 process. But the bottom line is that, when this committee passed the 1996 act, you were among those who predicted that Bell Atlantic, then NYNEX would be through the process in New York by the end of 1996. We are now in 1999. I don't think that the process has evolved in the way that any of us anticipated.

Meanwhile, the world has changed a lot. And I think our point is that, essentially, we have huge incentives from a revenue standpoint to continue to pursue the 271 process, separating data from voice services. And allowing us to engage the Internet market in the interim is not going to reduce our incentives or the necessity for us to complete the 271 process.

Mr. MARKEY. I guess the only point I am trying to make is that the Telecom Act of 1996 does provide for your entry into the interLATA data marketplace, but that it does require for Bell Atlantic to open its local loop as the precondition.

Mr. TAUKE. There is no question that if we complete the 271 process in all of the States, that then we can enter the data market without restriction or for backbone purposes. We still will have all of the restrictions I alluded to earlier relating to the last mile.

Mr. MARKEY. But the chief issue for you is that it is just taking a little bit longer than you thought to resolve these 271 interLATA data, the local loop issues, but once they are resolved, you are free for voice and data.

Mr. TAUKE. Right. We are talking about what happens between now and the time we complete the 271 process. And from your standpoint, if I may be so bold to suggest it, you shouldn't be that concerned about what happens to Bell Atlantic. What you should be concerned about is what is Bell Atlantic not delivering to the constituents you serve and people all across the rest of our region because of these restrictions. What does that mean to their ability to enter the world of E-commerce, the new data world that is available? And is there anybody else who is able to do what we could

do over the 1 year or 18 months or 2 years to make this world advance so that we get the economic benefits that come from it?

Mr. MARKEY. So, I mean, so that is why I want to work closely to you to get those restrictions lifted and get it resolved, that 271 provision resolved, knock heads with these State regulators and you and the Justice Department and get it done. Because it is really not a question of what, you know, Bell Atlantic can do for me, it is what I can do for Bell Atlantic. I mean, that is my motto.

And I want to work with you to get that 271 restriction——

Mr. TAUKE. Well, now that we are entering into a new era of good feeling, I am looking forward to it.

Mr. MARKEY. Let me—is it Vitale?—if I could, Ms. Vitale and Mr. Vradenburg, I would like to read you a quote from a hearing held in February 1994 before this committee on the issue of developing legislation to deal with the issue of the convergence of these technologies.

This is what it said: “The open access and interconnection requirements placed on the telephone companies should also be applied to the cable television industry. The asymmetrical application of these provisions will frustrate the development of an integrated network of advanced networks. If we are to realize the full potential of the information highway, all telephone and cable networks should be open and unbundled. We must move away from information bottlenecks and transmission monopolies. If some networks are open and others closed, we risk creating a tangle of private toll roads, not an open highway. With mandatory interconnection and equal access, customers on one network will be able to reach other networks. Open access requirements also encourage the robust development of niche information providers who can deliver their products to consumers with little or no capital investment.

Furthermore, open interconnection can help ensure that competition can still thrive even before we realize the vision of legislation where customers have access to at least two ubiquitous competing broadband networks. As the Nation makes the transition to a system of multiple networks, competition can be safeguarded if all information providers are guaranteed access. This protection will be especially important in less densely populated areas where, at least initially, it may be financially prohibitive to construct more than one broadband network.” Now this was testimony by Dick Notabach, who was the CEO of Ameritech at that time. Could you comment on that testimony? Ms. Vitale, Mr. Vradenburg.

Ms. VITALE. Well, I couldn’t agree more with the particular testimony in terms of opening it up and having access available to everyone. And I think that it is critical that we are able to purchase the unbundled loops, that you have access to customers. And that is how RMI.NET has thrived and been able to offer different products and services throughout the country and we are able to do that. And we are able to do that in small, rural areas also because of the opening of that.

And the more choice that we have, rather than only one and, if we were dependent upon the RBOCs to deliver high-speed access, we would be in a world of hurt. And we are able to have other choices. And I mentioned earlier that we have companies in Bloomington, Illinois, and we are able to be able to deliver high-speed ac-

cess to them starting next year because of these companies that we are able to resell their products.

Mr. MARKEY. Thank you. Mr. Vradenburg, very briefly.

Mr. VRADENBURG. Well, I agree with the comment. It echoes comments and sentiments made in a speech by Vice President Gore in 1994 on exactly the same subject. It was a very visionary look at how the future was going to develop and we have only partially realized that.

Mr. MARKEY. Okay. Thank you, Mr. Chairman.

Mr. TAUZIN. Thank you, Mr. Markey. The gentlelady from Missouri, Ms. McCarthy. I am sorry? Oh, Mr. Apfelbaum wanted to respond.

Mr. APFELBAUM. Could I respond to that? I am sorry. You know, I thought it was a fairly established principle that common carrier regulation was only to be employed when there was some kind of market failure. Some of the speakers today, while they are talking about at least seven different kinds of providers, seem to say that each of those providers is a monopolist. I think that makes no economic sense.

Also, some people have said it is crucial to be able to buy access to these different providers and I think the policy question is crucial to whom? As Commissioner Powell said the other day, the point of competition policy isn't to look at the effects on individual companies, it is to look at the effects on competition. When a market is in its very early stages and there is no indication that the market is failing, that is the very worst time to come in and say here is how it is going to work for everybody from this moment forward.

Finally, I do want to emphasize, too, that, in terms of this debate about whether ISPs can have access, Road Runner provides access to any content that any of our customers wants.

Mr. MARKEY. Can I ask just to conclude—I thank you, Mr. Chairman—is your point that it is technologically feasible for multiple access? Or is it just a business model that you wish to pursue?

Mr. APFELBAUM. Well, I think that the technical component is part of the policy issue and—

Mr. MARKEY. Are you saying it is infeasible to do that?

Mr. APFELBAUM. I think that it adds a clot of costs and inefficiencies for no consumer benefit. So in that sense it—

Mr. MARKEY. So are you saying the engineers say they can't do it? Or that you don't derive the full consumer benefit from doing it?

Mr. APFELBAUM. It is more the latter.

Mr. MARKEY. Yes.

Mr. APFELBAUM. I think engineers can do anything they want to do. The question is whether the costs are worth it.

Mr. MARKEY. Okay. Thank you.

Mr. NETCHVOLODOFF. Could I just add just something to that?

Mr. TAUZIN. Mr. Netch, proceed.

Mr. NETCHVOLODOFF. I think that the question here is a question of scale. Are we talking about 6,000 ISPs? Are we talking about 500 ISPs per market? And the complexity is not a straight line. It is asymptotic. It is logarithmic. And the more equal access you are providing for under a regulatory scheme, the higher the cost to the

end-user. And this is especially problematic when most ISPs are not adding value. They are simply providing a service that is already being provided by whoever is providing it.

Mr. TAUZIN. Yes, we will do another round if we need to. I need to recognize Ms. McCarthy who has another appointment.

Ms. MCCARTHY. Thank you, Mr. Chairman. Mr. Kurtze, your eye on technology is very phenomenal and in your testimony you talk about the importance of the last mile and how critical it is to getting it to potential customers like me. I would like you to expand upon that because I think it is a very impressive technology and you took the law quite seriously in 1996 and abided by it and here you are today on the cutting edge of these new technologies and better service to customers. So if you would expand a little bit on that last mile broadband and what we in the Congress should be doing to help you get there, I would appreciate that.

Mr. KURTZE. Well, as I have said earlier, we have designed the ION concept, an integrated, on-demand network to be access technology agnostic. So as other opportunities present themselves to us, we are prepared to look at wireless, to look at different forms of access technology to the end-customer and there are more available to us today at the small business and large business arena than there are at the consumer.

So our concern has been, in the short-term, that we are in fact using unbundled elements and DSL type technologies from the incumbent as we roll-out this initial product to consumers because that is all that is practically available to us if we want to launch that network and get consumers to see—the value to the consumer is not in the access technology. The value to the consumer is in the services and the kind of things we put on our networks and others might as well. We want to get that value out so consumers can see it and to do that, to date, as I said, in our initial 3 markets we are launching this fall, we are depending on the unbundled access that is available to us from the ILEC as a function of the 1996 and other current regulations.

So our position is, you know, that process is working now and, in the short-term, we would like to see it continue while these other technologies get a chance to mature and actually present themselves in the marketplace.

Ms. MCCARTHY. I assume by your response that you would favor having interconnection rights to the last mile, whether it be by telephone wire or cable?

Mr. KURTZE. Oh, yes, we—the more technologies that are available to us, the more we think our overall network will give us the opportunity to present an acceptable proposition to the end-user.

Ms. MCCARTHY. Thank you. Mr. Scott, you, too, have abided by the 1996 act and here you are. And we wish we could duplicate you all over America because that kind of competition is what we hoped to foster in the act. I wonder if you, since you in your statement talked about the carrot and stick and the critical difference in carrot right now and the true importance of it both to you and companies like you and to those companies that would like to be like you but the hurdles in the way as well. Would you mind touching upon this IP telephony that will be a viable business, how soon you think

that might be available and what we in the Congress could be doing to help make it possible?

Mr. SCOTT. Sure. I guess I differ a little bit from some of the opinions expressed on how quickly IP telephony will be what we call ready for prime time, providing voice service in the local exchange. We are predicting that, given the amount of resources that are being dedicated to this task within the vendor community, that it could be feasible within a year to a year and a half. We are actually beginning to trial some technology that would allow us to put voice over a DSL loop as an overlay technology and are beginning those trials in Kansas City right now. That technology is here. So I am more optimistic about that.

And it may interest you to know that we are already using packetized voice in our long-distance network to carry services. It is trickier, granted, to actually move it into a local exchange, but many carriers in the long-distance market are already converting the voice signal into a data signal and carrying that around for reasons of efficiency.

And your earlier comment about the carrot and the stick.

Ms. MCCARTHY. Yes.

Mr. SCOTT. I have been somewhat pessimistic up until relatively recently at ever getting through the process of interconnection and all of the requirements for opening up the local exchange as laid down by the act. But I think the carrot has finally worked and it has been skillfully employed by the Texas Commission in working through a number of different interconnection agreements that parties had fought over for, well, ever since the act and actually before that. So we have seen that the carrot aspect, section 271 of the act, has really started to make some progress in the Texas jurisdiction. And we think that will serve as a model for other States.

Ms. MCCARTHY. And could I take from those remarks that Congress ought not get in the way of the commissions—Missouri, Texas, or otherwise—proceeding? Are there things we should be doing up here to help facilitate?

Mr. SCOTT. Yes, I think you are right. Congress should not get in the way of the implementation of that. Everybody has been patient and I think we are starting to see some progress in that and so changing the regulatory scheme, I think, would be the worst possible thing to do.

In terms of encouraging, I would have one suggestion. It may be both an issue for the U.S. Congress and also for State legislatures to deal with. But the subsidy mechanisms that are set up to support universal service. We are waiting to see the specifics of that and whether those are targeting subsidies toward particular companies or if they are subsidizing the consumers. Because we see a lot of innovation that could occur in meeting the demands in high-cost or rural areas. And so I think one thing that would be very important for Congress to consider is that the subsidies not accrue out of default to a particular provider of service, but that it be independent of provider or technology to give us all maximum incentive to compete for those market opportunities.

Ms. MCCARTHY. That is a very good idea and I thank you for it. And I have run out of time. And, Mr. Chairman, I thank you for your graciousness.

Mr. TAUZIN. Thank the gentlelady. And the Chair now yields to the gentleman from New York, Mr. Engel, for a round of questions.

Mr. ENGEL. Well, thank you, Mr. Chairman. First of all, I want to commend you for doing this. I know we are going to be doing more of this in the next months and I apologize for just coming in. This has been one of those days for me. Since I really didn't hear the testimony, I really just have a general question that anyone who might want to answer it could. When we passed the Telecommunications Act a few years ago, most of us were in favor of it because we thought it would bring about increased competition for consumers. Increased competition, the theory goes, brings about lower prices because there is, obviously, more people competing for the same thing.

I think that my constituents in New York have experienced disappointment the way constituents have across the country that they haven't seen the benefit of lower prices and they have a growing fear that not only will the lower prices never come, but that they will ultimately lack the access to broadband technologies, the very technologies that we are discussing today.

So, as this committee in the next several months—I know the chairman is planning on getting the members together at a retreat and I know that we are going to be studying this issue a lot and one of the nice things about this committee is whenever you think you know everything, you realize how little you really know—as we are dealing—this subcommittee and the committee—with legislation that advances the broadband technologies and the access to the consumers' homes, what assurances will the consumer have or can the consumer have that these technologies will ultimately be available for all Americans and at reasonable prices? Because, obviously if it is not reasonable, we could say it is available but my constituents, many of my constituents, would not be able to afford it.

So I am wondering if any one in the panel—a lot of people here. I see my colleague—my former colleague—Mr. Tauke and other friends here. So does anyone want to take a stab at it? I would be appreciative.

Mr. VRADENBURG. Mr. Engel, my name is George Vradenburg from America On Line and I would like to try and answer that question. At the end of the day, it is what the consumers demand and whether or not there is some additional service or features that we can deliver to them through broadband that they can't get through narrow band. And whether we can get the price of that service down and the applications or the features or the services improved so that they will pay whatever additional price needs to be paid.

In terms of access to the marketplace, it seems to us here at AOL that is very important that we maintain the policy that we have had over the last few years, which is to keep the Internet deregulated and to keep the infrastructure open. We are buying DSL lines now from Bell Atlantic in your region and we are able to do that because Bell Atlantic is obliged to sell them to us. We would also like to see competition in these access technologies so that we have urged, Mr. Engel, that the cable systems as well sell us access technologies so that, in fact, we can buy transport from either or both of their plants and drive the costs of this down so that we can get

consumers' prices down. At the end of the day, it is consumer demand.

We have seen consumer demand in Internet narrow band services now roll out a new medium faster than any medium in history. We have rolled out the Internet to 33 million American households, which is 5 times faster than we have been able to do in the television or the radio marketplace. Why is that? Consumer choice and competition and broader services and we would like to be able to do that as well in broadband.

Mr. ENGEL. Mr. Tauke, I guess you would have a little different opinion.

Mr. TAUKE. Actually I have a very similar opinion. I think, first of all, as we alluded to earlier, that there are a lot of things in the 1996 act that are working very well, but it has taken a lot longer than anybody wanted for a lot of these things to work and we can have a long discussion about that. But on a going-forward basis, it seems to me that where the key question is how do you deal with the new market? And we do have a new market with new technology and new opportunities, if you will, and how do you get the infrastructure for that new market deployed and how do you get it deployed ubiquitously and how do you get it at a reasonable cost to consumers?

I believe that in the foreseeable future, the best policy that the Congress can pursue to achieve those objectives is to follow the model that was used in the world of wireless. When wireless technology was in its infancy, then the great telephone companies said we would have 1 million users by the year 2000. Well, obviously, that has been totally bypassed years and years ago. We have many technologies now in the wireless market. We have lots of competition in the wireless market. There are a variety of packages of services consumers can buy. And the price has come down.

Why has that happened? In part, because companies were able to make decisions without excessive fear of regulation about deployment of technologies. Not everybody succeeded. Some tried it. Some lost. But it has resulted in a robustness in that market, which I think has served consumers well. Part of the difficulty we have today is that there is not the same kind of opportunity available for many players in this new data market, Bell Atlantic being one of them. I won't go through all we have talked about today, but there are a lot of barriers to our being able to deploy the services.

Just one example: The FCC has talked about having us do our DSL services in a separate affiliate, which means we would have to buy separate trucks, hire new people, you know, and so on, to have them go out and serve the people in the city of New York. This is enormously expensive. We believe it would increase the cost \$8 a month per customer to provide the same service. But that one regulatory requirement, if it were adopted—it hasn't been adopted—but if it were adopted, would have tremendous impact on costs to consumers. That is the kind of thing that we have to avoid.

Mr. ENGEL. Yes.

Ms. VITALE. Congressman Engel, I am Mary Beth Vitale. I am president of RMI.NET, one of the small, 5,000 ISPs out there. And I wanted to address one point that you made about are the consumers really getting more products, more technology for lesser

price. And I think one example I would like to cite is that ISDN has been around for quite some time at a very large price point for a consumer and it was not ubiquitously available or distributed. It was very slow to come and at the time it was just the RBOCs that were delivering that service.

As the 1996 act started to be implemented, more and more competitors came in delivering the DSL service that you are seeing right now and whereas ISDN was at a certain level of technology for \$200 a month, you can now have a DSL service that gives you even faster speed, higher technology, delivered to consumers and to businesses at around a \$40 price range. So here they have gotten, you know, a better technology, quicker, and cheaper.

So I think it is starting to work. It is starting to happen. And it is because of the act. And we see it right now. And we are able to resell those products.

Mr. ENGEL. Well, thank you, Mr. Chairman.

Mr. TAUZIN. Thank you, Mr. Engel. The Chair would now recognize himself again. Let me take you through all of the various pipes and examine what is the difference in governmental treatment insofar as broadband would be concerned and get you to comment for me. When it comes to whether or not a platform can legally limit consumer's choice of an ISP today, clearly ILECs and CLECs, incumbent telephone companies and the new competitive local telephone companies, clearly they are common carriers. No one disputes that the telephone companies could today limit consumer's choice of an ISP. Is that correct?

They cannot. That is right. But cable can, right? Cable today can limit because it is a private network, it can limit. What about—and maybe you can help me here, Mr. Apfelbaum and Mr. Netch—what about if cable decided to offer IP telephony? Would they then be under the act, a telecommunications carrier with common carriage obligations, under current law? Mr. Apfelbaum. Or even circuit switch?

Mr. APFELBAUM. I am not really sure there is a clear answer to that under the existing law. I think our view would be that, generally, what we do is provide cable service and that, under that law, we are not obligated to function as a common carrier.

Mr. TAUZIN. Even in IP telephony?

Mr. APFELBAUM. I am not sure that is 100 percent clear under existing law. And, you know, I think that is one of the issues going forward, but, generally, I think the Cable Act is pretty clear that what we do is not subject to common carrier regulation.

Mr. TAUZIN. Mr. Netch, you want to comment? Do you think that either switched or IP telephony is or is not subject to common carriage obligation today when delivered by a cable company?

Mr. NETCHVOLODOFF. Well, switched telephony clearly is under title II and we are in full compliance with title II in the 1996 act.

Mr. TAUZIN. How about IP?

Mr. NETCHVOLODOFF. IP telephony is a grey area. I think that Congress was not clear about this. There is, as you know, a report from the FCC which Barbara Aspen who was the author of that report cited some ambiguities and also cited the fact that there were certain statements on the floor and in report language indicating that the cable usage of Internet services would be under title VI.

Whether or not that survives, I have no way of knowing. But I think it is a grey area.

Mr. TAUZIN. Fixed wireless, mobile wireless. Probably not, right? Anybody want to challenge that? Would fixed wireless and mobile wireless have the capacity to limit a consumer's choice of an ISP or would they be treated as common carrier?

Mr. PICKLE. You know, Mr. Chairman, today at Teligent, we actually have ISPs as customers of our network. One of the great things about building a facility-based network as opposed to using other facilities provided by other suppliers, you can do with your network whatever is best for your business and best for the consumer. We do do that today. We don't believe it is a legal requirement, we just believe it is the right thing to do because we believe in competition.

Mr. TAUZIN. What about if it is a retail service you provide?

Mr. PICKLE. We would do that as well.

Mr. TAUZIN. You would? Do you think you are obligated to be—are you treated as a common carriage under the law under those circumstances?

Mr. PICKLE. Oh, I think, yes.

Mr. TAUZIN. Satellite. Here I want to turn you, George, if you can, because I want to get your interaction on this. You know, you commented about your company's recent deal with Hughes Direct TV. Since the 1996 act, it seems to indicate that, except the Commission shall determine whether the provision of fixed and mobile satellite service shall be treated as common carriage. That until the Commission should make a determination, it seems at least that satellites, until the Commission says otherwise, may not be common carriage or instruments. In that case, could Hughes, in your business arrangement with them, limit the choice of ISPs to consumers?

Mr. VRADENBURG. I don't know that answer, as a matter of law, Mr. Tauzin. Our deal with them is not exclusive.

Mr. TAUZIN. What is your business plan there? Can you tell us?

Mr. VRADENBURG. Well, the business plan is to be able to offer to an AOL customer a broadband service no matter where they are in the United States.

Mr. TAUZIN. What if I am not an AOL customer?

Mr. VRADENBURG. A non-AOL customer we wouldn't be offering services to.

Mr. TAUZIN. Yes, you wouldn't be doing it. But would—

Mr. VRADENBURG. One of our competitors would be. They can do it over the DSL platform. They could do it over a wireless platform. They can do it over a satellite platform.

Mr. TAUZIN. I guess what I am asking you, is your agreement with Hughes exclusive?

Mr. VRADENBURG. Oh, no, sir.

Mr. TAUZIN. Hughes could offer other ISPs. And the question that is hanging out there is do they have to offer other ISPs access to that system?

Mr. VRADENBURG. I don't know the answer to that question.

Mr. TAUZIN. Okay.

Mr. VRADENBURG. They can, under our deal. I think it is a matter of capacity. I think we are clearly investing in them and that we want to build out a platform up there.

Mr. TAUZIN. If they don't have to offer other ISPs access, then you would agree with me that it is possible that then AOL would be the beneficiary of it because you would deal with AOL and nobody else.

Mr. VRADENBURG. Well, that is certainly true, although, clearly, we have not sought to make it exclusive because we believe that, in fact, the more choices there are for the American consumer, the more applications are out there off of the Internet, the faster these Internet services will be adopted, and we will compete for our fair share. But we would like to see the tide go up for everybody and then compete for it rather than try and constrain the growth of the business.

Mr. TAUZIN. When it comes to electric lines, now, Mr. Falcao, maybe you can help us here, I would assume that if an electric company decides to offer broadband services, that it would be treated as a common carrier. But would it? Or would it be a cable company at that point, which is exempt because it is not defined as a telecommunications carrier. Which is it? What do you think it is going to be when NORTEL begins to unveil its electric line, broadband services?

Mr. FALCAO. I honestly don't know. I would think it would fall into the same category as you were discussing with the cable company, but I honestly don't know.

Mr. TAUZIN. Well, I guess you get my drift here. I heard a lot of don't knows and a lot of grey area. A lot of we think but we are not sure. A lot of we would like to see it work this way, but we are not certain it does. And the strange thing about it is that, you know, there are some of you who were telling us don't mess with the act, don't mess with the law, just let it work. But there are a lot of don't knows out there. And we are talking about the same service, the same ones and Os. Broadband distribution of the same services, just coming on all these different pipes with a lot of I don't know what the rules are.

You can understand why we are going to have a good time exploring this not only in future hearings, but at our retreat.

Let me ask you to help us in that regard. Mr. Boucher and I opened up our line of questions with asking you to prognosticate a little bit for us, to guess when you thought things might be out there for people. What I would like you to do is to come back to us in writing on that.

What we would like to know, for example, from the ILECs and CLECs is when do you think, on a time line, the various broadband services are going to be available to what percent commercial and what percent residential customers if we don't change the law? If whatever uncertainties or handicaps currently exist in the law, if we do nothing? We would like to hear the same thing from cable. Some ideas over the next 3, 5, 10-year period when broadband services are going to be available to people, what people, and what services? What percent commercial? What percent residential?

And we would like to hear the same thing from the mobile and wireless and from the satellite folks. And eventually we are going

to ask the same thing from broadcasters who might be able to do some similar broadband services over the new spectrum we have provided for them. And we are going to have to ask the electric companies, I suppose, to comment as to whether or not they think they are going to be in this game and when, too.

What I would like to be able to do as we further explore the I don't know and the maybes and I think and I guess and I am not sure about these issues is to see, without changing any laws, without Congress getting into this act at all, or the FCC doing anything differently than they are doing today, when are consumers likely to see what broadband service is offered by what pipes? So that we can get a picture as to which of those pipes are going to be open and which of them are going to be closed networks and when they are likely to be available to offer consumers the kinds of choices we are talking about.

The reason I would like to ask you to do that—I mean, we have been through this a number of times at this committee level. And Mr. Tauke, you were here when we were first debating communications deregulation issues all the way back in the early 1980's. This issue of timing always plagues those of us in Congress and I am sure at the FCC. The issue of timing, the question is will there be competition available in a market at the right time to ensure that not only the players can enter that market and compete, but that consumers are not inappropriately stuck with only one provider that is, perhaps, in some cases, not an open network. Perhaps a closed or private network. In which case, what is our responsibility under those circumstances? How can we aid the timing of the deployment of these services so that choice is out there rather than the necessity for somebody to regulate?

And those issues are going to plague us as we try to unravel these I don't know and maybes and I guess as the way it is going to work, until we can give you some kind of certainty. All of you talked about certainty. Mr. Pickering I think centered his comments on that, that clearly business certainty requires regulatory certainty and governmental policy certainty so you can move forward. And I will go back to what Mr. Shimkus said. Our role is not pick winners and losers out here, our role is to try to make sure that you all can play. And, more importantly, that Americans will have real choices out there and that they have the full services available to everyone as close as possible at the same time, recognizing that, you know, in deploying services, some people are going to have it sooner than others.

If you would kindly do that for us. Kindly come back to us in writing on as good a time line as you can predict. No change in law, no change in regulation, making whatever assumptions you want to make as to whether or not you are common carriage or not.

Mr. Kurtze, you had your hand up, sir? No. And I don't see any other members here. Let me offer each of you right now, a final word if you would like to make it, on the record, before the committee. Any one of you? Final words. Mr. Apfelbaum.

Mr. APFELBAUM. I would just like to say one thing. I think the way you framed that question, we were talking about whether ISPs could serve as ISPs as such, but we don't have a closed network.

We have an open network where our customers can get any content they want. And I would just like to clear about that.

Mr. TAUZIN. I understand. My question was whether or not the platform could legally limit consumer's choice of ISPs, though. And your answer was yes it can as a cable platform, but you are not quite sure about the laws on IP telephony.

Mr. APFELBAUM. Right. But I just want it to be clear that we don't run a closed network because our customers can get any content that they want.

Mr. TAUZIN. Any other final comments? Yes, sir, Mr. Vradenburg.

Mr. VRADENBURG. I would first say that they run a closed network and obviously customers cannot get access, direct access, to AOL or to other ISPs. They can, obviously, go to us through the Internet which is, of course, is open to everyone because it is the Internet.

But the final word I would say, Mr. Chairman, is the following. What I think I have heard today and I hope that you have heard is that we are going to have in the world of convergence a set of digital services which are voice, video, and data, which are going to go through a variety of different platforms and are going to be single mixes and bundles of services going through a common technology through quite different platforms treated differently because of their historic legacy.

And that, as a consequence, there is going to be a strong need for the government to assure that it does not pick winners and losers, that its inadvertent action, inattention to this issue, does not result in an imbalance in the marketplace and a choice that results as a consequence of government, as opposed to consumers.

We have right now a problem which is big enough to see, but still small enough to solve. And if the government does not do anything now, then it will of necessity begin to be having an effect in the marketplace because of its actions or rather because of its inertia. And, as a consequence, this is an issue that I commend you for taking up right now. This is a problem, now. Not in 5 years, not in 10 years, but now.

The government, by its action, historic in character, legacy, and quality, is beginning to have an effect in the marketplace which is differential because of its differential treatment of different platforms which are now beginning to offer like services. And so I commend you, Mr. Chairman, for taking the steps now to focus on this problem.

Mr. TAUZIN. Thank you, sir. Ms. Vitale.

Ms. VITALE. The comment I would like to make to sum up is, addressing your last question about the electric industry, cable industry, and the telephony industry and whether there is similarities and should they be held by the same restrictions or requirements. And I think those industries have, you know, a lot in common in the respect that they are the only real access to the consumer at their home. And for emerging companies such as myself currently right now, RMI.NET can only deliver services from an unbundled loop through the telephone company to consumers there.

Once technology advances and, obviously, in cable it already has been advanced and then electric utilities are moving forward, they would not be required, if they are not underneath the act, to resell

those products. So I am relegated to really only having access through one means because of the law.

And if we keep in mind that those three industries, in order to be delivering the products for their industries, got regulatory relief to be a monopoly—there were pricing advantages and return on investment advantages, you know, to deploy their networks and their infrastructure. And now the lines are crossed and blurred because everybody is in everybody's business. And I think that having the technology to be open and access to be available to everybody will only just ensure that there is an economic growth and new companies that will evolve from that. Thank you.

Mr. TAUZIN. Thank you, Ma'am. Mr. Tauke.

Mr. TAUKE. There has been quite a bit of discussion about openness in the sense of consumer choice and whether or not it is fair and equitable. But I just wanted to mention something that I don't think has been mentioned and that is the way the rules in this matter have impact on deployment. Just bluntly speaking, if we are in a situation where we operate by one rule where, A, we cannot package our service with an Internet service provider and, B, we can't designate an Internet service provider for our consumers and therefore derive the revenue from that to supplement the revenue from the line, it is hard for us to compete with somebody who is able to package and designate an Internet service provider. And, if we, therefore, are not competitive in the marketplace because of a rule, then that slows down the deployment of the alternative services that the consumer might want.

So the rules relating to openness and the ability of consumers to choose an ISP have real implications for the way in which technology will be deployed and how, graphically, it will be deployed. I just would cite the video dial tone model, which was something of years past and was obviously a failure. There were a variety of reasons why it failed. But one reason why it failed is because one technology, in this case the cable industry, was able to say to a customer, we will give you transport and the programming package and the other industry was supposed to come in and say to the customer, we will give you transport but we can't give you the programming package, but we have to offer you a variety of options. Economically that didn't work. There were technological issues too, but economically it didn't work.

So, as you examine this, think of the economics and what it means for the roll-out and deployment of services as well as the fairness and consumer choice issues.

Mr. TAUZIN. Yes, sir, Mr. Falcao.

Mr. FALCAO. First I want to commend you on this because I believe it is a very important issue. The only observation I would make is the Internet has achieved a faster penetration than any other technology in history, so our decisions are going to have to be made in that context, very rapidly.

Mr. TAUZIN. We are not good at that. You know that.

Mr. FALCAO. So my only comment is I think we really are under a very, very right time pressure to make decisions quickly.

Mr. TAUZIN. Mr. Netch.

Mr. NETCHVOLODOFF. Mr. Chairman, first, thank you very much for having this hearing. I think it is a privilege to be here and to

participate. I think that one thing that is very important to bear in mind is that the deployment of technology is very, very capital-intensive. There are hundreds of billions—and I mean literally hundreds of billions—of dollars that will be spent, probably in the next 5 to 10 years, developing high-bandwidth capabilities in this country and there are a number of unaffiliated sectors in the economy that are committed to do this.

We read every day in the newspaper announcement from various parties, whether they are using microwave spectrum or whether they are going to do it by satellite or whether they are going to do it over utility lines, the one thing that is very clear about all of these plans are that they are going to cost a ton of money and I think that one of the things that the government has done successfully with respect to the Internet is to try to do no harm with respect to imposing regulatory overlays.

And so I would suggest that, as you consider whether or not there is a strong likelihood that there would be five or six, perhaps even seven, competitive, unaffiliated facilities-based, broadband providers of access from the home, that the marketplace will be fully capable and able to discipline the pricing and the selection for the consumer under those circumstances. If the cable model is closed, which we don't think it is, but if it is closed, from the standpoint of the consumer, we will lose because there are a number of broad, high-bandwidth competitors that are going to tee up infrastructure to provide access.

So if the customers don't want what we are providing, they won't take it. So that would be my comment, that the government should try to do not harm from a regulatory point of view.

Mr. TAUZIN. Mr. Pickle.

Mr. PICKLE. Mr. Chairman, if you will take into consideration the Telecommunications Act of 1996. We are, in fact, we like to say a product of that act. Now it is not perfect. We all agree with that. But I think—we think—that it has set in motion an irreversible force toward competition. And we think competition is the only way the broadband revolution will ever be realized. And so we would only suggest: Allow people to compete and compete fairly and we think the Nation will gain from that.

Mr. TAUZIN. Mr. Kurtze.

Mr. KURTZE. Thank you, Mr. Chairman. I think I would agree with most of the comments of this panel hearing. And I would say that the issue is the one you framed correctly where you have asked for supplemental information and that is timing. When does this competitive marketplace really exist? And when will it serve the American consumers? Because what consumers want to buy are the applications that will be available on these networks and the services. They really aren't technology junkies like some of us here on the panel that really understand the difference. But they want those applications and those applications will flourish when there are multiple ways to reach the consumer and there is that competitive dynamic. So I think the timing issue that you have raised is, in fact, the pivotal issue as to when things should evolve.

Mr. TAUZIN. Anyone else? Let me ask one other thing of you that can either respond or not, your choice, but I would appreciate some of you trying. What we are basically talking about when it comes

to common carriage, the question of common carriage, is that common carriage, even must carriage for cable companies when it came to video programming, was always designed, as you said, in a broken marketplace where there was not competition and there was only one provider and therefore some sort of common carriage law had to be applied to that monopoly provider or that near-monopoly provider.

In fact, must carry has been sustained pretty much legally on that basis that cable was the video provider for America for a long time and should be obliged to carry the programming of television stations, which were operating under the quote, unquote, "public interest standard." Is there a need for us to examine the term of common carriage in any other context, as we think of broadband services? Or is the old context sufficient? And by that, I mean, will it be enough if there are four or five or seven competitors out there, 1 day, none of which may have a common carriage obligation, all of whom may pick the ISPs they want to deal with and consumers can then choose from among those carriers who they want to deal with and what content they are interested in receiving from which one of those carriers? Or will there always be a need for someone to be open to everybody under some new theory of what common carriage means when it comes to information or knowledge and communications?

You can either do that now or later. Mr. Netch.

Mr. NETCHVOLODOFF. One of the things that happens is that scale is important. To the end-user, scale is important. But scale is also important to the provider. And if we are talking about perfect democracy here where 6,000 ISPs have all equal opportunity to engage somehow in a variety of networks, it isn't going to work because you can see already that AOL has an arrangement with Bell Atlantic, which is based on scale. And, therefore, the smaller ISPs have said this isn't fair because we are at a price disadvantage.

The problem here is you can't repeal the laws of economics. And if you have seven competitors, five or six competitors, and there is no market power amongst them, then I do believe that the marketplace is the place to put your trust.

Mr. TAUZIN. Mr. Vradenburg, you had your hand up.

Mr. VRADENBURG. You raise, I think, what is the pivotal point. Because the chairman of the FCC has posited a world in which there are four or five facilities-based providers and that is a world of which he would like to get to and think that that is adequate. And if one said each of those facilities providers could designate their ISP or their access point to the Internet, you would have four or five or six competitors in the marketplace. And you say to yourself, well, what is the level of performance there of that marketplace? Well, we have seen that marketplace in a number of aspects of our economy: the broadcast television or record companies or motion picture companies.

We have also seen in the last 5 years something remarkable. And your Houma, Louisiana?

Mr. TAUZIN. Houma. "Houma on the ranga."

Mr. VRADENBURG. Yes, you have got one cable provider, but you have got 400 ISPs.

Mr. TAUZIN. That is right.

Mr. VRADENBURG. And what you have in a world in which there are 100 competitors is a world where you get this extraordinarily tumbling effect. You have price and feature options from those people which fix every niche and cranny of a consumer's desire and you get technological innovation and business model innovation of type this country has never seen before, indeed the world has never seen before. You get customer adoption rates faster than any medium in history. You get technological progress faster than any in history. So there is something different about a marketplace which has 100 competitors than there is about a marketplace for 3 or 4.

Mr. TAUZIN. No question, Mr. Vradenburg. The question I pose, though, is a legal one. Assuming that that is a good idea to have that kind of a marketplace when it comes to knowledge and ideas, when you do have five, six, seven different platforms to deliver those ideas, does the government of the United States have any legal right to regulate content on some common carriage theory for one or any of those pipes at that point?

And I want to yield to my friend from Massachusetts for a final comment, so if you can brief and then come back to us in writing on it.

Mr. KURTZE. Mr. Chairman, I think what you are really asking is, you know, where—to go back to maybe our joint good old days—this is a supplier of last resort argument. And is there a requirement still, at some point in time in the future, for a supplier of last resort?

Mr. TAUZIN. Yes. I guess that is a better way to phrase it. Yes.

Mr. KURTZE. That is a social question.

Mr. TAUZIN. But can you do that legally?

Mr. KURTZE. We would like to think theoretically, no. That there wouldn't be a requirement, that the marketplace would work. But I think that is a good question.

Mr. TAUZIN. Well, anyhow, if you would kindly come back to us on it, I would like to hear your thoughts on it. Because, I mean, it is a philosophical question as to whether or not it is a good idea to do it for a marketplace that could be as vibrant as you describe, Mr. Vradenburg. And that is as vibrant in many communities today. So it a question: Is that a good idea? Second, is it a legal idea that is enforceable in law in a country that is pretty strict about seeing government takes its hands off of free speech? In our society, you don't try to regulate content.

Mr. Markey.

Mr. MARKEY. I thank you, Mr. Chairman. And it is not so long ago that the most contentious issue was whether or not the telephone company should be able to buy the cable companies in their own market. That is the central provision in the Telecom Act, that they are not allowed to. So we have a two-wire world. And the interesting thing was both industries opposed that provision, that they both saw wonderful synergies in having one huge pipeline and the cable companies, of course, would have telephone companies bidding, you know, on giving their shareholders an enormously great return. But as a matter of public policy we don't allow that to happen. That is central in the 1996 act.

And I guess the question is when do the witnesses believe that we will reach a point when we have four or five networks? Give us a date when you think that is possible?

Mr. TAUZIN. The gentleman came in after I made the specific request. I have asked each one of the various industries to give us a time line so we can actually draw a map of it as best we can for the gentleman. Then I thank you. Unless anyone has a final word, then let me thank you again for your extraordinary patience today. This has been very good, but it is only the first step.

As I began it, let me end it on the same request. You saw members coming in and out. Some had the benefit of some of this discussion, some did not. That is unavoidable. Members have so many duties that I can't fault anyone who could not be here for the full hearing. You saw we had to leave for votes, even. There are members on our committee who are going to end up having to make some pretty important decisions that will affect all of you. Please do me the favor of continuing this education process.

We will get to a point where you will have a chance to throw all of the brickbats at each other you want to. And I promise you, we will get there sooner or later. But in the meantime, as we go into retreat, as I try to get members to focus on the critical importance of broadband. I mean, it is truly revolutionary. It is truly going to make a huge difference in what this country is all about. Maybe what the world is about. I need your help in making sure they understand all of the applications and how they work in different pipes and different communities with different consumer groups with different content. And the more you do of that for me, individually and collectively, I think it is going to move our process along a lot quicker and we will get that date where you can be throwing those bricks at each other again.

Thank you very much. This has been a very productive hearing. This hearing stands adjourned.

[Whereupon, at 2:54 p.m., the subcommittee was adjourned.]

[Additional material submitted for the record follows:]

SPRINT
August 31, 1999

The Honorable W.J. "BILLY" TAUZIN
Chairman,
Subcommittee on Telecommunications, Trade and Consumer Protection
2183 Rayburn House Office Building
Washington, DC 20515-1803

DEAR MR. CHAIRMAN: Thank you for the opportunity to testify on June 24th before you and your Subcommittee on Telecommunications, Trade, and Consumer Protection concerning the deployment of data services, particularly broadband services. I believe that the question of when such services will be more broadly available is important to the public; I know it is vitally important to Sprint.

At the close of the hearing, you invited us to provide further information concerning the provision of these services, including when can customers expect to see broadband services at home? Over what pipes and in what order will they be available? Who will have an open network and who will have a closed network? What can Congress do—if anything—to move up the timeline?

The purpose of this letter is to provide additional information on these issues, as you requested.

The telecommunications industry, due to changes in technology, is going through a period of convergence where voice and data communications are rushing toward each other. Due to packet switching technology and other developments, there will no longer be a difference between voice and data traffic on modem networks. As a result, broadband services will increasingly include voice capabilities intermingled

with other data packets. I believe that we must make sure that any broadband deployment facilitates both voice and traditional data uses.

When you ask the question "when can customers expect to see broadband services at home?" you are focusing on the right issue. Large business customers have had access to Telephone Company special access broadband facilities for several years. Companies such as TCG and other competitive access providers have also provided broadband capability to big business locations. Recently, specialized wireless carriers have also offered broadband capabilities to large business locations. Small businesses and residential customers are another story because there are fewer broadband options currently available. Telephone companies are currently deploying xDSL service to provide broadband capabilities and cable companies are providing broadband through the use of cable modems. There are dozens of ISPs and other companies that provide services that could use broadband plant, but only a few options exist for broadband transport to these service providers. In each case, the owners of last mile telephone wires and cable facilities to the home are exercising their market power to harm competition and to deny the availability of competitive, robust broadband services to small businesses and everyday Americans. I believe that if the Regional Bell Operating Companies (RBOCs) and GTE chose to open this last mile to others in accordance with the purposes and requirements of the Telecommunications Act of 1996, broadband services from a variety of competitors, including the RBOCs and GTE, would be rapidly available and at increasingly competitive prices. I also believe that cable companies should open their broadband transport facilities so broadband service alternatives are available to customers of cable companies.

Conversely, I believe that without this last mile open to competitors as the Telecommunications Act intended, it will be an unfortunately long time before there will be the widespread competition and competitive pricing that Sprint desires and that we believe consumers desire.

Although the RBOCs and GTE, as well as the cable companies, have argued that their last mile facilities are subject to extensive competition from other technologies such as broadband wireless facilities, this isn't true, as your questions recognize. The only facilities that are currently ubiquitous and that are well on their way to being upgraded to handle broadband communications are the local distribution facilities of the incumbent local telephone companies and cable companies.

There are today only a handful of ways to potentially provide broadband services, e.g., over the existing telephone wires of the RBOCs and GTE by installing Digital Subscriber Line (xDSL) equipment; over cable lines that have been upgraded for data communications; just emerging wireless broadband; geosynchronous satellites (GEO) that are not suitable for voice; and as yet unproven low earth orbit satellite (LEO) systems. My prepared remarks before the Subcommittee discussed in general the challenges and uncertainties of these several mechanisms.

The bottom line is that it will take a few years before the xDSL and cable technologies are widely deployed. Satellite technologies will likely prove to be economically unworkable on a large scale for both voice and data uses. And it is possible that there will be no near or mid-term broadband availability or choice at all for consumers if the current local monopolies succeed in extending their monopoly into the provision of broadband services.

On the other hand, if the last mile transport services of telephone and cable companies were made available for competition as intended by the Telecommunications Act, a choice of competitive broadband services traveling over these transport systems would be rapidly available. I think this could begin as quickly as 2000.

Sprint is eager to provide broadband services right now using both the MMDS capability it is acquiring in portions of the nation and through the last mile facilities of the telephone companies.

About a year ago Sprint announced its Integrated On-Demand Network, called ION. ION is a family of broadband-based services for both business and residential markets. ION provides all distance, voice, video and data services, using a common protocol over Sprint's ATM integrated network. Sprint ION service replaces multiple access networks from multiple suppliers and provides the opportunity to integrate multiple services on a single access and transport network.

Sprint ION will serve not only large business locations, but also residential and small business customers. Sprint ION will bring a broadband ray of light to small businesses and the homes of America. These smaller locations will have access to multiple voice sessions, which will act much like multiple lines to the home. In addition, high-speed data products such as always-on high speed access to the Internet will be provided. Video conferencing, e-commerce, gaming and other new and innovative applications will be offered over the broadband ION network.

The Sprint ION service is a reality today. Service is currently being offered to large business customers in many locations and, as announced on June 21st, will rollout to residential customers this year.

The availability of ION will be limited in the small business and residential markets because broadband last mile access continues to be a significant problem for Sprint and for other potential broadband providers. While Sprint ION services are the most technologically advanced broadband products in the industry, the RBOCs and GTE, along with a very aggressive AT&T, are blocking deployment of Sprint ION to the consumer market.

Unfortunately, under the current rules the RBOCs and GTE have the opportunity to create a network that allows them to deploy xDSL broadly but greatly restricts xDSL deployment by competitors using their last mile facilities. Sprint estimates that over 50 per cent of the phone lines of the RBOCs and GTE will not be available for xDSL provided by competitors through collocation in RBOC and GTE central offices. This problem is caused by the widespread installation of digital line concentrator equipment outside central offices that defeats central office xDSL. In addition, the RBOCs and GTE continue to stymie broadband competition and products by denying reasonable access to the remainder of their essential last mile facilities. AT&T is firmly denying access to its facilities to other potential competitors. Indeed, AT&T is hard at work attempting to assemble exclusive broadband deals with non-affiliated cable companies or buying them up to create an massive exclusive network of its own.

Over what pipes and in what order will broadband services be available to small businesses and residences? Other companies who are pursuing different strategies to get broadband services into the home or small business are better able to give estimates of their estimated time of widespread deployment and those estimates will produce the order in which they are available. Sprint is currently collocating xDSL equipment in hundreds of RBOC and GTE central offices serving approximately 13 million households by yearend 2000, but many RBOC and GTE lines will be unavailable. As I've already said, if the RBOC and GTE xDSL facilities were opened to competitors, additional broadband services would be available quickly. Sprint is aggressively pursuing MMDS technologies and hopes to have broadband services available to approximately 19 million households by year-end 2001. Useful wireless broadband spectrum is in short supply and while Sprint is actively pursuing this means of bringing broadband services to residences and small businesses, wireless broadband spectrum can cover only a small portion of the potential market through MMDS/ITFS spectrum available to Sprint. Indeed, even in areas where Sprint has MMDS/ITFS spectrum available, with reasonable success in the marketplace, problems will arise with capacity because of the scarcity of spectrum available to us.

Geostationary satellites are at such a high orbit that signal delay caused by the distance signals must travel, creates significant voice and real-time two-way video problems. While geostationary satellites may work well for old fashioned data transfer, they do not work well for services requiring real-time two-way communications. LEO applications conceptually hold some promise.

My prepared remarks before your Subcommittee and my testimony discuss other features and other problems with the limited number of means by which broadband services can be offered to residences and small businesses.

Who will have an open network and who will have a closed network? Unless forced to do otherwise, the local telephone lines will be closed and the overwhelming majority of cable will be closed. By the time other technologies are available for wide deployment it may not matter. By then, there will be an oligopoly for the provision of these critical services.

What can Congress do—if anything—to move up the timeline? Open up the last mile of telephone wires to competition and require cable companies to allow competition on their lines. Nothing else will achieve rapid deployment of broadband services, competitive offerings and market-driven prices. Nothing. Allowing the RBOCs to offer broadband services while maintaining their local monopolies would probably result in a momentary increase in broadband availability, but at a tremendous cost—a continuing phone company monopoly of voice, a new monopoly of broadband services, inferior competitive offerings and much higher prices.

So far, the incentives for the ILECs to open the last mile to competition as set forth in the Telecommunications Act have not been sufficient for them to open up that last mile to competition. Maybe their desire to offer broadband services will be what gets them to open up the last mile. I hope so. And if so, it would be a tragic mistake to remove that incentive by repealing the essential compromise of the Telecommunications Act. But if their desire to provide broadband is not sufficient to get them to open up the last mile, then Congress needs to look at ways to force them to do so.

Again, I appreciate the opportunity to have testified before your Subcommittee and for your consideration of these views.

Sincerely,

ARTHUR A. KURTZ
Senior Vice President