# LEGG MASON—CAPITAL MARKETS: INVESTMENT PRECURSORS™ IN TELECOM, INTERNET AND ELECTRONIC COMMERCE

*Willard Intercontinental Hotel, Washington, D.C., March 9–10, 2000**

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* Prepared by *CommLaw Conspectus* staff members. *CommLaw Conspectus* thanks Scott Cleland of the Legg Mason Precursor Group for his coordination of this event. It should be noted that this edition includes only excerpts from selected conference seminars. A complete version of the seminar transcript can be found on the *CommLaw Conspectus* website at <www.commlaw.cua.edu>.

## INTRODUCTION

**MR. CLELAND:** Welcome on behalf of Legg Mason and the Legg Mason Precursor Group.

The one thing I hope you noticed about the agenda this year is a much greater emphasis on globalization. That was purposeful. We believe that the globalization trend is real. We have been working on it for about a year, year and a half.

[W]e had been thinking about hiring a globalization strategist and looking for one for a long time. I am pleased to announce that—and I would like to introduce Rudy, if he would come up here—Rudy Baca has joined us a few months ago as our globalization strategist, and I am going to have him tell you a few things. He just joined us from the FCC International Bureau. Prior to that he worked for FCC Commissioner Quello, and he has been involved in many international negotiations around the world.

[W]e decided to hire a globalization strategist [because] [w]e wanted to have somebody looking at the world through the globalization trend. It was extremely [difficult] to find [the right person for the job]. We spent a lot of time looking [and] believe [Rudy is one of the best people to tackle globalization issues].

And we're really excited that you can find a copy of his report. It is an outstanding piece of research called "The Building Blocks of Growth in the New Economy; a Guide to Global Investment Precursors in Telecom, Internet, and E-Commerce." I am going to have him describe a little bit of it to you for about five minutes.

[We believe Rudy's report has shed some light in an area that has long been a black hole for understanding.] Essentially, he has created a framework [for] analyzing different countries [and their relative level of hospitality towards growth in the new economy], [as] we know investing is all about relative values.

**MR. BACA:** [We reached two big conclusions in the report.] [Using] a framework of twenty-five questions, we ran[ked] thirty countries [that] comprise 85% of the international telecommunications services market to see where they stacked up for relative growth.

[First,] [t]here is a huge disparity among the countries in their relative hospitability to growth[,] the building blocks for the new economy. [Very few countries have all the factors in place, such as] getting telecom factors right so that internet growth can [flourish] [and] getting internet factors right so that e-commerce [can develop]. Basically, we have identified what we call the "broadband four," which are the United States, the United Kingdom, Canada and Ireland. We've got others that have a relatively less hospitable ranking, down all the way to a couple of recommendations where we say the investors should be very, very careful in these countries, even though they have proclaimed themselves open to growth. Relative to other countries, the low-ranking countries do not have those factors in place that [will] make relative investment growth hospitable and will provide a return on investment[s].

[The] second big conclusion is that the internet is now, and will remain for the foreseeable future, much more U.S.-centric than most people realize. Therefore, people cannot simply take the U.S. growth experience and [apply it] to other countries. The U.S.-centric pattern is comprised of various factors, such as deciding of the servers. Seventy-five percent of secure servers are sited in the United States. [O]ver 90% of the websites are in English, reinforcing [the] bandwidth capacity into and out of the United States.

[Very few people realize the impact of pricing barriers.] [B]ecause of artificial pricing barriers from country-to-country in certain regions, Europe in particular, it is often much cheaper to sen[d] th[e] packetized information from Bonn

to New York and back to London, than sending it through Bonn to London directly.

## CABLE OPEN ACCESS

**MR. BRENNER:** Let me present the cable point of view as it [exists] today. I think that the key position of the cable industry during this entire debate has been that the government should not regulate questions of access or pricing of services in the broadband space on cable. The cost of regulation, in terms of the slowdown and the complexity of that type of regulation, is simply not worth the cost. This is a valid debate to have.

It is a debate of the role of the government versus the role of the private sector. [This is a] well-known [debate] to people familiar with the history of telecommunications regulation in this country, [as well as] other countries.

[T]he scheme of common carrier regulation involves complicated pricing behavior by the government and by the regulated entities that slows down innovation[,] makes it [less responsive] to market forces and ultimately gives competing players a way to play against [each other]. We think this is what is unfortunately motivating a lot of the forces that [have] favored government regulation.

[All the mediums involved in the telecommunications industry, including] cable, DSL, satellite [and] wireless [believe in the power of broadband]. [P]eople believe that there is a market for it. We don't need the government to prompt or prime that market[,] as competition develops from the various sectors.

The second point—and I want to make five quick ones—is that [the environment for providing broadband is] changing. The environment under which the cable industry is going to be providing broadband has already [changed] in the last three or four months. AT&T's letter with MindSpring [and] the AOL/Time Warner Memorandum of Understanding spell out ways in which the top [two] cable companies in the United States are committed to an arrangement by which unaffiliated ISPs can get on their system[s].

So it isn't that these companies or the cable industry generally oppose unaffiliated ISPs[.] [O]ur fight has been to keep government from [intruding,] [w]hether it is [at the] federal, state or local level, where you have eleven thousand jurisdictions trying to do regulation on this technology.

So these changes are worth watching, as Ms. Lathen has said and the Chairman has indicated. It is important to see how these market developments work, but this is all a new space for both the cable players and for some of the ISPs—certainly for AOL, as [it] figure[s] out how the architecture should work.

[Thirdly,] [l]et me also say that the cable industry is a very diverse industry. It is not just AT&T. It is not just the @Home partners. [I]t is not just Time Warner. There are other large companies. Those of you who follow the cable stocks know that companies that were hardly significant in the pantheon cable five years ago[,][such as] Adelphia [and]Charter, are among the top companies in the United States today. And these are companies that have taken very different approaches.

We have many unaffiliated companies providing turnkey ISP service in the cable industry. HSA, ISP channel and different cable companies are taking different approaches on how they will roll out broadband. There is no monolithic model, and I think that is good because we'll figure out what is the best way in this very rapidly changing world of ISP services. [A year ago,] [a] service was a bargain at ten dollars, and today is [a] bargain at no dollars. There is lots of free ISP narrowband service. Who knows how this service will price out ultimately and what the relationship of advertiser support will be.

Point number four is that not one state legislature has sided with the forced access community. [This is most likely influenced by the approaches taken by Congress and the FCC.] I think there have been seven tests this year, and not one has been won by the forced access group. It's that, by having cable out there doing its thing and doing it with a lot of customer interest, it has been a boon to competition. I don't know that DSL technology was created two or three years ago, but it was only two or three years ago that the phone companies seriously got interested in providing DSL service and broadband. So it was the cable modem that created an interest on the part of GTE and the Bells to begin to roll out their own version of broadband. [T]he same is true for satellite.

And the exciting steps that are being taken by

the DBS industry to provide broadband, I think is a result of the cable modem. This competition has [allowed cable to acknowledge its valuable platform]. I think it explains the run-up in the stocks last year. [It explains] the tremendous interest by the American policy-makers and the investing community, as well as customers in the broadband plant of cable.

[I think] [i]t is the best solution for providing broadband now and in the future. And I think that the competition has helped us see what a terrific industry cable really is. It was a plant that was sort of an undiscovered gem, and it also explains why the value of the per subscriber numbers have gone up so much. [P]eople [now] see the potential for that plant in terms of customer services, whether it is e-commerce, t-commerce or what have you.

My last point is that this debate has been both good and bad, like every public policy debate. The good part, I think, is that we have had an honest exchange about the role of government in the market. Do we want an interventionist industrial policy approach? And I don't mean to use labels for the purpose of using labels, but there is a lot of baggage that goes with coming in and saying we're going to regulate AT&T's Portland plant on a common carrier basis. Anybody slightly familiar with the common carrier regime of the last twenty years of the FCC knows that there is a whole mess of CFR rules that apply to common carriers and rates. And when the parties can't agree on rates[,] the government entity has to determine the rate because of a lack of agreement. I think that has been a good debate. I think a free country has to think about those things from time-to-time and decide what the best way is to go.

[The bad part] is that it has allowed a useful debate about the role of government and society to descend or to disintegrate into an opportunity for some parties to jump on one side or the other for regulatory advantage. I don't mean to single out GTE—and I'm sorry that Bill Barr isn't here because I have debated with him [previously]—but from what I can tell, GTE wants to retard [the cable industry's] development as a competitor to GTE and its markets.

They do not want access to the cable plant from what we can gather in any large measure[.] [W]hen it comes to their own cable systems, they have cable systems in Thousand Oaks [and] Ventura County, [California]. If you go to their website and you want their modem service, they will tell you the exact same thing [as cable], even though they criticize the cable industry for this practice. [Thus,] if you want to bring your own ISP, you will be charged separately for [it]. Greg has told me in so many debates about the crime of pay twice, and yet one of the key members of Greg's coalition does exactly the same thing in its own business practice.

Now I'm not saying that this won't change and develop as we better understand the market models and the pricing points of internet access, but please, let's be consistent if we are going to make a national debate about something. [It should be a] debate over the real issues[,] not peripheral issues about the phone companies trying to slow the development [of cable] in markets [dominated by the phone companies].

**MS. LATHEN:** Well, I certainly have been most appropriately placed this morning, because this is where I have been sitting for the past eighteen months—between the cable companies and the franchisers. This has really been an incredibly long[,] intellectually stimulating and vigorous debate.

The issue, as you know, has been whether or not the FCC should mandate access to the cable pipes by unaffiliated ISPs. And last year when I was here, that argument was being argued very vigorously by AOL[.] The landscape has changed since then, but nonetheless, the debate continues. I think [the Cable Services Bureau is] probably the only thing that has remained the constant in these murky waters[.]

[Our position]has been that we believe that the government should restrain itself from regulating this market. [Our reasoning is] that it is a very nascent market and that it [is] too soon to regulate. [T]herefore, we decided it was best to let the market develop. [W]e believe by staying that course, even though we are being pulled and pushed—and in many instances kicked—by the parties who do otherwise, we were correct.

We find today that there are now over two million cable modem subscribers and 800,000 DSL subscribers. We expect that the wireless and broadband technologies will become active participants in this industry as well. Just last month, Echo Star and Microsoft announced a partnership with Julotthat, [which] may result in two-way

broadband over satellite technology in the very near future.

Obviously this is a very vibrant industry, and we believe that regulation at this time could have a stifling and chilling effect on that vibrancy. Therefore, we continue to maintain our policy of vigilant restraint from regulation. We believe that the quickest way to get technologies to American consumers is to let the market do its work. And thus far, we are convinced that [this] is exactly what's happening.

Now, you know, we are not naive[.] [W]e get pushed, pulled and kicked all the time, and we know that there are risks associated with having a policy of regulatory restraints. [T]hose risks are that a monopoly could develop[.] [T]here could be a gatekeeper [and] irreversibly closed systems could result. We are very, very mindful of that, [which] is why we have been equally vigilant in monitoring this marketplace to make sure these types of things don't occur. And we haven't just been monitoring. We have been active in this regard.

Late last year[,] the Chairman encouraged several of the key parties to debate[,] like AT&T and MindSpring. [He wanted the parties] to come together and to start talking about what the principals of openness should [be]. We felt it was very important to have the parties engage in that discussion[,] [a]nd the end result was an initial good first step[.] [T]hat was the AT&T/MindSpring agreement or understanding that opened the door to begin discussions in this area. We have seen even more discussions[.] [L]ast week[,] AOL and Time Warner [made an] announcement, which went even further than the AT&T/MindSpring agreement in coming up with principles.

Our Chairman has talked about principles, and the principles that we're looking for are open protocols[.] [B]y that[,] I mean interface standards that applications developers and equipment designers can use and that arrive in an open and transparent manner[,] [s]uch as the IP protocol familiar [to us].

We also believe in open boundaries. That means we encourage interconnection, no bottlenecks and no controlled content. We believe that there should be open prices. That means that the prices for access to the network should be determined by a competitive market, not unilaterally by a ratesetter, [regardless if it is a public or private rate-setter]. [Additionally,] customers [should be able to] reach the service provider of their choice without having to pay twice.

And as I said, we are encouraged by developments [of] some of the key stakeholders in this debate, but we will be happy when we see implementation of the principles that have been announced. And so until then it still remains rhetoric. These are nonbinding Memorandums of Understanding, and we are looking forward to seeing them become concrete. We will continue to be vigilant in watching and monitoring this marketplace. Thank you.

**MR. OLSON:** The internet has grown up in the '90s under a certain set of rules, [and] we're all currently working under [those rules] in the '96 Act, [which are] user-driven [rules] where the control over the relationship is at the user level. The results of that have been a very robust internet, which has grown exponentially since the first e-commerce dollar signs began to appear[.] [T]here [was] a debate between '96 and '97.

It's been a fundamental paradigm that [the internet] is user driven from one end to the other, and that's how the internet has grown up. That's how robust it has become. And because the ease of access and the ease of entry onto the internet has become customary[,], you have Amazon.coms and Yahoos, and other folks. You have two guys in a garage with a great business model. [L]et the best one win.

It has been tremendously ironic for me to see some of the promotions from the cable industry concerning their internet service because they quote or refer to Yahoo and Amazon in [describing] the diversity of the internet, as they should. And yet, under the business model they are implementing with the FCC's tacit assent, an Amazon.com is not going to get started in this country. A Yahoo is going to have great difficulty [materializing] because the control is not in the user anymore. The control is up the line, and it is a fundamental, fundamental paradigm shift.

In fact, in Portland, we have enormous respect for Deborah Lathen and Chairman Kennard and their leadership in so many areas. We have a disagreement on this one, [b]ut we are all focused on the goal in a way that we certainly weren't a year [ago]. The means are terribly important, and this paradigm shift is being implemented through federal inaction.

The result is that the internet is at risk of fundamental change[.] [I]f you don't believe it is, then you would have to say that broadband and narrowband are the same thing and [are] part of one big market. If you believe that, then we are not going to make a lot of progress in this argument. But if you believe that there are differences and broadband is the wave of the future, then this shift is important.

If there is anything we learned from the AT&T breakup, from the unbundling proceedings and even [from] radio days, is that in so many instances the market cannot take care of itself. The FCC [was created] because the radio market [prior to 1934] could not control itself. One radio station was galloping over another, and it required federal intervention. It required government intervention to straighten it out because the market was not straightening itself out.

Even with unbundling and the internet, the market did not take care of them and so the result was a careful series of decisions and government actions. Though I applaud these [voluntary] steps [taken] by AOL, MindSpring and AT&T, I still would submit to you that it's not going to be a cure-all. In order to preserve the internet that we have known, government will have to step up.

At this point, due to federal inaction, this battle is being left [for the local governments to fight,] city hall to city hall. That's [the status] now[,] and it's unfortunate. If we had an open docket or some more leadership on this issue, federally, I don't think we would be in [this] situation[.] [However,] it's not going away [and] will continue to barrel along as it has. Thanks.

**MR. SIMON:** Let me back up just a minute. As you say on Wall Street, I would like to spend about thirty seconds of my time discussing the open access principle. [T]hen, because I know you all have things to do, like spend money, [I will] tell you how this is going to affect that.

Open networks are how we all got here. Open networks are how seven thousand ISPs are in business today. Open networks are how Amazon.com and every other .com company has been able to have access to customers starting at zero and ending up at millions. And if you change open networks[,] you are opening a Pandora's box [with an unpredictable ending].

Now it's nice to say that the government should [not intrude] until you need the government. And the government has always governed to the extent that it will not allow the owner of an infrastructure network to dominate that network. That has been true in every infrastructure we've had[,] [including] railroads, highways, telephone, television, radio[,] phone lines and the internet[.] [T]he internet that we're talking about keeping open is the underlying road upon which every [lucrative] company rides. And if you take that principle away, you are unraveling the tapestry of the new economy. Now you don't have to take it from me[.] Larry Lessig [of] Microsoft has written [on this issue]. He says if the government does not regulate now, the government will eventually have to unravel a monopoly. [W]ho here has enjoyed unraveling Ma Bell? Who here has enjoyed the unraveling of Microsoft post facto?

It's like saying, as he puts it, you don't need your seat belt as long as you're near an emergency room. Well let's think ahead a little bit. [M]y good friends at the FCC have not even started a proceeding to ask what today's law require[s] of this service, and in fact, haven't even defined what kind of service it is. If we allow that to happen[,] then we are treating the cable infrastructure differently from every other infrastructure.

I imagine myself as an investor. [The] [c]able industry comes to me, and they say, "we'd like you to spend billions of dollars with us. What do you own?"

"Well, I own one of the most dilapidated infrastructures in America because we've been in a monopoly for a long time."

"Oh, okay. Well, what's the good news?"

"[T]he good news is I would like to spend billions of dollars to make it a better infrastructure."

"Great. Who is going to use this infrastructure?"

"Me, and just me."

"Okay. Who are you?"

"Well I have 95% of people who watch cable video and cable programming, and I would like to get all those people to buy internet [service] from me."

"Great. How many people are going to offer internet service over this new network?"

"Me."

"And what if they don't want you?"

"Well, let them go to DSL; let them go to satellite; let them go to wireless. I don't need them."

"Well, I'll tell you what, why don't you go sit in a

room with [the] guys from Point Cast until you get a better idea?"

Why would anybody want to build a system and then not let other people pay them money to use it[?] [W]hy [are] AT&T and AOL/Time Warner now saying that they are going to do forms of open access? Keep in mind the evolution of these issues. First it was "won't do, can't do." Then it was "will do, not yet." Then for AT&T it was "will do, not yet, not much."

Now AOL/Time Warner has said they will do it. They would like to do it sooner because AOL can't get on Time Warner's network until they change the Roadrunner contract. Well[,] who has an equal share of Roadrunner with Time Warner and AOL? AT&T does[,] which is why you see on the wires today rumors that the Justice Department pressure is making them divest themselves of interests in either @Home or Roadrunner.

Great. That's the first step, but then what happens? If you only have open access for a few other people that you like, two years from now that's not open access; that's leveraging your monopoly power. Where is all of this going? Well, it's like a two-legged dog, and sooner or later it is going to fall over.

And it's going to fall over in one of several different fora. Either a law clerk in court is going to decide that this is a telecommunication[s] service, [or] the FCC is going to have to open it up or do a forbearance proceeding[.] [I]f they forebear from regulating this[,] they also have to forebear from regulating DSL, which will cause a huge war in the phone world. Or the Department of Justice clerks and lawyers are going to say, "we don't like this kind of concentration, but we are only affecting AT&T.[W]e're going to make AT&T open up, but we can't open up the whole market unless the FCC does something." So once again, it's back in [the FCC's] ball court.

Or a couple companies do the right thing and they do it soon, like AOL/Time Warner proposes[.] [However,] that affects only a small part of the market[,] which leads to something you don't like—uncertainty. Which part of the market is open? Which part is not? Where are they open[?] [W]here are they not? Where does the ISP or the web provider own the customer, and where do they get owned by the cable network operator? That makes your job more difficult. So if you're looking for certainty, if you're looking for a national marketplace, there is only one way to get it[.] [It] is to have a policy of open access that affects everybody now.

**MR. SIMON:** The key to the existing problem of why the cable guys aren't opening up is because this is customer capture time. Motley Fool said that by the time the Excite@Home contract runs out, [which is] the middle of 2002, they will have over two billion dollars of revenue a year[.] This constitutes twenty million customers, and all of those customers have already changed their e-mail once[.] [T]hey put their e-commerce wallet[s] into that system[and] all of their privacy issues into that system[.] They're not going to change again. So if you want to help one or two companies, then Dan's your guy. But if you're trying to invest in all the companies that are trying to capture customers, Dan's not your guy.

Now one last point. [I disagree with] [t]he idea that if the government did anything it would be too long and difficult. [W]hy [then] do we have the FCC at all? Everything that they do is difficult. Everything that they do is uncertain. Everything they do is controversial. What's different here? The difference here is they're hoping that the marketplace will fix the problem, and I understand that. But if the marketplace doesn't, their job [will be] ten times [harder][.] [It will be a difficult task] when two or three people are dominating the cable broadband market[,] and [the FCC] want[s] to go in and undo it.

**MR. OLSON**: The last time I checked, [the] broadband market share was [approximately] 90% cable modem. There are facts out there now. We know the central control mechanisms. We have Powell's City of Books in Portland; one of the great sites that everybody [frequents]. And the city counsel has enjoyed going down there—watching the folks at Powell's punch up books, the word "books" on search engines and have Amazon.com show up every time. That would be fine if everybody could choose another place to go.

**MR. CLELAND:** [I'd like to ask a question regarding the future.] I want each one of you to say what the [occurrences are] that [will] be happening in the months ahead that [will] give people an indication of how this debate will evolve. Just what are you looking [at] to get a sense of where this is going?

**MR. OLSON:** The Portland decision, number one. If they say it's a telecom service, then the

cable industry is facing the prospect of national open access or the FCC has to deregulate DSL[.] You can't do it any other way. Number two would be how quickly AOL/Time Warner are able to change the Roadrunner contract because there is enormous pressure for AOL to get on that network. And they can't get on it without getting the Roadrunner contract changed. And they can't change that contract without AT&T agreeing with it. And if AT&T blocks it, then they are begging for trouble at the DOJ[.]

And the third thing would be [the length of time that] AOL and AT&T tolerate being the only ones [with] open system[s], [as] the rest of the industry [continues to] not hav[e] open system[s]. [AOL and AT&T] will [eventually] start pressur[ing] for everybody else to open.

I would add to Greg's comment about the Ninth Circuit decision. We still expect to be upheld there[.] [O]nce that occurs[,] you're going to see many more local governments [jumping in on this].

There [are] a tremendous number of local governments, some very large ones, that are waiting for the outcome of that Ninth Circuit decision to have their own open access condition come in. And it's simply going to happen because it's the right thing to do. It's the obvious thing to do[,] and many local governments are poised to do this in the absence of federal leadership[.]

What we expect [are] over-builders. We are seeing for the first time some other companies begin[ning] to put enormous dollars into medium density markets. I can only say that because Portland, which is a medium density city, ha[s] four folks asking for competing cable franchises right now. And to the extent that they install open systems, and the customers go there, I think that is going to have an enormous impact on the incumbents[.]

**MS. LATHEN:** Well, Greg, in the spirit of love and harmony, I must say in one aspect I do agree with you. I think that AOL/Time Warner and AT&T/MindSpring's Memorandums of Understanding should force the other cable companies to come to the table and start thinking about opening up their systems.

They are going to have to do that to remain competitive. I think we are going to see the parties put more meat on the bones, in terms of what openness means and in terms of implementation. And I think that you will be buying me dinner because it will show that the FCC was right[.] [It will show] that we have all kind[s] of competition flourishing and all the other technologies are out there competing against cable, DSL and everyone else.

**A SPEAKER:** Just for Deborah, you indicated you want to regulate on fact not fear. What are some of the telltale facts that [c]ould emerge [and] change your position on this?

**MS. LATHEN:** That is a good question. First, I'll start with the premise that we don't see a monopoly. We see a very, very small market. [R]ight now[,] two million Americans hav[e] high speed internet access out of thirty million Americans who have access to internet through traditional dial-up modes. So we see this as a very tiny marketplace. But if [we] did see signs of a monopoly developing, signs of irreversibly closed systems [or proprietary systems] being built[,] then I think we would definitely have to take a very serious look to stop those harms from developing.

## CONVERGENCE POLICY

**MR. BAKER:** . . . I'm going to make a fairly bold statement here. [T]he internet will become the core telecommunications offering of the future. [U]p until this point[,] different applications have traveled over different wires using different technologies and have obviously been subject to different regulatory schemes. But on a going forward basis, as everything becomes digitized [and] packetized [for] travel[ing] over the IP network, your internet provider becomes crucial to all of these applications.

And as we like to say, "bites is bites." They are just ones and zeros whether they are reconfigured at the other end as a voice conversation[,] full motion video[,] [o]r text and graphics[.]

Right now the quality of your ISP does not affect your phone call [or your] video transmission. But in the very near future it may, and that's why it's important for customers to be able to choose who provides that access service, regardless of which "wire" they use and regardless of where they live. [L]et me delve for just a minute into open access.

Open access ought to happen sooner rather than later, and it ought to be—regardless of [the] customer's cable company—not limited to just

one or two. In the same vein, the AOL/Time Warner Memorandum of Understanding last week was [a] step further in the right direction[.] [B]ut again, as much as we applaud that effort, Time Warner is the second largest cable company in the U.S. The point is, regardless of [which] cable company you choose and what means you use to get broadband access, you ought to have a choice in your internet provider over [those services].

I don't want to risk repeating too much of the last panel. I want to skip ahead a little bit to mention another issue. Obviously for us, cable open access is right there at the top. But another area that we think is extreme[ly] importan[t] is the issue of privacy. This has sort of reared its head in the internet realm[,] as we think of it today[.] [E]-mailing, surfing web pages and, of course, double click[ing] [have triggered issues in the privacy realm].

Obviously, the FTC is addressing this problem in their COPPA regulations that are now out and in a further rulemaking that's going to come out [during] the second quarter of this year. There are obvious internet implications[.] [L]ooking broader and further out, if we have any hopes of all of the services that we enjoy today traveling in an enhanced mode over the internet backbone, then we have to address this fundamental privacy issue. If we don't get past [the privacy issue], then I think a lot of the technological innovations that we could be enjoying in the near future will not come to fruition [because] customers [will be] afraid to use the technology.

So at every level[,] we need to address these things.

**MR. FRISBY:** I'd like to start with two simple propositions. First, voice and data have converged; secondly, there is a tremendous demand for internet access and IP technology. And in fact, IP technology is really becoming dominant. I think we really need to start thinking about the internet as simply the next reiteration of the public switch[ed] network. When you combine these propositions with the Telecommunications Act, you get the two points I'd like to talk about briefly.

First of all, the competitive forces are taking hold, and as a result, we are beginning to see a very striking growth in the provision of advanced services. And secondly, regulators will not be able to keep up with the technological changes. The fundamental issue for them, therefore, will be how to encourage and not hinder competitive growth in the market without the use of the traditional regulatory methodology.

But I'd like to spend a minute or two focusing on competition, and the fact that it's really working. Industry estimates [show that] the telecom spending in the U.S. has topped $500 billion for the first time this year. The abundance of capacity is driving the cost of bandwidth to near zero, and IP is rapidly becoming the de facto industry standard. CLECs now have 10.4 million access lines out of a U.S. total of 185 million. It's estimated that CLEC capital expenditures in 1999 were over $15 billion, and CLECs are currently investing over $1 billion per month in broadband facilities alone.

Similarly, e-commerce has taken off[.] [I]n fact, online sales will grow to [125] billion in the next three years. Vint Cerf, who was the keynote speaker at CompTel's recent annual convention, estimates that the internet has about 200 million users. But that's really a drop in the bucket, given that there are 6 billion people on the planet. Competitive telecommunications companies recognize this potential. In fact, many are discarding their traditional labels of CLECs or IXCs, and describing themselves as ICPs, integrated communications providers. These are the companies that provide the converge[d] technologies, and they are making use of internet-based technology and e-commerce.

In fact, we recently released a study at the CompTel convention on e-commerce. The senior executives from fifty-one national competitive telecommunications companies were interviewed. The key findings were as follow: nine out of ten carriers believe that e-business is an important competitive tool and is going to be a critical factor in driving their revenue growth[,] increasing market share and keeping costs down.

More than 75% of the companies plan to increase their online capabilities by the end of 2000. More than seven out of ten have appointed an executive to seed their enterprise-wide e-business initiatives. In fact, 50% of the respondents have earmarked more than 20% of their next year['s] R&D budget for e-commerce. Nearly all of them are offering online product information, and a number of them permit online ordering and bill-

ing. By the end of 2000, more than 75% will offer online capabilities for ordering, trouble reporting, account inquiry and billing. Almost half can identify their online customers, and of those who can identify their online customers, almost 70% have the ability to retain a history of web interactions. Eighty-four percent are using intranets, and 70% have created extranets to forge new relationships with partners and suppliers.

But what does this increasing demand and use of converged technologies mean for regulators? It means that the times have changed[.] [W]e are well beyond plain old telephone service. In such an environment[,] the goal of regulators must be to promote customer choice by ensuring that all markets are open and that barriers to entry maintained by incumbent monopolies are removed. [R]egulators must develop swift, sure and meaningful enforcement mechanisms. We don't need further telecom legislation. Similarly, we don't need a national broadband policy. These would only serve to confuse the market and hinder industry growth.

**MR. WOOD:** I want to borrow [from] my colleague on the Texas Commission, Bret Pearlman[.] Certainly, as a state regulator we care about [equity] issues[.] [W]e care about making sure that the broad population benefits from the technological achievements that this industry has been spinning out on a daily basis.

I'm going to say density is really a proxy for all the things that make deployment of broadband, particularly DSL, but not just DSL. It would include fixed wireless and cable modem[.]

The things that make it difficult are generically density. I think most of us have found that there are some other impediments, but I'm going to just focus on density. So if you will allow me that flexibility, I would appreciate it. What are the solutions to bad density but high demand?

Should you subsidize? Is it a necessity? Should you take other people's money to pay for someone else to have a low-cost, affordable product, as we have done[?] We have made that policy decision for voice-grade service with the Universal Service Funds. Or better yet, can we promote, or make the world a little more welcoming to an alternate technology, such as wireless?

We are going through a number of proceedings [in the US] that would allow a wireless company to obtain existing Universal Service Funds for voice service. What if that same company decided it wanted to get the Universal Service subsidy and not only provide voice but also provide data over the same line? Should they be allowed to do that?

[J]ust in the last six months, a number of states [have been] looking at [the type of persons who] actually get certified to take advantage of existing subsidy money[.] The Texas legislature has directed our Commission to do a study of just this issue and give recommendations about how we can get broadband deployed in Texas. We don't want to be left behind on this. The economic development potential for rural broadband is absolutely astronomical, but we don't want a price tag that is absolutely astronomical either. So that balance is hard.

[Additionally,] Chairman Kennard request[ed] the Universal Service Fund Joint Board to look at the definition of universal service. Should we broaden the definition to include, as a basic entitlement, the right to have broadband service? So that is teed up for the Joint Board to look at in the coming twelve months. Susan Ness is chairing that effort. But all of us looked at our work plan, and this is one of the items on there. An interesting one is bad density and no demand.

Of course, the small government inside me says, "well, not a problem to fix[.]" [B]ut there are others that might decide we need to fix that problem[.] Because if density is a surrogate for all [of] the things that make it expensive to deploy, demand could be a surrogate for not just demand but also for income levels. If people don't know about a service, of course they won't demand it. But shouldn't they know about it so that they can get into the American mainstream?

[T]he second item to look at in the next three to eighteen months [is the] DSL affiliates that are providing the market solution[, such as SBC's Project Pronto]. [T]he significant capital investments [required for a market solution] will be something to watch. And certainly, the community has already taken notice of that in recent writings[.] [In sum, those are] my two issues: the deployment of the digital divide and the deployment through market base, such as Project Pronto.

**MR. TAUKE:** I think the bottom line that we are facing this morning is how [to] get investment in the broadband infrastructure of the nation. And it's clear that substantial investment is

needed. It's also clear that at the moment Wall Street is punishing those companies that make announcements about substantial investment in the broadband infrastructure. And so, as a result, we have a situation in the nation where there is a lot of uncertainty about whether or not it's wise to make substantial investment in broadband infrastructure, particularly at the local level. So what can [we] do as a nation in order to encourage the investment that is needed to build the broadband infrastructure essential [for] deliver[ing] the kind of services that the people are demanding?

First, looking at broadband investment at the backbone level[,] there is the general view that we have plenty of broadband capacity[.] And certainly, if you look at the amount of dark fiber being put out there by a variety of players, it is clear that there is a lot of capacity. But I think the issue at the backbone level is not capacity. The issue at the backbone level is whether there are enough players to ensure that we have the proper interconnection peering [for] permit[ting] a lot of people to participate in the marketplace and to ensure that there is a full choice for consumers. Do we have hubs that are close enough to the internet service providers and the people to ensure that there is high quality of service? I think in both of those areas we have problems.

It's clear that there is a different history for the backbone world than there has been for other industries. The history is a strange one[.] [B]ut suffice it to say that today there are a few players, like PSI Net, who are relatively small [and] can play in the game because of history. But other than that, you can't play unless you are very big. [So] the challenge for most people is [whether] they [are] big enough to be able to peer with MCI[.] And the answer for virtually everybody is no. [T]he players who are big enough to bring a customer base to the marketplace, such as Bell Atlantic, are prohibited from getting in the game. So we have a challenge in terms of getting the proper structure in the backbone industry that will permit full openness of that industry, encourage real competition and [make sure] that there is an availability of backbone to customers across the nation.

The second area for investment is local investment. And in the local investment area, companies[, such as SBC,] who announce aggressive programs [for] investment get punished for doing so. Why are they punished? Well, presumably, for two reasons. One is that there is a lot of regulatory uncertainty out there as to what is going to happen to that investment; how will [it] be treated? Will that investment be treated in a way that permits the company to make money on it or will the investment be undervalued, primarily in the regulatory arena? The second problem is that nobody knows what happens to the old investment.

The way the rules work today[,] we, as a company, are putting more and more wholesale customers on our old network through unbundling of the network, line sharing and so on. We are putting a lot of people, a lot of wholesale customers serving retail customers, on the old network. If we attempted to replace the old network [with the new network] that was talked about earlier in the panel, we would have a lot of wholesale customers [asking us to maintain the old system so that they could reach the customers].

So a major issue that we're confronting as we go forward is how [to] avoid locking in the old network [so that] invest[ing] in the new network [is not deterred]. How do we encourage investment in the new network so that [players] are rewarded rather than penalized by the investment community? From a regulatory standpoint, or a policy standpoint, we need a national broadband policy to address that issue. Ideally, we would have had a Title VII in the '96 Telecommunications Act. Those of you who are familiar with it know it was [discussed]. The Title VII provision would have essentially [set forth a different standard for high-speed service providers]. [A provider would] be treated differently based on the service [and] capacity offer[ed]. So if [a provider] offer[s] high-speed services[,] [it has] light regulation[.] [It has] parity with [its] peers[,] whatever the nature of [the] company may be. That didn't pass, but it's still needed. But until we get there, there are a number of things that can be done. And I'm like you; I'm running out of time. But there are regulatory barriers that can be lifted.

There is tax policy that Congress is considering this year to increase demand for services as well as provide incentives for investment that could be helpful in the deployment of broadband. And there are steps being looked at to remove entry barriers[,] ranging from providing loans to people who need it for investment to lifting caps on

spectrum in order to ensure that more people can enter the marketplace using new technology.

**MR. STRICKLING:** Thank you. I got the final word because I asked for it. While the title of this panel is "Convergence Policy," I think you've heard the panelists speak this morning more [about] encouraging the deployment of broadband technologies.

[F]rom our perspective in the Common Carrier Bureau—and I think this is largely true for the agency as a whole—we are certainly looking at how different services are regulated. I think the [main goal] before us is encouraging investment[s] by all providers, not so much trying to get the regulations to the point where they are the same for everybody.

[Not much evidence shows] that different regulation[s] for different providers is really impacting the decision whether to invest or not. Our goal is to encourage the deployment of broadband services to all Americans[.] [I]n doing so, we feel [that] we [must] encourage entry by a multiplicity of providers using a multiplicity of technologies.

Obviously, from a convergence perspective, we want like services to compete against each other[.] [B]ut[,] as I said, we don't really see right now where the different regulatory treatments are preventing that from happening. Last year, just briefly, we spent a lot of our focus on encouraging new entrants [to compete] in this space as well as evaluating the needs of the incumbent carriers.

For the new entrants[,] we had three major rulemakings last year[.] [First,] we strengthened our collocation rules[.] [Second,] we redefined network elements as the Supreme Court asked us to do[.] [Finally], as we closed out the year, we did order line-sharing as a way to continue the accelerated investment that we're seeing on the part of companies like COVAD, NorthPoint [and] Rhythms[.]

I think open access is a good illustration of that.

Before the events that David mentioned involving his company, AOL, and Time/Warner, we had the cable companies demanding the closed system. [I]f you [were] a cable modem subscriber, you couldn't have America Online, MindSpring or EarthLink as your primary provider of internet services. ILECs complained about this, saying they had to allow choice, and this was an unfair regulatory burden [that] would impede their investment[s]. I'm putting the legal issues aside as to whether or not the law would require this, and I'm trying to focus on the impact of all this on ILECs. [Essentially,] the cable companies [were] handing the local exchange carriers an exclusive contract with America Online. Now who wouldn't want to be the only provider of high-speed access to America Online? If you wanted America Online [or] MindSpring, you could only get it by using the ADSL offering of the incumbent companies. You couldn't get it from the cable companies.

Moreover, there is such a strong dynamic in favor of consumer choice out there. [One hundred percent of consumers would pick a company that gives them a choice.] [But] I don't see how the issue of choice, by itself, created a problem for the investment decisions of the incumbent telephone companies, as compared to the investment decisions of the cable companies. As we look at these claims and demands for regulatory parity, we have to analyze each of them individually and truly understand the economics behind it[.] [We must] determine whether it's really just a demand for a more generalized freedom from regulation because somebody else has it and [the other] want[s] it. [W]e [must] look at it in terms of the actual investment incentives that are created and try to specif[y] [the] impacts[.]

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**MR. BAKER:** A lot of time people say convergence, and they are thinking convergence of appliances. I don't know [if] that [is] necessarily the case. I think there will still be a telephone, a television [and] a computer[.] [People] are still going to use different devices. In fact, on a going forward basis, I would think [that we should see] even further splitting and refining of different applications for different devices.

In other words, we're in a PC-centric world right now, where [we] get full web browsing, a full color screen and all that. That works well [in a] stationary [environment]. That's going to work less well in [a] car, on [a] cell phone or on [a] watch. [People] are going to want different applications suited to different devices. So I think that when we talk about internet, we may be talking about several different aspects of internet. In fact, in that model it's not convergence, but divergence, at least in the application space.

**A SPEAKER:** [T]his is for [Mr. Strickling]. [M]any of us rely on the FCC for definitional things. And I note that the FCC still defines "broadband" as 200 kilobytes per second. At least in my part of the world[,] I would be laughed out of the room if I suggested that.

The companies we're talking to start at in excess of a megabyte per second to accommodate a standard TV signal. [O]ther companies have been talking to us that are planning systems up to twenty megabytes per second for high-definition television. And so I assume you may be revising that, but there seems to be a [discrepancy] between the definition and the commercial world[.]

**MR. STRICKLING:** Bob Pepper is going to be on the next panel, and he was mo[r]e involved in the crafting of [the definition]. But we've always intended to take other looks at it. Indeed, we have [mentioned] that in the Notice of Inquiry that came out just last month on this year's Section 706 study to reevaluate whether or not that remains an appropriate standard[.]

## WHERE'S TELECOM HEADING?

**MR. BROGAN:** This panel is titled, "Where is Telecom Heading?" I will start with Kevin Kelly's book, "New Rules for the New Economy," where he describes the terrain of the new economy as being full of gulfs, precipices and steep slopes. Companies will almost certainly climb hills only to find themselves on what he calls "suboptimal peaks." In other words, successful technologies are likely to be eclipsed in their primes, as the ground beneath those technologies shifts. These shifts are often caused by industry outsiders.

Quoting Kelly:

> In the network economy, nine times out of ten your fiercest competitor will not come from your own field. It is imperative to search as wide as possible for places where innovations erupt. Innovations increasing[ly] intersect from other domains. A ceaseless blanket search, wide, easy and shallow, is the only way you can be sure you will not be surprised.

Well, that is what we are aiming to achieve with this panel.

This is our [attempt to look] outside the box panel, and we've asked our panelists to share with us some of their biggest ideas on how nontraditional entrance will change the telecommunications marketplace . . . So with that, we will begin with Ken Epps and move on down the line.

**MR. EPPS:** The way I'd like to talk about it is in terms of decades[.] If you go back to 1980 and think about telecom, there was one company . . . I joined AT&T in 1985, and we were only worried about MCI[.] Sprint was kind of in the distance. And wow, how things have changed.

But that is kind of what [we've] seen. And since that time, a phenomena in our mind has occurred in the industry that we call "deconstruction." We actually call it "e-construction." But there is a book written by Phillip Evans called "Blown to Bits" that I think has the real underpinnings of what we mean here.

AT&T did everything in a vertical model. AT&T had the network[;] it had the customers[;] it had the brand[;] and it marketed to customers in that way. Then, starting in 1984 and moving into the decade of the '90s, [we] saw other companies starting to compete[.] [Some] companies started merging to build other networks. [Other] companies started reselling long distance at the customer level. So[,] competition just started to explode at that point.

So [we] move[d] from there [to] the decade of the '90s and saw different behavior from companies driven by nontraditional players. Because if [we] think about it, the only traditional player in telecom was AT&T. Anybody after that point in time would be, by definition, nontraditional. But the evolution of the industry has been so tremendous that even some of the nontraditional players [of] that time are now [considered] traditional, such as the MCIs [and] the Sprints.

And the new wave of players is coming at us in names and directions that you can't imagine. [T]he reason they are able to do that is because the internet is bringing capabilities that are allowing transaction costs to be tremendously lower[.] [B]arriers to entry are not as high, and you are seeing people compete and build billion dollar businesses along the horizontal value chain. And that's where Williams Communications is. We are primarily a network company, and we are [a] carrier's carrier, as we define ourselves.

. . .

A whole lot of nontraditional players entered the space with the 1996 Telecom Act. That Act started another kind of behavior from companies. [We] started hearing the word "underling" by everybody packaging products and services together to retain and attract customers. [C]ompanies were doing this because players were attacking

them along the value chain, and they could not compete. So you had to find a whole different way to compete, and the larger companies tended to do that. [C]ompanies like Willtel were providing network and capabilities to resellers that were fueling the other space.

If you project into the future—and this is where it always gets to be fun—it is our view that there will primarily be three clusters of companies in the market space[.] One will be a customer-focused group of companies. Companies that would fall into that group would tend to have more powerful brands because those brands would allow them to use that equity to attract customers. The next group would be innovation-focused companies. [A comparable example] would be the wave of application service providers that [we] see [today]. [The application service provider is] the type of compan[y] that [is] really going to drive tremendous bandwidth demand[.] [T]he last group is what we call "operations-focused companies." Th[e]se are the companies that will excel in operational excellence. Th[e]se companies will benefit from the outsourcing opportunities [of] companies that were formerly vertically integrated[.] [The operation-focused companies] will do their jobs with such precision [that] the vertically integrated compan[ies] will be very comfortable turning [their] capability over to th[ese] outsource compan[ies] [in return for] high-quality service, hopefully on more economical terms. So that's kind of a quick intro on where we see things going.

**MR. HUNDT:** Like it or not, telecom is heading for the presidential election. Why is that relevant to telecom?

First of all, there are three major parameters that shape the information economy . . . They are technology, economics and politics. Technology creates potential, and economics defines the actualities that can be delivered. And then politics supersedes, trumps, shapes and constrains the other two factors[,] meaning that it is perfectly possible to have a political system that denies technology any realization or completely alters the natural course of economics.

The biggest example in the last century is called the Soviet Union[.] [W]hile I was at the FCC[, however,] I think it was the general counsel of GTE who asserted that the FCC represented the second biggest example of an institution that was capable of thwarting technology and altering economics[.] [T]he relevance of th[is] point is [that] [the historic purpose of] the FCC [before 1993] was to create artificial scarcity[,] to maintain the scarcity that otherwise had developed because of technology and to do nothing with government policy that would alter these scarcities.

[I]n other words, [the purpose was] to perpetuate bottlenecks wherever they could be perpetuated, and if possible, to actually create them. Bottlenecks [maintain] places where economic value is created, so that's why the FCC fundamentally was hand in glove with the value holders of the economy. That's why the FCC's purpose was to maintain the status quo. Since 1993, Republicans and Democrats have agreed that the fundamental purpose of the FCC should be the opposite of scarcity maintenance or creation[.] [I]nstead[,] [it should be] to create amplitude, extra bandwidth or more opportunity for entry. This is the fundamental reason why the value creation since 1993 has been 65% in the whole industry[.] The value creation has been radically shifted to attackers and away from defenders. [T]hat is the opposite of all previous government policy.

This might have been a bad idea, but it was a conscious idea so the element of intent was absolutely there. [My point is that] I don't know whether or not this particular attitude and intended motivation will or will not survive the presidential election. It is certainly true that all the decision-makers that you know today are going to change[.] Mostly everybody in the White House will be gone. The [majority of] FCC [decision-makers] will be gone a year from now. The head of the antitrust division will be gone a year from now. The head of the House Committee of Energy and Commerce will be gone, no matter who is elected President.

The other thing that will be gone a year from now is the idea that it is essential to the American economy that we maintain the voice network. If that idea isn't completely gone by a year from now, it will be virtually gone by a year from now, and it will be absolutely gone within two or three years. The idea that our policy must have a profitable and successful voice network is defunct. Another idea that is a little later on the path towards mortality, but is certain to die, is the idea that a national policy requires that we maintain the

broadcast networks. That idea is also expiring as we sit here.

So the fundamental touchstones and tenets of historic policy are gone[.] One of the presidential candidates will be elected, and [who] that person [selects] [to make decisions] is a huge, huge, question mark.

. . .

**MR. PEPPER:** Reed talked about the technology[,] economics and politics. There is another piece of this though, [which] I call the "law of bumblebees[.]"

If you talk to aerodynamic scientists and engineers, they tell you that the bumblebee can't fly. But the bumblebee doesn't know that, so the bumblebee flies. [I]f you take a look at who have been drivers, in terms of using technology and economics and understanding markets in way[s] that have changed things, it is outsiders. It's people who didn't know that they were not supposed to succeed.

Who are some examples of that? Ted Turner didn't know that he was wasn't supposed to be able to take a broken down UHF TV station in Atlanta[,] work out some goofy arrangement with a satellite company, start WTBS and find a model for the whole CNN family of services. Bill McGowan and Jack Goeghen didn't know that they weren't supposed to win when they started taking on AT&T. Peter Kiewit Companies didn't know that they were supposed to fail when they started digging up local communities, putting in fiber and creating a company called MFS[.] Meg Whitman didn't know that she had no business model whatsoever when she wanted to start selling Pez dispensers over the internet and created eBay.

The FCC didn't know that we were supposed to fail in implementing the 1996 Telecom Act. We assumed [success]. We've actually ended up opening markets not only in terms of broadband markets but [also] in the internet. And remember, it was only five or six years ago that we went from a research network called the internet to [an economy driven by the internet].

The question is, who are going to be the next set of bumblebees? [It is going to be] the people who don't know that they are supposed to fail. [I]f you take the internet and packet communications to the next step[,] we are seeing embedded processors, embedded computing or ubiquitous computing.

[There's] going to be literally billions of devices that frankly don't need broadband. They want narrowband. Some are going to want broadband. But [there's] going to be a lot of machine-to-machine, device-to-device, in which all of these processors and devices are going to need to be connected. Some are going to be connected through your electric line [and] through carrier current power lines, just in the home. Others are going to need to be connected using radio spectrum.

I want to talk a second about radio spectrum. One of the things that we've done over the last fifteen years is begin to move away from the traditional top down, command and control management of the radio spectrum, in which every time any licensee wanted to do something they had to come to the FCC and ask [permission]. [W]e've changed that. Not only did we change it by implementing spectrum auctions beginning in 1994, but we also began implementing it by making the licenses much more flexible.

PCS licenses, for example, are flexible enough that companies can use whatever technology they want. It can be mobile; it can be portable but not mobile; [or] it can be fixed. There's a lot of flexibility, but it's not a true market and spectrum. There is a gap, a mismatch, between supply and demand for spectrum[.] Buyers and sellers of spectrum can't get together and trade spectrum the way people can trade bandwidth on wired networks.

So[,] there is going to be this increasing demand for spectrum[.] [W]hat we really need to do is move away from the traditional spectrum management policies that have created the kind of artificial scarcity that has led to enormous value creation through monopoly or scarcity rents. And we need to get beyond that so that new entrants can benefit from spectrum; companies can benefit from spectrum; [and] consumers and people who want to provide new services can benefit from spectrum. Some examples of this have to do with using a lot of unlicensed spectrum where [no] license [is required]. What you need to do is prevent interference to other people who want to use it.

[O]ne of the things to be looking at over the next twelve to eighteen months [is] going to be questions about where traditional regulatory approaches are going and where and how markets

will be better able to meet needs using radio spectrum. [H]ow are we going to begin to create the kinds of markets in spectrum that will [better] meet these needs? One example is the auction of the unused television spectrum in the TV channels sixty to sixty-nine. Then the question is[,] how will the new entrants negotiate voluntary agreements with incumbent broadcasters to provide a more rapid transition out of broadcasting and into the new services?

## FCC CHAIRMAN'S OUTLOOK

**MR. CLELAND:** I heard last night that FCC Chairman Kennard was not able to come due to a personal matter. He is still out of town. At this late date[,] he is going to be filled in by Kathy Brown, his Chief of Staff.

**MS. BROWN:** In this dynamic, technologically rich environment, policy-makers and regulators are really the last to know about what the next best thing is. And so, it's important [for us] to know [if we] are getting it right and to figure out what [right] is[.] That's our major challenge as policy-makers. So what have we done in our corner of this incredible world to ensure that we are getting it right? I think we've done three fundamental things, and we've done them right.

We've opened domestic monopoly markets. What have we done right? We've done interconnection right. One network can interconnect with another. We have done collocation right. We have done unbundling right. And we have ensured that the network is open. We have ensured that networks can interconnect with other networks. We've pulled back regulation on former highly regulated networks, and we will do so in the future[.] And we refuse to impose legacy regulation on new networks that are developing. [T]o ensure that there is a robust market for investment in all of these networks[,] [we must] not pick winners and losers, but [we must] ensur[e] that each of these networks can talk to the other and that we can get those bytes to the end-user.

There are different strategies involved [b]ecause we are in a transition, and there really is not symmetrical regulation over all of these networks. [We know and admit that.] [W]e need to understand what direction we want to go and make sure we're not imposing government regulation where it might impede development[.] [W]e are lifting government regulation and ensuring that it's not a hurdle to further development in the incumbent networks.

What's the second thing we got right? Spectrum policy. We got it right. We were right with auctions; we were right with spectrum flexibility; we [were] right about spectrum caps. We have shown and will continue to show that U.S. policy, with respect to spectrum management, has led the world in the use of our airwaves for new applications. There is a wonderful map in a report that Pepper's shop did a couple weeks ago for us on sort of the state of the industry at the fourth anniversary of the [1996] Act. [The] map of the United States show[s] how many mobile providers are in each market, and it's incredible. You see across the country three and four and five, and up to six providers in those markets. Competition has driven prices down[,] has increased deployment and [has increased] availability to consumers. It has resulted in new applications coming on the market. We have done this right, and we will continue to do it right.

The third thing we have done is open the international markets. We've encouraged the growth of global networks, global satellite networks, undersea cable networks and we've made sure that the pathways to the rest of the world are open. We did this. This government did this. We did it together to bring down accounting rates across the globe. We have increased demand[.] We have brought the rest of the world to a notion of cost-based provision of service. [W]e now have a dialogue through the WTO with many countries, seventy-six countries in the world, on opening those markets to our providers [and] thereby extending our markets across the world.

Those three things have been vital in providing the underbridge to what is the most robust economy that we have ever experienced[.] Alan Greenspan says, again and again and again, that it is the IP revolution that is fueling this productivity. The IP revolution wouldn't be fueling it as much without the interconnection; I'm convinced of that. It's the networking of these incredible information technologies that has changed the way we do business; it's changed inventories; it's changed trucking; it's changed transportation; it's changed merchandise; it's changed the way we market.

It is fueling education; it is fueling health care.

It is bringing down the cost of those services that are fixed or had been fixed in the American home. It's changing the way we interact with each other[,] with our media [and] with our politicians. It is, indeed, a revolution. And our part of it, as regulators, is not to get it wrong but to get it right—to make sure that we have laid the foundation for all the rest of it to happen.

If we can get to rational pricing—to a place where we can bring access charges close to cost and move toward what I think looks like the internet model—[then] I think that we will have accomplished a great deal. We know that in the long run [it] is best for consumer welfare to get these prices right. But in the short run, we will not place those transitional costs on the backs of consumers.

The second thing that I think is important for the deployment of advanced technologies in the American homes is online sharing implementation. We will move aggressively on that in the next couple of months. We certainly have a number of mergers before us that can either enhance or inhibit the very policies we've been talking about. That is a pro-competitive[,] open kind of network, and we will be looking at [that] over the next couple of months.

Fourth, we're auctioning two very important pieces of spectrum, the channels of sixty to sixty-nine spectrum[.] [W]e [also] hope very much to regard reauctioning the C-Block spectrum that will be returned to us[.] [Additionally,] [w]e have the WRC coming up and that will be incredibly important for us on a global basis. [W]e will be there with a very strong American delegation. Those applications are going to be extremely important to us, and the framework that will be set for 3G wireless will clearly be on the table[.] We will be very much involved in that.

We would like to go forward on the fixed wireless issues. These fixed wireless issues get sticky[.] [T]hey are the new bottlenecks, if you will[.] [The rooftops and inside wiring issues] are tough, tough issues. But they were tough, tough issues when we started on the telephony side, too, and we found a way through them. I'm convinced that we can find a way through these.

Then we will, indeed, fund the e-rate again this year[.] [W]e believe [this is an important part] in this entire movement to make sure that advanced technologies are accessible to all Americans in every part of America. This has been a lesson in developing markets in the "new markets," the President calls it. The notion of the digital age[.] I think, when they write the history of the end of the Twentieth Century and the beginning of this century, it will be all about how we transformed this country[.] [W]e transformed this country by assuring that this incredible infrastructure [is] available to folks.

And maybe we can look back and figure out what was the next best thing[.]

**A SPEAKER:** I'm curious [to know] how PC-to-PC voice over IP is considered an information service.

**MS. BROWN:** [T]hat is difficult to know why PC-to-PC transmission of voice over the internet is an information service, as opposed to a telecommunications service. We have a famous report worked on by Pepper that we did for Senator Stevens where we tried to talk about this issue and the complexity of this issue. We really have not ruled on this overall, at this point. It's one of those paradigm-shifting questions though that one doesn't want to [address] with the same old answer. Because it's a new technology, it seems to [have] great promise, from the garage to something that really may be viable for both commercial and residential use. Certainly, we are seeing it internationally.

## WIRELESS DATA OUTLOOK

**MR. WILLIAMS:** I'd like to just kick off here by talking about three broad categories that I think are kind of central to the whole wireless data debate. First, why now? Why is everyone interested in wireless data? As Brad said, I was involved with Ather Systems from the beginning, and it seemed like for years we were trying to say wireless data is going to be big[.] People, until a year ago, really didn't seem to care much about it. It kind of fell on deaf ears. People were more interested in a lot of other things. [We] would go to a carrier and say, "Why don't you partner up with us to try to generate some data revenue and try to get some applications going?" And they would say, "Bring me an application. What is an application that is going to be good? I need to see an application."

And if you think about what's happened, the reason that wireless data has really taken off in the last year is because people have become as depen-

dent on the information on their desktop as they were on their phone communications that led to the growth in cellular. So if you think about it, it used to be people would check e-mail once or twice a day. You could check it once a day and it wouldn't matter; you wouldn't miss anything important. Now people feel like they need to check their e-mail almost on a real-time basis. And so you see things like the BlackBerry and Athers device that let you check e-mails in a real-time basis.

Before [stock traders] [started trading] online[,] [they] would call [their] broker[s] once a day [or] a couple of times a day, if [they were] active trader[s]. [A]ctive traders now [who trade online] need access to that information all the time. [S]o[,] one of the areas in which Ather and others have focused [on] is enabling online traders to take their applications [and] act on [them] wherever they go.

[We] are going to see people at the enterprise level, the business level, being more and more dependent on the information that's on their desktop. [T]here are certain people in organizations that feel that way now, but over time, everyone in the organization is going to be dependent on a real-time basis on desktop [information]. [W]hen that happens, [it will] enable people to be in touch at all times.

**MR. EIN:** I think there are some other really interesting applications that aren't out there yet that are going to be killer applications in a wireless environment, [even though they] were not killer in a desktop environment. Most of these center around location-based applications. [T]here is opportunity in a lot of areas to create new companies that focus on a wireless platform[.] Particularly[, there are applications] that weren't as exciting in a desktop environment but become killer applications in the mobile environment.

I think, in those categories, you are going to see some really, really exciting new companies develop in this space. [I]n areas where the entrenched online companies or entrenched brick-and-mortar companies aren't focused on what a wireless environment can mean, I think there is an opportunity for really exciting entrepreneurial new companies to develop[.]

**MR. LINDER:** Well, at CTIA last week, for those of you [who] were there, [we] experienced the immense congestion in the cell phone area[.] I actually dug down to figure out what happened[,] [a]nd I'm proud to say that my company had a central role in causing this just amazing congestion.

I spoke to some of the engineers from AT&T Wireless[,] Sprint and others[.] [T]here were about three thousand phones on Sprint's network at the show using the wireless web browser. [T]he characteristics of web usage on the phone are so different [from] the characteristics of voice usage in terms of on-hook time and everything else that [this information can be] used to calculate capacity[.]

That, I think[,] is an indication of what's to come[.] [C]ouple that with the keynote by the Chairman of NTT DoCoMo, where he mentioned that their company is seeing an average revenue per user of twelve dollars a month from data usage [a]nd ten dollars a month attributable to extra voice calls from that data usage[, y]ou start seeing that there is something big beginning to happen here[.] [These events are causing] the death of the term "wireless data." The term "wireless data" is almost inappropriate.

The wireless network has a signaling network alongside the voice network, yet we never even consider the fact that we are using a signaling network. What's happening now is that wireless data is melting into the network as one of the core services of the network. That is what is to come.

Every medium goes mobile. Every medium that becomes essential to people's lives goes mobile. If you look at the radio[,] it used to be a big box in the living room but then became the transistor. The phone used to be that black thing in the center of the kitchen somewhere, [but now] it's with us everywhere today. And the same thing is happening to the internet. [F]rankly, I don't know how to trade stocks without the internet any more. I have never spoken to my broker on the [phone] for the last three years. I need data connectivity. I need that medium brought to me wherever I am. And that's where we, at Phone.com, see this industry going.

There is a fundamental shift [happening] in the wireless industry, and that shift is really the grand unification—as my CEO, Alane Rossman, termed it last week at CTIA[.] [I]t's the grand unification between the internet and the wireless medium. [W]hen those two unify, it starts becoming blurry[.] [W]e believe that in fact the bounda-

ries between internet business models, internet companies and wireless carriers will begin to blur.

[T]he wireless medium will become an integral piece of that medium we call the internet. And so, will carriers be bought out by internet companies? Will internet companies become carriers or will carriers become internet companies? Well, we believe all those will happen. We believe that there will be the AOL phone, and there will be the Amazon or eBay phone and the distinction will blur.

[S]o[,] we see technology providers like ourselves [as] being at the core of this convergence [and] really beginning to supply the tools that are necessary to bring about this convergence. And the convergence will actually become physical[, like what is happening with ADSL]. [W]ell, when your line has ADSL on it, how do you decide how you are going to make your voice call? Is it going to be a circuit call through the analog part of the line? Is it going to be an IP telephony call through the ADSL part of the line?

Of course, there's a huge industry spinning off to try to figure out this answer[.] [A]s wireless moves to the packet domain with third generation systems [and] with two and a half generation systems in some cases, it starts becoming an IP-based network where the intelligence moves out to the edges.

All the network knows how to do is route packets. For example, a voice call becomes an application residing in the device because what is going between them is just bits. A video call is an application. An internet session is an application. An e-mail session is an application. A voicemail session is an application.

[W]e see the wireless infrastructure business moving to[ward] becoming a software business and software application business where discreet applications provide value-added services in the network. [W]e see that beginning with the area of messaging. After all, messaging is absolutely the killer application in wireless today. And that is going to be the first entry point for this new infrastructure architecture. So when you have the ability to take internet technology and [mold] it into today's networks, we believe that a whole new model emerges.

In total, you end up with a radically new structure where wireless carriers become media players[.] [T]hey become media players in purveying this media we call the internet in a portable way.

**MS. O'BRIEN HAM:** I'm going to talk a little bit about how important I think the investment community has been to both the thriving economy and the vibrancy of this wireless market. They have fueled the technology, the innovation in the new services that we're seeing in the marketplace, and I think we at the FCC appreciate that and want to see it continue.

As some of the panelists are suggesting, I think that the wireless marketplace is very vibrant. It has been a huge success story from our standpoint, thanks to the innovations in the market, the financial backing that the investment community has given and, frankly, the regulatory approaches that the FCC has taken in recent years. One of the things that I think that we've learned at the FCC and that we strive for, is that competition is good for the consumer, and in turn, it's good for the investor. I think that demand for wireless offerings and data applications are up.

Americans are a mobile, fairly sophisticated group of consumers, and the projected growth that we understand in this area is pretty mind-boggling. As competition has been introduced we've seen subscriber bills have gone down by something like 35 to 40%. Capital investment in this industry is up around 340%. Jobs have gone up over 280%, and the number of subscribers has jumped dramatically, too. And this is all really good news.

In other words, competition has increased demand for wireless services, and it's providing great investment opportunities. As prices come down, the average consumer can afford cellular phone service, for example, where maybe in the past this was more targeted to high-end uses. Also, I think in recent years, we've shown a lot of flexibility in our rules, in terms of what people can use the spectrum for.

One example that jumps to mind is LMDS, which originally was sort of envisioned to be a video-based service[.] [T]hen it became apparent over time that it was going to be used for other types of data applications, for example. And the Commission's rules provided enough flexibility for that to happen without us having to go through another rulemaking, and change the rules and so forth. In other words, letting the marketplace define what the spectrum can be used for is a good thing and I think we recognize that,

and we've been striving to be more flexible in how we deploy the spectrum.

In general, in the wireless arena, I think the FCC has been more hands-off, more deregulatory, recognizing that the marketplace is doing a lot to make things better and that maybe the government doesn't necessarily have to jump in to change things. And so we are very excited about the development in the industry. We are looking for ways to do better; to facilitate innovation and competition through our auction designs; [and] through how we deploy the spectrum.

One area that I know the Chairman has spoken about is in the area of secondary markets[.] [We wonder] why we are not seeing more partitioning in disaggregation of spectrum, for example. [We have an interest in seeing what happens with spectrum] [a]fter [it] is deployed by auction[.] [We want to see if there are] areas that otherwise aren't being served [that] perhaps should be served and could be served.

**MR. WHEELER:** First of all, Kathleen, you are dead on it when you say that the success of wireless internet is going to be government keeping out.

You go to Rudy Baca's latest report; his first report for Precursor, in which he talks about what the European governments are doing and how that's going to impede the growth of the internet[.] [Then,] compare what ou[r] government has done [and you are] right on for your philosophy and your leadership here. You go to Ben's idea of the great unification, which I believe is a term from physics or something. You go to Mark's idea of what is the killer app[.] In that grand unification the killer app is instantaneousness. I will invent a word: instantaneousness or instantaneonisity or something like that.

We have to think about how wireless is going to change the internet. We have become convinced. We have learned that the internet is a place; wrong. The internet is not a place you go to. You do not go to your PC, so you can go to your portal, so you can go to the internet. The internet is a presence. It not a place; it is a presence. The difference that wireless brings to the internet is that it is not just the internet without wires, it is the pervasive internet.

Yes, the things that we have come to know and love on the internet we're going to be able to use wirelessly. But it's even going to be more pervasive than that expedient example. There are seventeen billion microprocessors in the world. There are six billion people. There are three microprocessors, therefore, for every person alive on the earth today. [Are those] going to be connected by wires? I don't think so. So, we have just begun to touch the surface of the new pervasiveness of the instantaneous app that wireless enables.

There are two components to it; one is hardware and one is delivery. We are living at the vortex of these two great revolutions. Moore's Law is alive and well. The palm pilot has more computing power in it than the mainstay IBM mainframe from the middle 1980s, and it costs significantly less. Numura Securities a few weeks ago came out with a report in which they said that the largest computer company in the year 2003 would be Nokia—not Dell, not Compaq, but Nokia, because the phone is a computing device.

So we are living in an environment where you have portability of processing in the palm of your hand. The problem is right now we have to take it and make it unportable. We have to take it over and plug it into the wall so we can get to our information. That's where wireless comes in.

Ben talked about NTT DoCoMo, and what they are doing in Japan. Four and a half million subscribers to wireless internet access in one year; twelve months. The largest ISP in Japan is wireless. Ben referenced the fact that their average is twelve dollars a month in transactions; a three dollar charge, and a ten dollar lift in RPU for voice. Twenty-five bucks a month; [a] 30% lift in RPU associated with this service. Their churn is one quarter of what the voice churn is. It adds real stickiness, so it changes the entire economics of the wireless business, in addition to bringing these two great developments together. And that is being done, ladies and gentlemen, at ninety-six hundred baud. All of the stuff you hear about throughput we need to take with a serious grain of salt. Ninety-six hundred baud is what has created the largest ISP in Japan and the kind of numbers that I was talking about. Steve Case built his business on dial-up telephone lines. Wireless is today the equivalent of dial-up telephone lines. You take your laptop on the road, your mobile computing platform. You go to a hotel; you plug in. You are lucky to get somewhere in the twenties, twenty Ks, coming out of there [while] paying a

huge surcharge to the hotel. Let's not become baud snobs. There is a very successful business model alive and well today at dial-up data rates. Mobility is more important than speed.

Lastly, the wireless business, the wireless internet business, the wireless data business will break into four layers. It's like a tiered wedding cake. At the top you've got fixed services. In Burlingame, California, they are getting their parking meters ripped off by vandals. They put a wireless chip in the parking meters that call[s] the cops when it gets ripped off. Surprise. There is a successful business there for that, for meter reading, for burglar alarms, other kinds of things. So that's the first tier of the cake. The next tier down are the vertical apps. Any of us who have been stopped by a cop know that vertical app real well: "can I have your license?" [Then,] [he or she] goes back to the cruiser. That's a vertical app; one of the largest vertical apps out there right now. The next layer on the layer cake is the enterprise. How are you going to have constant wireless connectivity to your enterprise network? And the final layer is the consumer.

And so we need to look at wireless data in the totality of that layer cake and think about it again as pervasive; not as a place or something you go to, but as something that goes to you all the time.

**MR. WILLIAMS:** I don't know if it's directly applicable to the competitive U.S. model but are we truly looking at incremental revenue opportunity here? [O]r, are we looking at cannibalization and the need to address pricing in a way that fully grasps with the consumer, and therefore, perhaps [becomes] more of a zero sum game?

**MR. WHEELER:** But let's go one other step. Don't think that we have to be dealing with the same economic model that we are dealing with today. It's not always going to be a sale of airtime or a commission on a transaction kind of a thing. We've got to look to other models. The model that I find fascinating is the broadcast model. Here you have a very expensive product that is given away for free, and they make a lot of money.

Now how can we break that quote, okay? But stop and think about it. Banking; when I walk in and do a transaction with my bank it costs [$1.07] to see the teller. It costs fifty-four cents for me to do it at an ATM. It costs—and I'm pulling these numbers out—twenty-six cents to do it online with their private service, and it costs thirteen cents to do it on the internet. Now between thirteen cents and [$1.07] is a lot of money. There's got to be a way that we can figure out how we both can benefit from that and establish a whole new model.

If you can go today in Helsinki, Finland and press one for a "Coke," two for a "Sprite," et cetera, on your cellular phone to get something out of a vending machine, I think it is also possible to have the same kind of a transaction basis with banks; with airlines; with merchants.

And [then] maybe we actually get to a point where permanent fees don't exist. The money is being made by the efficiencies enabled by the delivery of this transaction wirelessly.

And I think you need to think in terms of how the internet grew.

I remember shortly after Jim Barksdale went to Netscape, he was explaining [that] "The throughput isn't the big deal." He said, "When I go, and I want to know where George Washington was born, I don't need to see a picture of it. I don't need to see a picture of George Washington; I just need to know where. What is that information?"

And so we are very much in that kind of an environment today. If you are going to access information, the kind of information you need is not heavy overhead graphics. The internet, because of bandwidth, has grown, and suddenly become more and more like television. That's the experience that we're going to have because we're going to start here. We're all going to learn how to use [this]; the bandwidth is going to grow, and it will become more television-like.

I have to tell you my favorite story about the answer to your question, however, because I asked the Chairman of the Board of NTT DoCoMo exactly that question. And he said to me, "Well, you know over here, we love horse racing." And he says, "We do lots of off-track betting, and we are now doing it wirelessly through the wireless phone, and I think people want to look at the horse before they bet on it." So there it is; the first killer app for big throughput wireless.

**MR. LINDER:** One other comment on that also. Bandwidth is not a cure all.

The thing that people don't think about when they think about when is three G coming; when is two megabyte coming to the phone, is that by the time the two megabytes hits the phone your home

connection is most likely going to be ten to twenty megabytes.

If you look at DSL and at cable modems, and so forth, the turning point for the wired internet in three to five years will be ten to fifteen times what it is today. You will have a thousand mips on your desk and a tarabyte of disk there, all humming away with liquid cooling.

So the relative difference today is a factor of ten. You have ninety-six hundred baud here. When you have two megabytes here, I believe you are going to already have ten to twenty megabytes at home. And so there will be still the difference in the fidelity, if you will, of the two mediums.

## TECH OUTLOOK

**MR. POWELL:** One can begin to try to employ scenario analysis, if you will, to try to pick up on trends and understand what those trends may reveal for basic categories of change, and then begin to understand how we might be efficiently moving in that direction.

Let me give you some sense of what I mean. Some technological change, to use Khan's terms, is "surprise-free." That is, it is absolutely clear to me, and inevitable, that the trends toward bandwidth and connectivity will continue.

And that in our lifetimes, we will see a world of relatively ubiquitously deployed broadband capacity to individuals [and] communities. [A]nd, the world will be substantially more connected than it is now.

But one of the things we are trying to do at the Commission, or I should at least say that I'm trying to do, is to consider some of the trends and what they mean for our fundamental and original models. Take, for example, television and video entertainment. There is a trend that is observed every year when the FCC puts out its cable competition report. That is, by some small increment, the number of Americans that are subscribing to multichannel, subscription-based services increases. If that trend were to continue, and let's say ten years from now 92% of Americans subscribe to some form of multichannel video product, it's hard to express how fundamental a revolution that would be in communication policy and the basic model of video distribution. Free, over-the-air television; the network business model; the importance of interactivity with video product, would be substantially different than it has been for the last fifty [or] sixty years in this medium space.

A second trend it seems to me that one can spin out in scenario analysis would be, as David Isenberg himself has coined it, "The rise of the [S]tupid [N]etwork." The importance of the paradigm shift that allows networks to push intelligence to the periphery, into the hands of users, is so profound. I'm running out of adjectives to describe it at these panels.

What you are starting to see is a clear emergence of that network model as the superior model, and a model that will be differentiated among competitors by software. Increasingly, it is not going to be the engineering layout of the network, or many of the buckets, boxes and gadgets that are employed in the institutional center of a traditional phone network. It's going to be the importance of software differentiation in that network and that is where the differences in fortunes might rise.

So I think that following the trends of software differentiation and network management [are] another one of those significant scenarios . . . At the end of the day, all these pipes we are screaming and fussing about deploying today will get there. And once they are, I don't think consumers will care one whit about what it's called; how it works; [or] how fast it is because that will settle out, to a great degree, from their perspective.

Then, the premium is going to be placed on what on earth you want me to do at the other end of this pretty pipe. I still think that content, goods and services, products, software and applications again will begin to reassert themselves in the great network technological revolution as the premium product to have in the network space.

The internet takes that to the third act: narrow casting to the level of individual preference [and] making it potentially economic that if you like stories about ants, and no one else in the world does, you still may be serviced for that purpose.

Finally, let me just say that there will also be a lessening importance of distance and geographical boundaries.

And then finally, I would say something that's really becoming clearer to me. More than we think, it's all been done before. The more I read about the history of other kinds of networks, the more I am startled at how [similar] it is, rather than how different it is.

And the number of people running around day trading, trying to figure out how to do this is amazing to me. None of them have read anything about how the telegraph went, or how the original years of the telephone went, or how the airline industry or ATM machines, or the railroad network went[.] [These models have] more answers than you could imagine about the way this revolution is going.

And I would commend to you some of the work of the economist Hal Varion who has gone back and looked at network industries and sort of demonstrated how they almost always follow the same pattern. They start with experimentation; that is, once the basic elements of new technology are on the scene you find hoards of inventors and entrepreneurs frantically experimenting with those building blocks to try out new products and services. People forget that the automobile industry, in 1904, [had]over 240 American automobile companies.

The next step he talks about is capitalization; the rush to find the money to begin to make a mass-market product. You see that in venture capitalism . . . . [This] is the frenetic pace of competitive bloodletting that ultimately almost always culminates in massive consolidation. I think we will see the same thing in the internet space and the technology space. Thank you.

**MR. HOLLAND:** We are really looking at about five events that occurred over about a decade-long period.

I go back to the midnight team leaders, and at that time, a company called Teleport Communications Group, a company called MFS Communications and a company called Institutional Communications. [They] started building, for the first time, major metropolitan fiberoptic networks in, respectively, New York, Chicago and here, in Washington, D.C. This was the first time that fiber had been run to numerous buildings, and this was primarily for the benefit of just very large users, although that network in Washington did go into the Capitol building and the FCC, as well.

So there must have been a lot of users there. But that was a very major milestone. That was 1985 to 1987. In 1991, the people that ran the internet at that time—it was called the NSF Net. The internet actually [was] started in the late '60s by the military. At this time a great event was happening with the internet. The NSF group was upgrading it from one and a half megabytes to forty-five megabytes, [which was a] big leap forward after being in service for about twenty years.

In 1993, there were two entrepreneurial companies: one that I was a part of, MFS Communications; and a new manufacturer in Canada, NewbridgeNetworks, that rolled out the first nationwide ATM network. [This new network allowed] a user in Dallas, Washington [or] Los Angeles [to] connect to a file server in New York at ethernet speed, native-mode ethernet, using ATM technology, which was a revolutionary new technology. It was neat. We didn't sell much of it, because it was very expensive then. But it's the type of thing you probably are thinking, gosh, there is nothing to that. Well, there is nothing to it today.

In 1994, I went out to Mountain View, California, and I met with a couple of guys, Jim Clark, Mark Andersen and about fifteen very young programmers with their sleeping bags in their cubicles. They had something that I had never seen before. It was absolutely amazing. It was something—it was a web page with a lot of interactive graphics and video. They called it "Son of Mosaic" at that time. Sixteen months later, I had my first internet browser on my computer, and [I] used e-mail for the first time. [That was] November of 1995, just over five years ago. These five events show how the technology transformed the networking industry, but there were two things I think that are important here to realize.

Number one: it was slow. It was glacial speed compared to what we've seen in the last few years. It was an evolution, not a revolution. And number two: [do you think it] was the big established players that were introducing all of the new applications and technology? Not a chance. It was new entrants. It was entrepreneurial companies that were making it happen. At that time, at the end of 1995, the communications industry was where the software and computer industries were in the early '80s. You did not have the distributed network with the value add and the control at the fringes, as Commissioner Powell talked about. You had a very centralized network—very much like the old mainframe computer industry.

There was one difference between the computer and software industries and the networking industry in late 1995. Because the same silicon economics and microchip technology was driving the equipment in both of them, that was [their]

regulatory barriers to entry. For a change, technology really overwhelmed events and really pushed Congress into passing and enacting what I think was the most significant piece of commercial legislation to hit the networking and high-tech industries since the end of World War II[.] [It] was the Telecom Act of 1996.

That started to take away the boundaries and really unlocked the venture capital markets, [including] the NASDAQ[.] [It] really [got] the investment dollars to turn that glacial pace of change. [It has] taken a long time just to get [from] where we were with crude browsers at the beginning of 1996 to where we are today. The developments of the last few years have just been staggering.

If you look at things like ATM technology, which was a very powerful technology being employed in networking all around, it really realized that dream of distributed processing [and got] the intelligence out to the edge of the network.

Dense wave division multiplexing. Remember those fibers that were put out there in the streets of Washington back in 1986 that could carry 8000 phone lines on a single fiber pair, where it took [much more] straight copper to do it before? You can go in and change out the electronics on that today, and you can carry over two million simultaneous phone conversations on that same fiber pair with dense wave division multiplexing.

That is warp speed. And what has happened is really the convergence of technology, a globalized economy and indeed, the removal of archaic regulatory barriers. And we certainly have seen a lot of progress made the last couple of years in that area. Now I think where things are moving is at the core of the network; we've had technology take over.

We have tremendous amounts of new networks going in. Now it's that last piece. If you happen to live in 5% of the buildings in America that are huge, you've got it. The other 95% don't. Technology is like digital subscriber line. I think if there is anything that is a killer out in this industry, that is. That is the way to really enable the bandwidth to the small business market and to the consumer markets. We are really starting to see that take off. I know the chairman of BT, Sir Ian Valance, said back in 1990 that "What the market wants, and what technology can deliver, the legislators will ultimately allow that to happen." Well, it did happen. It happened in 1996. Now we are really reaping the benefits of it.

**MR. ISENBERG:** I'm going to show some slides. Here is a picture of the Intelligent Network. All you have to understand is that it's complicated; it's centralized; [and] it needs experts to run it.

Now here is my ideal—what's that? It's called the "Stupid Network." It's just a big, dumb, empty cloud. It's the transmission component of your application, just like the hard disk is the storage component of your application. You don't need experts to run it; you just buy network enabled products, and either plug them in or don't plug them in and use it wireless.

There are three points I want to bring to you today. One is that the internet shifts control and value creation from the telephone company to the end-user. And this, all by itself, I contend, is what made interactive TV a flop and made the internet a success.

Number two: we've got the wrong architecture for broadband internet.

And number three: we've got some early indicators about what the right architecture is.

Let me show you. The internet shifts control to the end-user. In the old network, every network node touched the call when you were setting it up. That lets telephone company B add cool features to their network, so you would go to it in preference to company D. But that's the old way of doing things. In the new way of doing things, inter-networking submerges the differences, including the cool features in any one network so user A connects to user B.

So that's what Commissioner Powell and Royce Holland were talking about when they said the intelligence is shifting to the end points. That's why we have the incredible value creations we are seeing today. We have the wrong architecture for the broadband internet. The phone network wasn't designed for broadband internet. It was designed for two-way voice. The cable TV wasn't designed for internet. It was designed for broadcast. We have DSL and cable modems; they are not optimum solutions. They are retrofit solutions. They are designed to protect existing investments, but they don't work real well[.] [A]nd, [DSL and cable modems] are real expensive and real complicated. ATM, furthermore—not the teller machine but the asynchronous transfer mode tech-

nology—is obsolete. Why? It was designed to handle mixed traffic in the middle of the network, but under IP, I can handle mixed traffic right here on my terminal. It was designed for efficient handling of fixed-sized cells.

A decade ago Moore's Law was good enough[.] Now we have wire speed IP switches because we've had several more Moore's Law doublings that can do variable length packets at wire speed like this.

SONET, at this moment, is irrelevant, because SONET is a circuit technology that implies that for every stream going [one] way, you need another stream going [the other] way. But IP is inherently asymmetrical. So there's my bottom line. You don't get backwards compatibility without backwards.

So let's move forwards. What's the right architecture? This is what I think it is, given early indicators. It's basically IP over ethernet, over light. We know that the optics are moving really fast. We know that the internet is moving really fast. But let me tell you that [the] middle layer ethernet is getting so good it's starting to displace things like SONET, the synchronous digital hierarchy. You might have to have opto-electronic to optical regeneration if you get too long a run. Then the last link is fiber over gigabit ethernet. Inside the apartment building you have a gigabyte ethernet switch in the basement [and] category five going up to the apartments. You can use this kind of architecture as the basis for a wireless infrastructure. "Now the future is already here; it's just not evenly distributed yet," says William Gibson.

I believe that's true. I have found a few places where the future has arrived. I'd like to tell you about one of them: Stockholm. In Stockholm, the city chartered a company in 1994 to put fiber to every block. In 1995, the company Stokab started its build. In 1997, they had, because they could use the city's subways [and] the city's theme tunnels, they had put ninety-six fibers on every block of the city of Stockholm.

**MR. LUCKY:** I think there are five technical areas that are important in the infrastructure today.

I just want to give you a few biases, and that's all they will be, about these areas. The first is the packetization of the network. Second, is broadband access. Third, DWDM, dense wavelength division multiplexing. Fourth, wireless, and fifth, quality of service, QOS. I think just about every problem we work on falls into those five categories, and let me give you a few biases about them.

First, the packetizing of the network. I think this is the business of ripping out those classified circuit switches; throwing them away; blowing them up; bringing in some routers; bring[ing] in some gateways; bring[ing] in a collage and a soft switch architecture.

Second, let's get into long distance, because we hear there is money there.

And third, let's upgrade our core network with voice trunking on ATM, or something like that, so that we will be ready for whatever.

And fourth, we [are] out to packetize. So it's like I say; it's happening, but slower than one might think. Now I always get bothered when I think about this relative to what David was talking about, the "Stupid Network." This is not a "Stupid Network." You've got intelligence inside the network that mates—it's a double-bubble network. You would think of the network as a bubble. We've got two clouds: one is the internet and one is the public switch[ed] telecommunications network. And so we have a double-bubble network, and the two bubbles talk to each other through gateways and some intelligence.

And it bothers some of us because generally speaking I agree with David on the idea that the network ought to be really stupid, but I do want to say it's not as simple as he says. This is my time; my turn. You know what really holds the internet together today? What is the *sine qua non* of the internet? I think the domain name system [is].

What is centralized, complex [and] requires experts to run? The domain name system. People at Networks Solutions stay up at night with those super computers in the basement, working on how all the names will be [decided]. But I just want to make the point that it's never quite a clear, simplistic picture, but I do agree with the philosophy [that] everything that isn't nailed down gets pushed out to the periphery. But there are things like quality of service, [which] I will talk about later, that properly belong inside the network. So again, it's not so simple. Okay. Now we can argue that, and I think there would be good technical arguments on both sides. Second, broadband access. The simple answer is there ought to be a fiber to every home. This is what God intended. And it really wouldn't cost that

much, so what we need to do is bring back monopoly and we could do it.

But given the free market system, this ain't never going to work because you dig up the streets, you put in the fiber, you invest up front and the person says: "Well, I just took this wireless service, and you lost your money." You have stranded investment, and with that kind of threat, I mean this just isn't going to happen.

Now we've got this wonderful valve between DSL and cable modems. That's the greatest thing going because you know if it weren't for cable modems, [do] you know what the price of DSL would be? There isn't much doubt about that. I mean, never before [had] TelCo been faced with a service that was priced before they worked out the service.

There are two interesting factors. One is that this is the stickiest market there ever was. I mean, once you've gone through the pain of getting cable in, you are not going to DSL or vice versa. So first-strike capability is really big here, but there is a counteracting factor and that is that [the logistics must be worked out]. [T]hey just can't hook everybody that needs to be hooked up fast enough. And just work out [the logistics of] how many new people are joining every year and how many people can actually go out and install these things. They can't do it. You have to be plugged in. It didn't used to be that way, at all.

But on the other hand, I don't believe in that traffic information thing. [T]he trouble with the telecom business is that they bear the brunt of the investment risk [in] that when you want a fiber to your house, they've got to put in, pay for it and take the risk of [it]. And they said the computer industry is not like that. You go down and you buy a computer, you put down two thousand bucks, and you take the risk of what happens with Moore's Law and stuff like that.

Dense wavelength division multiplexing, the next technical area, is rife with opportunity of changing the way we think about the network. And if you really want a "Stupid Network," like David talks about, this is a great way to do it.

And right now, of course, we are just in the business of upgrading capacity. [W]e've got a long way to go in terms of [improving] routing capability, switching [and] optical switching so [that] you will have a very fast network. And let me just give you an idea of the kind of thing I have in mind. This is a true story. About twelve years ago, we first had a gigabit over an optical link; I was at Bell Labs then. I went to a customer meeting, and I told them [that] we can get a gigabit over a fiber.

The customer came up to me afterwards and he said, "You know, I would like to lease a gigabit channel from AT&T. Do you think I can do that?" And I said, "Well, I don't know. This is just a prototype, but yeah, I will let you talk to our salespeople and see what we can do." And he said, "Thanks a lot, but you should understand," he says, "I only want it for a microsecond." And I started thinking about it, and I thought that's a good idea; a gigabit for a microsecond and then give it to someone else. And that's the kind of thing that optical switching could do [to form a capable network].

Okay, wireless. I think we had a lot of talk about that already, but from a technical standpoint, the beauty of wireless is that for all my career, I saw wireless spectrum as such a precious thing. I'm sure, in the FCC, you still see it that way, because people are besieging you to give this little piece of bandwidth to them. [B]ut from a technolog[ical] standpoint, the capability [of that piece] is expanding so much that there is a whole new picture emerging. [F]rom a capability standpoint, [a picture is emerging that shows that] there is enough for everybody, for everything. [Y]ou [have got] the Moore's Law of signal processing. You've got adaptive antennas. You've got space-to-space communications. It just opens up tremendous capacity. You've got techniques like ultrawide band and cognitive radio that break the paradigm of the spectrum allocation that the FCC is using right now because [people want all] the ultrawide band. There are all kinds of new technologies that can be used here, and it's very, very exciting. But in the end, I [have] a cell phone, and I don't even care what technology is in it. All I care is [that] when I go to Europe, it doesn't work. I just want it to work everywhere.

Finally, QOS. [T]he industry and the engineers are fixated on QOS, quality of service[.] [F]irst, it's a really neat technical problem, and second, it gives us something value added that we can sell to people for a premium. [When we add QOS,] we get more money out of our network and it gives us something to do. Someone told me there was a cartoon in *[The] New Yorker.* I didn't see it, but I sort of made up my own version. A couple people

are standing over a toaster and someone said, "That's really nice toast. Who is your electricity provider?"

So anyway, QOS gives us something to do, but there are people that will argue cynically that QOS has been very slow coming. And what has been happening in the meantime is the rising tide of the internet; [the internet just keeps] getting better and better. And so the question is, will QOS get there before [the internet] is so good you don't need it? I don't know the answer to that. And you can argue a lot, because it is very true that voice on IP and web browsing on IP are absolutely different animals. And a network optimized for one does very poorly on the other. [I]f you mix the two together, the network performs very poorly, unless you throw bandwidth in it.

## INTERNATIONAL TELECOM OUTLOOK

**MR. HUBERT:** [T]hank you for your welcome.

It is a pleasure, since I understand I am one of the only representatives of the European continents present here today. It is in my capacity as a European that I would like to talk about the changes taking place in our market. The European market is certainly different from the American market, and although Europe may seem a long way away, in the era of the net economy, it has never been so close. Therefore, let me give you some idea of the momentum and importance of the European markets, and within it, the French markets.

The European Union is one of the world's two biggest markets with the United States. In 1999, it totaled $192 billion, compared with $247 billion for the United States. Competition in Europe is fierce. The European Commission listed 557 authorized operators on the long-distance market in mid-1999 within fifty European member countries. Many international peers, notably U.S. firms, are present on the market, and a number of fine European network operators, such as AT&T, MCI WorldCom, Level Three, Global Crossing [and] GTS, have obtained licenses in France.

The European operators are naturally a driving force in this market. They include all the incumbent operators, including of course, France Telecom, whose efficient transformation is illustrated by its recent results and strong presence on the European markets. Also present are a number of new entrants, brought in by recent alliances. One example is the venture [that] aimed to set up a model potentially covering eighty million consumers in Europe [in order to] pave the way for the arrival of the internet. In this way, Europe has grown up in its market to a host of new operators, many of whom are North American. This situation has created an impetus, which will only be corrected when European operators are able to gain a firm footing in the North American markets.

The European market combines significant growth potential for development. As a result of deregulation, the market grew by 5 or 6% in 1998, and the figure for the last year is expected to be higher. This growth undoubtedly illustrates the importance of January 1998, the day the European market opened its doors in the history of European telecommunications.

Considerable progress has been made over the past two years by the European market, notably by France, which is opening up to widespread competition and enjoying strong growth. For example, at the end of last year, ninety-one licensed operators were present on the fixed and mobile communication markets. And two-thirds have full or partial links with the U.S. economy. The French telecommunications services market grew by more than 10%, in nominal terms, last year.

The two main sources [of] growth [are]the European and French markets, mobile [communications] and the internet. The European mobile service market has seen spectacular growth over the past five years, on a scale that nobody had foreseen. And the pace is unflagging. The average mobile penetration rate in Europe at the beginning of this year was 44%. The number of mobile phones in Europe today can be estimated at more than 150 million, compared with about 80 million in the United States. According to data published by the European Commission, the mobile market accounted for 20% of the European telecommunications services market in 1999. To a great extent, this success shouldn't be explained by any difference in economic systems. It must be attributed to the introduction of a single standard: GMS for the second generation. Far from hampering technological innovation, the current standard actually [fosters] it. Today Europe is getting ready for the third mobile generation and confidently expects this technological edge to further

stimulate the base of dividends. International players and investors have already acknowledged this fact. Open any daily paper and you will realize that [this is a] major issue at stake. Within twelve months the European countries will deliver—covering all—Europe, about sixty licenses for third generation.

In France the mobile market totals twenty-two million customers at the end of January 2000. In the space of five years, the customer base has increased from one to twenty million, which means that it virtually doubled every year. This growth can be expected to continue on an average of one million a month. More than thirty-five million French people will have a mobile phone by the end of the year, and that's the same number of subscribers as for fixed telephones.

The internet is also one of the main driving forces behind the development of the European market. For example, internet access traffic is expected to account for more than 15% of France Telecom's total telephone profit this year and could rise to 50% of local traffic within the next three years. The [United States]. has played a fundamental role in the birth and extraordinary expansion of this new form of communication. Europe got off to a late start with respect to the U.S. [This] fact can be explained, notably, by the many different languages used across the continents. But this situation gives it considerable potential for growth [in] the different markets: long-distance infrastructure, access services and contents. Moreover, the characteristics of the internet economy are not the same in Europe as in the U.S.

In Europe, most of the value traded via the internet value chain is internet access markets, and notably, [it is traded] in the market for internet access calls. In the U.S., by contrast, it seems that the value is concentrated in the contents sector, so the basic approach is different. But ultimately, priority will be given to diversity of service.

Competition should exist not only for networks but also for services. This is a constant source of concern for the French regulator. And as the internet develops, it is probable and desirable that a new balance should be struck between the different continents for the creation of contents.

A few words about functioning in the market. Interconnection charges for this year are down about 25% in two years. In consequence, France ranks among the leaders on the European market, before Germany but naturally behind the U.K., which has opened its market fourteen years ago. The [inaudible] favors the internet since internet charges for internet access calls have fallen by 19%. The price of internet access calls is no longer an issue in France. [A]s a result of the decisions taken by the regulators last year, these charges are now among the lowest in Europe.

About two levels of service; I would like to mention this point, a concept of particular importance for both our countries. A debate is currently underway in France on whether this concept would include certain internet access services offered by telephone services. I would like to point out how important this debate is with respect to the issues raised by the information society. Looking beyond the figures, I would like to stress that the French market has removed the barriers, and that the same barriers must be brought down in people's minds on both sides of the ocean. There should be no doubt about that. With ninety new entrants, more than half U.S. operators, let me say frankly, that I cannot share any statements relative to substantial barriers to entry in France.

Our main priorities for the year 2000 might explain this point. The wireless copper loop will be in place by summer 2000; opening new possibilities in the supply of high-speed services for business and residential internet access is naturally the first item on the list. This reflects a joint decision made by the French market, and the procedure for attributing licenses is well under way. Forty-four licenses will be issued; two national [and] forty-four regional. It means that at each point in France there will be four competitors. We have received applications from twenty-eight companies, and the process of examination will be completed next summer.

This technology has run considerable interest among operators. Its survival marks an important stage in the opening of the other loop and the development of internet in France. The development of high-speed internet access is also tied into the expansion of ADSM. This technology is already up and running in France. The problem facing regulators today concerns competition. It is important to make sure that this major technological advantage is available to all operators seeking to unleash themselves on the market. More broadly, as part of a process, we see an eighteen month growth through public consultation. We

expect to complete the competitions of France Telecom's local loop by the end of this year. A clear agreement has been reached with respect to the program and schedule.

I would also like to mention cable networks, which are another possible avenue for development of high-speed technology. A number of industrial and commercial initiatives have been set up presently with a view of supplying internet access by cable, and this initiative has transposed the decisions and recommendations that we made two years ago.

Combining mobile telephone and the internet is another priority of France within the area of European markets. And we shall see two complimentary processes emerging this year. The arrival of unit works and services technology is making it possible to adapt the supply of internet services through the GSA environs. Here, I am thinking in particular of GPRS and their work protocol, which are now implemented. This transition period, which would last a few years, will also see the arrival of edge technology and the definition of procedures for the introduction of third generation mobile phones.

The fact that Europe has put in place a current schedule to coordinate introduction of the third generation is certainly a major decision. In 2000, almost all European union countries plan to define and publish the first of license attributions. In this way, the first commercial offerings will be put in place at the start of 2002. Most of European countries have chosen, except U. K. [and] Germany, to set up a contest for this purpose. France will dedicate four licenses. To conclude, I would like to stress the importance of diversity and complimentary in both economic and social models. Diversity of language is a source of wealth. This is true for the internet and also for other media. I hope to assure you today that our economics are different; their strengths and weaknesses are not the same. They are complimentary, nevertheless, and this is what struck me in the discussions I had with William Kennard on his recent visit to Paris.

Our approaches and objectives are similar, because we are faced with similar questions. We share, for example, the same approach to the internet. The object here is not to add further regulations, but to make sure that existing rules are implemented so that the market can develop. In this way we meet the requirements expressed everyday by operators.

Let me summarize. Our goal is efficiency, including: efficiency in allocation of resources; efficiency for a better productivity; and efficiency for a dynamic attitude towards innovation. We work to bring consumers better services at a better price. We work to give industry good opportunities in investment and profits. Thank you for your attention.

**MR. ABELSON:** What I will address is some of the changes in developments that are happening in the international marketplace and then try to look at what might be considered trends in this area. What I have done is to try to summarize this into little catch phrases, and some of them will be familiar to you. The one that is not, because I just made it up last week, [is called] the "Three Ss;" they are spectrum, standards and society. And then I get to the chairman of the FCC's ABCs, [which are] access, broadband and competition. Let me start [with the ABC's].

The goal that we are all working for, and of course the one that is set by statute for the FCC, is to work in the public interest. That, coupled with expressions that you've heard over the last half year from, for example, the Federal Reserve Bank, shows us that the work that we're doing in information technology has a direct impact on our economy and on our society. [W]e are creating in this information technology area tremendous opportunity for our country. [A]nd, [as] other countries join in this effort, [they] are creating opportunities for themselves. To get to the point where we are actually benefiting our society and economy, we need to have certain pieces in place. And those are the pieces of ABC: access, broadband and competition.

The access piece is directly related to what Kathy Brown mentioned during her luncheon presentation; that we are the connection. "We," being [the] telecom world, are the connection between different pieces or places of information. [W]ithout networking, we [would] only know a world in which you have personal computers that don't talk to one another. The innovation that we have seen in the last five years, at least in the public economy, has been that we are all network[ed] now. And that relies upon a very aggressive program on access. All of the issues that we address

are not unique to the United States. The[y] are, in fact, shared by our partners. You have just heard the summary of the status in France. We could go in and look at range of countries that are addressing the same issues. And of course, not a single one of us have The answer; that's a capitalized "T." There are only several answers and what we try to do is learn from one another.

We have been fortunate in our relationship, that is the U.S./French relationship, that we have the highest level of cooperation and dialogue, and we truly are partners as we explore these questions. It's not always true that we can partner with countries, and that we are able to achieve this level of cooperation and understanding.

This brings me to the second point, which is on broadband. Our goal, of course, is to try to make access available to a broadband network; one that really allows for operation and networking at the level of the expectation of both businesses and consumers so that we don't turn the worldwide web into worldwide wait. And you've all heard that debate. This goal of achieving access to broadband is, of course, very, very complex. And once again, there is not a single answer.

One of the answers is, of course, the C in ABC, [which is] competition. So far as the FCC [can figure out,] the way you get access to broadband is by promoting competition. [I]f that piece is in place, then the other pieces fall in place as well. [We've had this discussion with] a number of our colleagues around the world and what we're finding is [that] it is happening in the most unlikely of places. So you can find this debate raging in India and Pakistan, [the same] as you will find it raging in Malaysia and Thailand. It is not unique to the north or people in the south, the east or the west. It really is going on all around the world. And our goal is, of course, to help regulators, [in particular because] the Federal Communication Commission has a bias toward regulators. We'd like to help regulators in their job of regulating. I should say that in the context of using the word "regulating" and "regulators," we also recognize that there is something called "deregulation." And as codified by the FCC last fall, "unregulation." So I am not, in fact, suggesting that the solution is to regulate, but it is regulators who have to make the decisions whether or not to regulate. And that's as important a decision as it is to engage in regulation.

. . .

The other parts of the three Ss—down to two now—are standards and spectrum. And I raise these because I believe that these are trends that you should be looking at as you wonder what will happen in the future, in this world of information technology. The world of standards has always been a sort of backwater part of industrial policy. And up until the EU['s] work throughout the 1980s [when standards were] recognized as a front part of economic integration, it really had a secondary status. The world of standardization, however, is key to any success. We've seen companies that have engaged in attempts to set proprietary standards, and we've seen them fail. I would point at IBM years ago—not the current IBM, but the one before the fall, in which they attempted to have a proprietary standard—it didn't work.

Companies have found that by having open standards they can get their technology into the marketplace, get it used and have it as the basis for worldwide systems. We've also seen attempts by governments to get involved in this process; to promote standards. It is not uncommon for our colleagues across the Atlantic and Pacific to believe that there is a government role in setting standards. And I think you will see this discussion come back as we go into the future.

The last of the Ss; we're down to one, [which] is spectrum. One word: scarcity. Spectrum is scarce. It is increasingly in demand, and because it is scarce, we have increasing conflict over how it is used. We don't have a perfect system in which we can assign spectrum. We can allocate it. In fact, all of the systems that I'm aware of are tremendously flawed, both the ones that we have in the Federal Communications Commission, and the one that is used internationally and is represented in the WRC.

But, they are the systems that are before us. The trend you should be looking at is increasing conflict over how spectrum is used; how it is assigned; and increasing difficulties in that process. There may be assertions that there are domestic priorities given when international considerations are at stake. What do I mean? That a country favors its own suppliers over those suppliers from overseas.

It is our job as regulators to ensure that [the] issue of discrimination based on [the] national flag, of course, is not [an issue]. It is our role as regulators to say [that] we may be interested in

your application because of what it does for the public good; how it helps our economy; [and] what kind of technology it represents. But to be focused on the flag would be completely inappropriate. And I think that, at least in our relationship, we have not done that, and I think that it behooves us, as regulators, to ensure that others don't do that. But that may be a trend that you would be looking at.

**MR. RIVERS:** As I look out at the audience, I'm sure it's no surprise; it's not news to you that this tidal wave of activity that we call the "internet" is changing the way we do business.

I trust that it's not new to you, that the very essence, the nature, the essentiality of the backbone is evident. If you look at a number of e-commerce hiccups over the last year or so, almost all of them are network related. And they trace themselves, in some shape, form or fashion to some backbone issue; some backbone issue that finds its roots in a backbone that wasn't designed to handle the capacity or the demands of the new traffic patterns.

Today's traffic, as significant as it is, will probably be a mere footnote as we move down the road a year or two. So those are things that I suspect all of us know. A couple of things that I suspect you may not know is that this is a global phenomenon, and obviously, from a United States perspective, the internet in the past has been U.S. centric. [W]e've seen a variety of studies that would talk about some 90% or so of the traffic touching the U.S. in some shape, form or fashion. Now that's perhaps down to 80% or so. And as we look at this and [see that] there are a number of issues associated with the internet, and [questions about] who will win in this particular segment[.] [B]ut, when you look at the backbone, I think it is overwhelmingly clear that the global internet backbone providers will win, irrespective of who wins the content, software or hardware battle.

It is such a powerful story in my judgment that my company, Cable & Wireless, has embarked upon building a global IP network with some eighty-four nodes that touch a variety of countries around the world. With a capability that reaches OC 192 to handle the bandwidth intensive applications that customers will drive. [We are trying to ensure] that we have the reliability, the consistency [and] the delivery of packets that customers want.

All of those things will happen, and I am absolutely confident that we and others who are international providers, who have the robust ubiquitous backbones, are in very, very good shape. Now the demands are significant. And when you look at the broadband demands, [they are significant]. [F]or our discussion here, we will define "broadband" loosely as anything 128 kilobytes or higher; the ISTN stuff or higher. And those broadband demands will continue to stress the backbone networks in a fashion that heretofore we, of course, have not seen. We have to be ready for that. As you look at the major national corporations and the fact that so many are now starting to trust more and more of their transactions to the internet, we certainly have to pay attention to that delivery mechanism. The business-to-business transaction, or B-to-B transactions, are significant—so significant that we are all going to have to look at the delivery mechanisms. [H]ow are we going to ensure consistency in terms of delivery, reliability and so forth?

Now there are a number of predictions we can make. Some of them are already coming to fruition. One being IP as the engine of growth for this new economy, and I think Minister Hubert talked about it a little bit in his comments. We are already seeing a number of studies that predict that IP traffic or IP revenues over the next couple of years will grow at a compound annual growth rate of some 60% or so. That, in contrast to traditional voice, where I suspect most studies will show [it] will barely reach 5%.

We obviously have to make sure that we are in position to handle that kind of demand. The other prediction that is coming more and more true everyday, is the globalization of the entire industry. And as we look at a number of commercial transactions, vendors who once sold to customers in Washington or Boston, are now selling not only to those customers, but [also] to customers in London, Berlin [and] Hong Kong. We certainly have to have the capacity to handle those issues. We also need partners. We need to have partners around the world. We [certainly] need to have access to get other markets, but it is important to have a basic wherewithal to get that done.

There are a number of international backbone providers who are striving mightily to have that presence in international locations. It's not just a luxury any more. We have been fortunate. In my company, we have locations in some seventy coun-

tries around the world. That certainly provides some advantage in the near term, but as we look at the marketplace, and the market is demanding that we place our emphasis in these international locations, that will be a necessity and will be an advantage for those of us who are moving steadily in that fashion.

And then, when you look at the business-to-business transactions in the areas of Europe, Japan and the United States, having a presence, having a capability that ensures the delivery of the commerce, is very, very important.

Now, thus far, the internet has been what some would call a best effort network. That is, you commit the traffic, and it will flow through a variety of different means and networks to get to the destination. Obviously, as it transists a number of networks and jump-off points, there is chance for degradation in terms of quality. There is a chance for degradation in terms of speed. There are all of those issues. So internet backbone providers who have the global reach to ensure that consistency, will, in my judgment, have an advantage. So as you start to assess the viability of various propositions, and they don't necessarily have to be in the telecommunications space, they—[the vendors and commercial artists]—will clearly rely on some delivery mechanism. And if you don't spend time looking at that delivery mechanism, I suspect you have a great risk of being misled in terms of the viability of that prospect. I would clearly encourage you to look at the basic capability of a company to provide its goods and services around the globe, and who they partner with to get that done. That, in my judgment, will be as important, if not more important, than some of the things you might see in a traditional spreadsheet.

With that, I thank you.

## GLOBAL OUTLOOK KEYNOTE

**MR. WHITACRE:** So the topic is: what's going on in the world of communications? But if you are like me, I probably spend a lot more time asking: what in the world is going on in telecommunication?

[R]egional companies have become national and international players. Long-distance companies have become cable companies. Cable companies have become internet service providers. New products and new services are introduced at a head-spinning rate. It is an amazing time to be in this business; there is no question about it. The pace of change is really amazing. Just think how far we've come in a few short years.

Incredible progress that's been made, and is being made in communications technology and services is being driven by customer demand [and] competition. Globalization is the watchword in business today. In the simplest sense, globalization means being able to put your resources where they do the most good. It means being able to follow or to find your customers, wherever they may be. That's a simple definition of it.

Communications is a very big part of that. Affordable, efficient, reliable communications today makes it possible for businesses to reach their customers most anywhere. It also allows companies to put their resources—their plant, their equipment and their people—anywhere they need them. And companies all over the world today are scrambling to put the pieces in places to meet this rising demand. Customers want a provider that can follow [them for] whatever they want. One-stop shopping if you would. That includes [the] internet. It includes wireless, local, long distance, networking, web hosting and e-commerce. And this has led to some tremendous consolidations worldwide.

Last year alone, telecom technology and media mergers totaled more than a trillion dollars. That's double the year before. The indications are that that's going to even jump higher, and as it does, the line between traditional service providers of communications will continue to blur. Among the global competitors, I believe a handful of companies will emerge. This consolidation now [is] natural. I think it's inevitable, and I believe it's in the best interest of customers. I think it will leave us with a healthier industry over time, making communications seamless, integrated and operational from one corner of this earth to another.

But for it to keep moving as it is worldwide, a handful of things need to happen . . . The first is market liberalization. That is, opening the markets around the world to competition and following through with a systematic deregulation. Now you and I know this has already begun in varying degrees in Europe, Asia, Latin American and elsewhere, and it needs to continue. You and I both know that regulatory models will never be identi-

cally matched across boards around this world. But they don't need to be identical. That doesn't need to happen. There does need to be[, however,] a general consistency.

And I'm not necessarily saying that other nations need to catch up to us, either. I do believe that the United States has set a good example of how to deregulate this business, but the fact remains we need to do more and we need to do it faster. I don't believe we should be constrained by rules of a bygone era, especially with the imminent arrival of overseas competitors.

The second thing that needs to happen is the development of global technology standards. [M]ismatched platforms make it a challenge to provide customers with connectivity across national and international borders. Now I think some great efforts are being made in this area, and it certainly needs to continue, especially in the wireless area.

The internet is a good example. For all its challenges and explosive growth, the internet has basically thrived because it's enjoyed the benefits of a single global language, HTML. That's the reason it's really flourished. That's the reason behind it.

Wireless needs that just as well. Clearly, the lack of digital compatible phones is slowing the deployment of wireless data here in the U.S. But I believe that [the] tide is turning. And there really are two steps here. First, manufacturers and operators, including people like SBC, are working hard to get this global interoperability between basic wireless calling standards. [This will] allow customers to call and to receive calls from anywhere in the world. And that's being addressed, and so is wireless application protocol, [known as] WAP. This standard will allow users to surf the net from any good old hand-held device. There is going to be a whole new range of great services, and they will be delivered by that [protocol].

[I]n the coming months, as these [great new] services appear and as markets worldwide open to increased competition, I believe we are going to see a groundswell of new demand. And I think with that, we are going to even see more competition. That said, I think you are going to see these big trends take shape over the next few months and years.

First, and I'm sure this won't surprise you, you will likely see U.S. telecom companies begin shifting some of their focus to overseas expansion. For the past few years, companies large and small have basically been choosing sides to become part of this full-scale competition, and SBC has even been a part of some of that. But as aggressive as companies have become domestically, I think we're going to see the same vigor in global expansion. I'm not so sure that all these deals around the world will be of blockbuster proportion though. I have a small scope. I can only speak for SBC, but we don't view [it as] strategic [to gain] size just for the sake of gaining size.

You don't have to be big just for the sake of being big. In fact, we've seen a few of the industry's big mergers and alliances fail because they lacked a shared vision and synergies. Companies may very well opt in the future for smaller partnerships [and] acquisitions, because they are fast, less dilutive and less likely to face regulatory scrutiny. That's certainly the direction that SBC is headed.

We achieved a lot of scale with Ameritech. To compliment that though, we have an alliance—not an ownership, but an alliance with Williams Communications. That gives us a state-of-the-art global network, but we don't have to spend the capital to build it worldwide. We don't have to own the global network; a partnership. Our partnership, for example, with InfoNet let's sell a whole suite of e-business solutions to multinational businesses, wherever they might operate on this earth; that's a partnership. These are effective partnerships[.] [Y]ou get to realize the benefits, and you get to realize them a lot faster.

The second trend I think that we should watch for is in Europe. That region—and I was there last week—is undergoing the type of consolidation that has occurred in the U.S. It began last year with Olivetti's purchase of Telecom Italia and Deutsche Telecom's acquisition of 121. And then there is the biggest deal of all, [which was] Vodaphone's deal with Mannesmann [that] was more than $180 billion. In fact, if you think about it, in a matter of a year or so, Vodaphone has gone from a relatively small player to the world's fourth highest valued company. It happened pretty quick.

I also believe we are going to see international firms continue to look closely at expanding in the U.S. I realize I'd have looked a lot smarter to you if I said that before last Thursday, but then this meeting wasn't last Thursday. So you will never know whether I could have said it, or not. But last

Thursday, the news broke about Deutsche Telecom and Qwest. But I think that only proves my point; we—you and I—can expect to see more activity here in the coming months. [This] underscores, I believe, the need for U.S. communications companies to have the regulatory playing field all evened out [or] leveled up, if you would. If not [leveled up,] then we are at risk, and we are a competitive disadvantage in terms of the services that we can offer. And I believe that inevitably exposes some U.S. companies to being acquired.

The third big trend that we expect to continue is the incredible [and explosive] growth in the data and wireless markets. You've heard these staggering figures; by early 2000, the volume of data traffic in the U.S. will surpass traditional voice. I think it already has. Experts are forecasting a 30% annual growth in data. That's probably right [or] maybe a little low. The value of e-commerce is projected to triple this year to a little over $400 billion. And then it's supposed to surge into the trillions in the next couple of years. Web hosting, which nobody heard of a few years ago, was a two billion dollar industry in 1999. It is supposed to be three billion this year [and] fourteen billion in [2003]. I believe that will happen.

Nowhere is the wide world of data more full than it is in the wireless part of our communications industry. And this is one area, when you think about it, that the U.S. lags overseas competitors. If you want to get a glimpse of the future, just look in Japan. DoCoMo [is] Japan's largest wireless carrier. It introduced its wireless data service a year ago. In the past twelve months, 1.7 million customers have signed up. Six point six percent of NTT's entire subscriber base signed up to this service in less than a year, [which is] 3, almost 4%, of Japan's wireless base. That's a sign of the things that we are going to see very shortly.

As technology improves domestically and as wireless prices go down, customers are going to increasingly view cellular service as attractive and affordable. There is a lot of potential here, and it's just one of the reasons there is such a great outlook for communications. The industry is going global and as it does, it's going to create unprecedented opportunity for innovation, investment and growth.

## WEBCASTING

**COMMISSIONER NESS:** It's always nice to be on a panel where I don't have to justify a regulation, because we don't have any in this area. Webcasting is an exciting development. Broadcasters are beginning to use their available tools to enter the digital internet age. And I continue to see this happening without FCC involvement.

Every day I see evidence of ways in which the broadcasters are beginning to use the internet—exploring opportunities for these kinds of services, ways to really amortize the cost of developing new content and put[ting] it out in different formats. And the internet makes a lot of sense; aside from the programs and the technologies, there are folks [like] AOL who are teaming with content providers. We think this is going to be an interesting development for ensuring that there is plenty of content out on the web.

We have IBS, who's building an internet broadcast network [and] including a number of broadcast groups. Apparently, they already are covering about 35% of U.S. households. They are putting their news stories on the web. Similarly, we have IBlast and Geocast who are looking at ways of getting the transmission from broadcasters[.] [These companies want to be] able to use a portion of the digital signal, and to collect those bytes and put them out with data and other information to be received by PCs. I think this is a very interesting development, and I think we are going to be seeing more of this with both Geocast, which has perfected a technology to do that, and IBlast, which appears to have a number of broadcast groups covering a wide swath of the country. So it will be interesting to see how those parties shake out, either to compete or combine.

And again, the Commission didn't have to lift a regulatory finger to get this going. What we did do—well, actually, I guess we did lift a regulatory finger a while ago—[is] we came up with our rules for digital television, and we said basically we were not going to mandate high-definition television. We were basically going to provide for great flexibility to allow the broadcasters to determine how they would use their byte stream for the public interest. And that's why I think today we're be-

ginning to see some of these new opportunities form.

I care a lot about open architecture. I think that this has been the key blessing for the internet. It has enabled it [to] really blossom in ways previously never thought possible. [W]e are continuing to encourage open architecture, notwithstanding that we have affirmatively avoided interjecting prematurely regulation where regulation might have changed the course of marketplace developments. And I'm thinking right now about open access type issues.

And then lastly, unless Congress tells us to take action, the copyright issues are not usually the purview of the FCC. And there was an effort last year with the Satellite Home Viewer Act to insert requirements for mandatory copyright. Congress determined that it was not going to go in that direction; at least at this point in time. So the Commission really has no role to play at the moment in those issues, although we do care very much about preserving free, over-the-air broadcast.

**MR. WILEY:** Webcasting, a coming phenomenon, really presents a challenge in applying old laws to new technologies or developing new laws that will promote internet innovations, while not restricting the rights of copyright holders, end-users and others.

In my view, the two most important legal issues concerning webcasting involve the application of copyright and the application of traditional communications regulations. With regard to the former, there is currently no compulsory copyright license for television station owners, as there is for radio. And why is that true? Because television station owners either own their own programming [that] they copyright, or they pay for their programming and presumably get streaming video rights. Now because there is no compulsory copyright, companies like Mr. McCallum's that want to send video over the internet have to obtain permission from individual copyright holders.

During the recent negotiations concerning the Satellite Home Viewer Act, the National Association of Broadcasters tried to get a provision enacted that explicitly would have excluded a streaming video from any compulsory copyright that might some day come. That effort was unsuccessful, but undoubtedly, this issue is going to arise again. And assuming you can't get successful negotiations between copyright holders and internet companies, I think the Congress is going to have to step in and ultimately resolve it.

Okay, let's turn to the other side: regulatory issues. Broadband access to the internet is clearly essential if we are going to provide to high-quality audio and video content over the web. Fortunately, we've seen a generation of new technologies arising that can provide such access through different transmission alternatives, [including] over cable modems, telephone DSL, wireless spectrum, satellite [and] ancillary digital television frequencies. And you discussed this yesterday.

Each of these alternatives, however, has developed under quite different regulatory regimens. And the key question is, will these differences create market distortions? For example, when an ILEC offers broadband internet access through DSL, the FCC has ruled that that service is a regulated telecommunications offering, not a deregulated information service offering. And thus, the telcos have to provide internet access, and they have to do it through their broadband facilities, applying the local competition rules, like interconnection, resale, unbundling and what have you.

It's quite different when you come to cable. The issue of broadband internet access on a nondiscriminatory basis is very much an open question. The FCC has taken a hands-off position, as Commissioner Ness has generally indicated, but local cable franchising bodies have taken different positions in this area. I think we are all waiting for the seminal Portland appeal. And of course, Congress has gotten involved; a number of bills have been introduced, but there hasn't been any legislation[.] And, I doubt that we're going to see any.

Turning to one other issue, [which is] not under debate, is the issue of webcasting and [the] FCC's existing broadcast regulations. And my guess is that the no regulatory approach of the Commission will clearly apply here when webcasters streamed onto ancillary digital television spectrum, which may well occur. A paper released by the FCC's Office of Plans and Policy last summer observed, and let me quote here: "Traditional regulatory structures were designed to fit services in existence at the time of their enactment. New technologies, while perhaps similar in appearance or functionality, should not be stuffed into what may be ill-fitting regulatory categories, in the name of regulation."

Down the road, however, I think all of this may lead to some kind of greater regulatory parity. It is hard to see how you are going to be able keep everybody who is doing the same thing in the digital future, in the internet future, under different regulations. Hopefully, that's going to lead to a lowest common denominator form of regulation. Or, should I say deregulation? Thank you.

**MR. MCCALLUM:** Good morning. iCraveTV's experience will be your precursors. The reason I go a bit through our story is because there will be other iCraveTVs in other forms and introducing other services. They essentially come out of left field, and suddenly confront the existing regulatory authorities in industry with problems they hadn't expected or [had] not quite assumed.

I'm going to speak about content, and about asset valuation and structural changes. But first, some history. iCraveTV is a multitasking companion television service. It converges television on the computer screen. In a sense, iCraveTV is in the recycling business. For the most part, I'm not going to talk about technology. There have been many discussions on these panels about that. I think we can just assume that the technology will be there and will meet the needs of our company and of others for streaming video on the internet.

But I wanted to make one comment, and that is that the industry is sometimes not ready. Our second day of operation we crashed UUnet nationally. We have learned a great deal from our experience. For example, existing program inventory has much less value on the internet than is appreciated. Much of it does not suit the viewer's reception quality, although that will change within about three years.

What will not change is that for much of the inventory, no one has the copyright to sell [it] to the internet. Collective agreements and one off-production financing agreements either did not take into account the internet or failed to put all of the internet rights in the hands of one decision-maker. iCraveTV was and is the white knight in this case. Because in Canada, we do have, effectively, a compulsory license; iCraveTV can cut through the Gordian knot of confliction rates. iCraveTV can release value in those assets that the owners can't, and that includes broadcaster and program producers.

It was suggested by some, namely the aggrieved, that we should have asked permission of the broadcasters before retransmitting their programs. In Canada, under our law, that was not required. But even if we had asked, the broadcasters could not have given their permission because they did not have the legal capacity to do so. By retransmitting their programming and paying them to do so, we were unlocking the value in the program asset that they could not unlock. Unfortunately, they did not see it that way, so we have agreed, for the time being, to stop retransmitting and to stop paying them. They still don't have the right to release the value in their assets. Now that is a bit like swimming with two gold bricks, but I guess the moral is be careful what you litigate for.

In learning a great deal about the market, we are applying those lessons to our new channels, which will be content that will be under contract. Our viewers take our video window and put it up on a corner of their screen as they go about doing other tasks. We learned that our audience was 80% male between the ages of eighteen and forty-nine, and that's an audience that advertisers would kill for. We also learned that most of the use was in the office; a market not reached by television. We learned that viewers were prepared to accept a rather poor quality image compared to what they could see on their television set, because they were getting it in an environment where they did not have access to television. We received many testimonials about how they appreciated that.

Last New Year's Eve, we found an enormous spike in viewership. It started at about ten in the evening, and ran up [until] midnight and on into three in the morning, when it began to slope off. Initially, we couldn't figure out what was going on. But if you think about it, banks, utilities and other companies required many of their staff to be at work in case of potential Y2K problems. They were sort of sitting around with nothing to do; they were missing out on the celebrations and so they tuned in to various television networks to watch the celebrations as a result of the service provided by iCraveTV.

Globalization is a wonderful thing, and we intend to make the most of it. But you remember the guy swimming with the two gold bricks; for them, globalization is like offering a drink to a drowning man. They don't have the internet rights; they can't use globalization for much of their inventory. Or rather they couldn't until we

came along with our second first to market development, which was the IWALL. In all this talk of globalization, please forgive me a moment for being anachronistic for talking about countries and national markets. IWALL creates country-area networks on the internet. The guys with the gold bricks do have the rights to sell to national distributors, film theaters, broadcast networks [and] specialty channels.

iCraveTV [is] the only provider of country-area networks. [T]his new opportunity has proven to be bigger than the one we originally launched, and frankly, it's created a problem for us. We have to go outsource more capital because now we have an opportunity to go out and exploit the world, not as one global operation, [but] on a country-by-country basis. In addition to English-language entertainment [and business information channels] that we will be adding, we are in discussions with probable partners from around the world to introduce channels in many different languages and cultures. They will be advertiser-supported; some will be subscription-based tiers. They are all part of the mix. We are even in the process of discussing private label networks that are interest-group based. After all, the internet is a community of communities.

My first structural prediction is that the public will choose their preferred portal or three, and that program suppliers will sell their programming to all. Programming exclusivity, which many are holding near and dear to their heart, will only work economically for a very few. My second prediction is that there is going to be a significant shake up, and it will have some unfortunate and unanticipated casualties. One such [problem] was referred to recently in a report by DFC Intelligence. We heard yesterday that specific technology is irrelevant and that we are now concerned about byte streams. Now that confirmed to me that local broadcast affiliates are seriously at risk.

At the same time as they are expected to make huge commitments to high-definition television, their suppliers, the networks, film studios, sports leagues, et cetera, are planning to end run them and go directly to the public over the internet. The local broadcasters can't survive on local programming and its ad revenue. They may be a very visible casualty of the internet, unless Congress intervenes. Three weeks ago, during my appearance before Congressman Tauzin's committee, I began to get a sense that in Congress, there is concern about the future of the local affiliates. And I certainly expect that something will be done, not only in the United States, but in other countries, to protect local broadcasters. Thank you.

**MS. FRAZEE:** I'm going to step back for a moment and look at what consumers want in the future of the internet, because that's the point from where we need to begin. And what do consumers want from the future of internet? They want interconnectivity. People are starting to expect their televisions, telephones, CD players and all kinds of hand-held devices to provide them with the same interactivity, the same range of choices, and the same convenience and control that they get today from their PCs. And they want these devices to provide more than they get today from their PCs. They want these devices to be easy to use, and provide content that they can get in the offline world and maybe content that they can't find in the offline world. We're hearing from people that they want their PC to be as simple to use as their TV. [W]hy can't my TV be as powerful as my PC? And they want to know when [they] will be able to watch TV while working on [their] computer. [O]r, when will I be able to purchase music once, download it from my PC [and] play it on multiple devices, [all] while I'm driving in my car, running or at the office? In a word, what consumers are looking for is convergence.

For the past decade people have been talking about convergence. It is a very overused term. But we predict that convergence is right around the corner. Looking out over the next year, we see a new world taking shape where everything gets connected, and it transforms people's lives. Think about the four boxes that now deliver a variety of content to people in their homes every day: the television, the PC, the stereo and the telephone. Already the distinction between these four boxes is starting to blur. And the internet is connecting them all. And with that connectivity comes many choices, many options for consumers and many opportunities for consumers.

For example, the TV will have channels much like the internet does, and you will be able to get interactive services, like e-mail [and] instant messaging. [Y]ou will be able to get music and streaming videos instantaneously, and more conveniently. And these applications will be easy for consumers to customize. Consumers might want

to store music on servers in their homes or keep it in online juke boxes for easy access.

For years, many have predicted that the television experience was about to change, but the television hasn't changed much from when we all were growing up, from when it was first brought to market. The biggest difference is that now there are more channels, and it's much more difficult to navigate. Later this year, AOL will launch AOL TV to give customers the interactivity they want when they watch television and to bring TV into the internet century. Time Warner's assets will jump start this roll out, and we are licensing products from other content providers too, just as we do today on the AOL internet service.

AOL TV will provide a new interactive model, new subscription models, a new genre of interactive programming and dramatically higher usage. Of course, we will have similar opportunities in the film and music industries to build new businesses around formats and devices. History shows us that the more powerful changes take place when existing content is merged with new technology.

I'm going to speak a moment on open access and on competition. Commissioner Ness touched on it. The internet has flourished because it's been built on an open infrastructure. It sparked competition and that has sparked innovation. In the new involve of broadband connections, cable, DSL, satellite and wireless will grow fastest if the infrastructure remains open and competitive. On the day Steve Case and Jerry Levin announced the merger, AOL and Time Warner committed to opening up their cable systems and to provide for competition by multiple ISPs. Last week, we took the next step [by] jointly releasing a Memorandum of Understanding between AOL and Time Warner to give consumers greater choice. We promised to deliver a framework—an open framework for cable, for delivering AOL and other ISPs over Time Warner's cable service. Now open access is not a question of whether; it's a question of when?

In our MOU, we also committed to not limiting video streaming over the internet on our cable systems. One thing the last years have made clear is that in the entertainment business, if you don't innovate, you don't stay in business. Companies must continually change their character if they expect to attract new audiences. The ultimate power is in the hands of the consumer. If we limit content, if we don't allow diversity of content on our systems, our subscribers will migrate to other ISPs.

And one final prediction on compulsory license. You have heard a lot about that this morning. I predict that Congress will not act on compulsory licensing; that we will not have a new video compulsory license for webcasting. AOL has never taken the position that there should be an internet compulsory license. The fight that took place in November of last year over the Satellite Home Viewer Act was a fight over Congress making a decision about the future of the internet [in the eleventh hour], without having debated it or discussed it. Since last November I've been talking to a lot of my colleagues in the industry, and I have found almost unanimity that people think that the internet deserves new models; not models of regulation that we've seen in broadcast, in cable and in satellite.

But rather we need to step back and think about the right public interest in this medium where there is no spectrum limitation and where there is a diversity of content. It's important that we protect creative works as technology advances and that we do so in a manner that empowers consumers with the greatest choices. We found ways over the years, as new technologies have evolved—satellite, cable, VCRs—to adapt our copyright system to deliver new forms of consumer convenience while we still protect the interests of artists.

So in sum, my predictions are: the convergence, both of content and devices, is right around the corner. And that while Congress will be looking at the issue of video webcasting, they won't take any action this year.