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THE FUTURE OF THE INTERNET

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

APRIL 22, 2008

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

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CONTENTS

WITNESSES

APPENDIX

THE FUTURE OF THE INTERNET

TUESDAY, APRIL 22, 2008

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 10:06 a.m. in room SR–253, Russell Senate Office Building, Hon. Daniel K. Inouye, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. DANIEL K. INOUYE, U.S. SENATOR FROM HAWAII

The CHAIRMAN. The Internet is one of the great success stories of the 20th century. It has been a key factor in the ability of the United States to steadily improve worker productivity for the past 15 years. Our economy and the quality of our lives have evolved significantly because of this network of networks.

The Internet has created an era of transparency, making it even harder for the corporations and governments to escape scrutiny for actions that do not stand up to the light of day. Again, I would suggest that, because of this expanded flow of information, our Nation is much stronger.

The Internet has also brought together communities of like-minded individuals who share an interest in a hobby, in a unique culture, or in saving a few dollars when shopping for their families. In a country that is defined by its very diversity, I would suggest that this capacity to bring people together serves us well.

Along with the great benefits, the Internet, unfortunately, has provided a new avenue for those who would seek to take advantage of the fellow citizens. Identity theft, violations of intellectual property rights, and any number of good old-fashioned scams have been updated to the Digital Age, and we continue to struggle with the best way to protect our children from inappropriate content and inappropriate contact with those who would do them harm.

Along with the problems facing individual Americans as they navigate the digital world, there are also challenges facing those who provide services and contact via the Internet and those who build and manage the network infrastructure necessary for the continued expansion and improvement of the Internet.

I believe that the government has a responsibility to create a regulatory environment that will 1 day enable each and every American to have affordable access to reliable broadband service.

To achieve this long-term goal, I've introduced the Broadband Data Improvement Act. This act is designed to give us a starting point. It will better define what "broadband" is, and it will provide

us with accurate information on the current status of broadband deployment in the United States. This information is essential toward universal broadband deployment.

Another significant responsibility of our government is to ensure that the Internet continues to grow and thrive. The issue of network neutrality and its offspring, nondiscrimination and network management, looms large in this debate. The central question here seems to be how to best balance the right of the American people to uncensored and unfettered access to Internet content and services against the desire of the Internet service providers to manage their networks in an efficient, profitable way.

For several years now, policy discussions on this subject have been waged on a rhetorical battlefield. We are told that nothing less than the future of the Internet is at stake. Yet, even in this winner-take-all environment, we see the inklings of progress, the dialogue between cable and peer-to-peer services, the novel open-access requirements on the C-block spectrum, and the swift response of a wireless provider to a text-messenging snafu that thwarted political speech.

It may be early for optimism, but progress deserves praise. In the meantime, I can assure you that this committee will continue to vigorously exercise its oversight authority over this important issue.

And may I now recognize the Vice Chairman of the Committee, Senator Stevens.

Senator STEVENS. Well, since I came in late, I'll yield to my friends and come back later. OK?

The CHAIRMAN. Then, may I call upon Senator Dorgan?

STATEMENT OF HON. BYRON L. DORGAN,
U.S. SENATOR FROM NORTH DAKOTA

Senator DORGAN. Mr. Chairman, thank you very much. First of all, thanks for holding this hearing.

As you know, Senator Snowe and I have introduced a piece of legislation, the Internet Freedom Act. And I want to mention, at the start of this hearing, that the creation and the development of the Internet is a remarkable thing in our lives, and it occurred under rules of nondiscrimination. It is an open architecture. The Internet has been completely open in its architecture. Anyone can go anywhere, anytime, under any circumstances, no gatekeepers, no tollbooths. And you also know, and we know, that there are those who have said, as this Internet has developed, that they would like to find ways to create tolls. And I've often quoted AT&T's old CEO, Ed Whitacre, who told Business Week, quote, "They don't have any fiber out there, they don't have any wires, they don't have anything. They use my lines for free, and that's bull." Well, he is suggesting, there, as others have, that they will want to at some point, as providers, begin finding other streams of revenue, and doing that by establishing various tiers and so on, and they can do that if there are not rules against discrimination.

My feeling is that innovation in the Internet will be stifled dramatically—innovation in our country will be stifled—unless we restore the nondiscrimination rules.

Mr. Martin will testify today—the Chairman of the FCC—that the four principles they have are principles he believes probably reaches something close to nondiscrimination. It's very interesting that we were told previously in these discussions that we didn't need to restore nondiscrimination rules because the FCC would be able to resolve this. Now, in a filing to the FCC, one of the largest providers in the country alleges the FCC does not have the authority. So, I think that, in itself, raises the question of, Why on earth should Congress not act to restore the nondiscrimination rules under which the Internet was created in the first instance? That is the purpose of the piece of legislation that I and Senator Snowe have introduced.

I know this is a controversial issue, but it certainly should not be. When should it be controversial to decide that there shall be nondiscrimination? I mean, those that oppose this apparently have to be taking the side, "We want to permit discrimination, in one form or another." That's a preposterous position, in my judgment. My hope is that this hearing will give us additional information with which to evaluate this issue and then pass our legislation.

The CHAIRMAN. I thank you very much.

Senator Sununu?

STATEMENT OF HON. JOHN E. SUNUNU,
U.S. SENATOR FROM NEW HAMPSHIRE

Senator SUNUNU. Thank you very much, Mr. Chairman.

I'm obviously looking forward to the testimony of the witnesses. I agree with many of the previous statements, certainly one that—the one that the Internet's a remarkable thing. I think we can all agree with that. But, I find the title of the hearing, "The Future of the Internet," at least somewhat interesting, in that if the Internet's taught us anything, it's that it's pretty presumptuous to predict what its future will be. And we don't have to look much further than the ground that's littered with, sort of, the corpses of dotcom businesses, 2001, 2002, 2003, and, from that, competitive destruction. We've seen a lot of growth and innovation in Internet-based services, content distribution, greater and greater deployment of fiber and methodology, wireless systems for distributing and providing customers with access to broadband. But, even so, this is an industry and a technology, an infrastructure that is in its infancy, and we should be very, very cautious about imposing regulations based on what we think competitors will do in the future and how we think consumers will respond when competitors do things that we think they might do. That is not the basis for sound regulation.

If there are anticompetitive practices that we can identify, we should act. And we already have a lot of statutes in existing law to deal with anticompetitive practices. If people aren't properly disclosing the way they operate and what they're doing to content, blocking access to Websites without disclosing that, I don't think we should do that in any case, but if people are acting in a way that misleads consumers, we should act. And we have the power to act.

But, writing regulations based on how we think competitors might behave and how we predict customers might act and respond

to that behavior is dangerous, indeed, because what we risk doing is enacting regulations that guarantee that the Internet will always look like what it used to look like, and I don't want the Internet to be locked in to 2008 or 2005 or 2001 or 1996, when we—when others wrote the Telecom Act that set the groundwork for a lot of what we're doing today. We need to let people innovate, let people invest, be on guard for practices that deny consumers access, that deny consumers benefit, that stifle innovation. But, we shouldn't base regulation on the predictions of politicians, certainly, or even those in industry, necessarily, because we've seen, time and time again, that some of those that we determine to be the most brilliant in industry today turn out to be foolish in their investments in their prediction of where technology is headed.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank you very much.

Senator Kerry?

STATEMENT OF HON. JOHN F. KERRY,
U.S. SENATOR FROM MASSACHUSETTS

Senator KERRY. Thank you, Mr. Chairman. And thank you for holding this hearing on this really important issue.

And I want to thank Chairman Martin for coming aboard, at the last moment here, to join us, which I think is really important, and we appreciate it.

And we also appreciate all of the other witnesses who have traveled to Washington in order to share thoughts with us on this today.

This is an issue on which there have been a lot of words expended, a lot of platitudes and politics, and I suppose it's almost cliche now, Mr. Chairman, to say that, you know, the Internet is the future. I listened to my colleague from New Hampshire, just now, talking about, you know, how we shouldn't get in the way of this competition, et cetera. But, in recent years, frankly, policy has received too little attention.

And, you know, all of us do know how extraordinary the story of the Internet is, the capacity it has to foster innovation, to serve as a forum for unfettered social and political discourse, and to allow for an extraordinary dissemination of information and knowledge in the country. But, frankly, you know, anyone still wondering whether our long-term and national investment in basic science and technology, which we talk about a lot in this Committee, is worth it, gets their answer every single day when they simply log in to check their e-mail and really take for granted something that began nearly 40 years ago as a DARPA experiment. And those of us sitting on this Committee when we wrote the 1996 Telecommunications Act will all remember that we were way behind the curve, in the sense that the entire discussion here was about telephony, not data, and within 6 months, almost, that Act was bypassed. But as the Internet, through its own freedom, its own ability to innovate, through the open architecture and the platform that has allowed this extraordinary innovation, as it has grown and become pervasive in our lives, the fact is that the debate over the need to ensure some very basic principles—principles, not nit-picking, you know, regulatory structure, but basic principles about how

and when network providers can manage content is becoming more and more politicized and polarized.

During the last go-around on this issue, in 2006, we were told by the major cable and phone companies that net neutrality was, quote, "a solution in search of a problem, a response to blocking and interference with Internet content which no network operator would ever attempt." That's what we were told.

I listened to my colleague from New Hampshire, just now, tell us, you know, "Don't get in the way of something that isn't happening or that might change the things that we can't predict." But, it's not a question of changing something we can't predict; it's happened. It has happened.

On the heels of this claim, before this Committee, we found out that AT&T censored politically charged words during a live broadcast of Pearl Jam concert in August 2007. A month later, Verizon rejected a request made by NARAL to use the network for text-messaging political content. And, finally, in October of 2007, Comcast admitted—and you have to sort of look at the sequence of their statements. You know, it's interesting, if you follow them, because ultimately what they told us again they weren't doing, it was proven they were doing. And they admitted to interfering with a subscriber's attempts to share files online using BitTorrent technology.

So, to whatever degree people were alleging, Mr. Chairman, that this was a solution in search of a problem, it has found its problem. And we have an obligation to try to guarantee that the same freedom and the same creativity that was able to bring us to where we are today continues as we forward.

Now, even though I want to acknowledge, the companies that I've just mentioned appropriately took steps to address each of these issues. And we applaud that, ad we appreciate their response. But, we can't expect, nor should the American people, the users of this incredible technology, expect that we have to rely on a discretionary and occasional political pressure or scrutiny from Congress, or from the FCC, or a vocal and organized group of advocates, in order to regulate the industry. That ought to happen because we have a set of standards and expectations in place. And I think Senator Dorgan's bill, which I'm a cosponsor of, is the approach that makes sense.

I also appreciate that the FCC is looking closely at this issue, held hearings in Cambridge and last week, in Palo Alto. And I hope that they're going to see fit to act in a way that will protect these open networks.

The cable companies and the phone companies, Mr. Chairman, tell us that, because of capacity restraints, there's a need for some level of reasonable network management. And there is an aspect to this claim that can ring true on the surface, but I think that is something of a cautionary claim, and we ought to put it to the test today, and take notice that you can establish a set of principles that don't violate that ability.

One other point I'd like to make, Mr. Chairman. Despite the fact that the Internet was born in this country, and this Committee has presided over its growth, America has been in a precipitous free-fall when it comes to our global broadband ranking. And this is

just—it's not only disgraceful and unacceptable, it's just—it defies any kind of rational approach to the economy that we have in this country, and want to have in the future.

The Organization for Economic Cooperation and Development has dropped the United States from fourth to fifteenth in broadband rankings of industrialized nations. The International Telecommunications Union ranks the United States 21st, tied with Estonia, in its digital opportunity index. The debate over net neutrality and America's global broadband ranking are linked, and I think it's important that we discuss the link.

When we talk about reasonable network management, we're also talking about the concept of scarcity. We lack the infrastructure to deliver highspeed broadband to every household, and the public's demand for content, such as video streaming, is exceeding the ability to deliver it.

More than 3 years ago, 4 years ago now, actually, the President told us this country needed, and would have, a broadband strategy, a plan, by 2007. Well, it's 2008, and we are legitimate in asking the question, Where is the plan? Where is the sense of urgency? Entire swaths of our country, including most of the western part of Massachusetts, have little or no access to broadband, and we're placing our businesses and workers at a huge economic disadvantage every day because of this, Mr. Chairman.

So, I hope we're going to start implementing the large-scale public investment for broadband, the incentives that we need to put in place, so that we can have universal broadband in America, and we need to pass legislation, like your Broadband Data Improvement Act, so we can get the kind of accurate data we need to know exactly what we're up against. I hope our witnesses this morning will share with us thoughts about that linkage and its importance as we proceed forward.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank you very much.

And, Senator Ensign?

STATEMENT OF HON. JOHN ENSIGN,
U.S. SENATOR FROM NEVADA

Senator ENSIGN. Thank you, Mr. Chairman.

I would ask that my full statement be made part of the record——

The CHAIRMAN. Without objection.

Senator ENSIGN.—and I'll just try to summarize, with a couple of points.

[The prepared statement of Senator Ensign follows:]

PREPARED STATEMENT OF HON. JOHN ENSIGN, U.S. SENATOR FROM NEVADA

Thank you, Mr. Chairman and Vice-Chairman Stevens for calling this hearing today on an issue that is very important to me, the future of the Internet. As you know, the Internet has become an indispensable part of our economy and an integral part of our society. It is a source of innovation, information, entertainment, new wealth, and communication. Every American's life has somehow been touched and made better by the Internet in some way, and it only becomes more ubiquitous and vital as it matures.

Largely unfettered by government laws and regulations, the Internet owes much of its success to innovators and entrepreneurs having the freedom to imagine, explore, and create new uses for the Internet. This openness has flourished without

the heavy hand of government intervention, although the continued preservation of the Internet's openness is at the core of the network neutrality debate. Perhaps no issue is more contested or more central to the Internet's future than this one.

I continue to believe that the competitive market will be the best steward of the Internet's famed openness, as it has been since the Internet was first opened to the public. Businesses must be able to freely determine how best to provide their content or services to users. Internet service providers must be allowed to reasonably manage their networks to ensure the best possible experience for users. We must avoid burdensome government regulations that micro-manage network operators or that limit the ability of companies to provide what their customers want and need. Such intervention could stifle the dynamic marketplace that has given us fiber-to-the-home networks, search engines putting the information of the world at our fingertips, wireless broadband devices, and streaming on-demand high definition video.

Even so, government does have a significant role to play in guiding the future of the Internet. Most observers agree that if there was more competition for broadband access the network neutrality issue would be rendered all but moot. Rather than imposing new government mandates that could reduce the private sector's investment in our Nation's broadband infrastructure, Congress should work with industry to find ways to encourage increased capital investment and to promote the entry of new Internet providers.

A related problem facing network operators is that of increased congestion, driven in large part by the transmission of pirated content. Government must work with interested stakeholders to determine what network management activities are practical, fair, and in the public interest. Congress' ability to focus attention and shine sunlight on these issues, like this hearing will do today, will be one of our most effective tools to foster such cooperation.

Restrictive government mandates and meddlesome regulations are not the answer to the challenges facing the Internet today. Indeed, such responses may serve to smother creative new uses for the Internet and to slow the expansion of advanced broadband networks. The FCC has adopted a set of broadband policies that seek to preserve openness, protect against harmful discrimination, and promote innovation. In conjunction with these worthwhile principles, Congress should also work to ensure that Internet companies can profit from their endeavors, protect their investments, and provide better and more responsive services. I believe these are goals on which we can all agree, and we must not let partisan politics distract us from the task at hand.

Thank you again, Mr. Chairman, for holding this hearing today. I look forward to the testimony of our distinguished panel of witnesses.

Senator ENSIGN. One of the things that we see around this place, one of the worst laws that I think that we ever pass, is the law of unintended consequences. We set out trying to do the right thing, but we end up with severe consequences of things that we never foresaw.

It is my fear of regulating the Internet that this law of unintended consequences will come up to bite us very, very severely specifically because of some of the things that my colleague Senator Sununu talked about—is that we can't predict—the technology is changing so fast, entrepreneurs are out there, coming up with different ways of doing things on the Internet, and what the Internet is going to look like 5 years from now, there isn't anybody in America who can predict that. And if they have somewhat of a guess that—they'll be multigazillionaires if they're able to predict what it's going to look like.

But, when you look at—when we should regulate, when the government should be looking at regulating is mainly when market forces aren't working, when the market forces aren't allowing for competition. Regulation is basically to protect consumers. If the market isn't doing an efficient job of that, a lot of times it's time for government to step in. In every one of the cases that my colleagues have talked about, especially Senator Kerry, the market

forces corrected it. He admitted that. Every single one of the cases that he talked about, the companies took action to correct that.

So, I think that we need to be very, very careful as we proceed with any type of laws or regulations dealing with the Internet. And I think the FCC would also be well advised to be very, very cautious in anything that they bring forward.

And so, I appreciate Chairman Martin being here today, because what we are dealing with can have some fairly profound consequences on the future of commerce in the United States. We want to be—I agree with—by the way, with Senator Kerry about us, you know, not having the deployment of broadband in the United States that we should have. I would say that if we would have passed my bill from a couple of years ago, we would have a lot better deployment of broadband in the United States, but that's another story for another day.

The bottom line is, this Committee—I think one of the important parts of this Committee is to bring out things that may be happening in the marketplace so that we don't have to do regulation. A lot times, one the greatest powers that we have as Senators is the power to convene, the power to shine light in places, and to bring out—to make sure that there is transparency. And in a lot of cases, when you do that, you don't need to regulate, because just the threat of regulation can make the market do the right thing.

And so, I think it's important that we're very, very cautious, because once regulations are put into place, once laws are put into place, they're very difficult to change. So, we ought to be very, very cautious as we proceed, and making sure that if the market is correcting itself, that we ought to allow the market to do its job.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Rockefeller?

STATEMENT OF HON. JOHN D. ROCKEFELLER IV,
U.S. SENATOR FROM WEST VIRGINIA

Senator ROCKEFELLER. Thank you, Mr. Chairman. I'll try to be brief.

I'm glad of this hearing. Chairman Martin, I'm happy to see you. You're not looking very cheerful right now, and you usually do, so I want you to be glad that you're here.

So, "The Future of the Internet"—lofty title, lots of things implied. I think it's useful to look forward. It's also useful to look back. I want to do that.

Forty years ago, as John Kerry said, DARPA—and it was the "network of networks," that's what it was called at that time, and later became the Internet. The Internet started with the Government, as today the relationship between Internet and the government continues. In fact, I believe it is a myth that the Internet is not regulated. It is regulated, in a variety of ways. We have rules to protect consumers against the nuisance of unwanted e-mail solicitation or spam, we require voice communications providers that use the Internet to offer 9–1–1 emergency service to their users, we require providers of these services to support our Universal Service policy. We have programs that put the Internet in our schools, pro-

grams to support the use of telemedicine, and laws that seek to diversify the range of broadband Internet service providers.

So, in short, Congress—we do pay attention to the lifeblood of the Internet, and we should. We want to foster an environment where it can grow and thrive and where the core values that have always driven our communications policy—and there are three: consumer protection, universal deployment, and competition—continue to propel us forward into the Internet Age even farther.

So, this is what I see at issue in the future of the Internet. Will we take these values and see to it that they inspire the next generation of great innovation? Will we squander them with a misguided notion that all is well—we can do that if we want—and that the unfettered market will serve the interests of our largest businesses and our individual consumers alike?

Taking the matter of broadband, that Senator Kerry was talking about, I am frustrated beyond any description by the lack of it in so many parts of a, granted, very rural and difficult State of West Virginia. I, for one, am very worried. The Internet and broadband represents our next great infrastructure challenge. It's on a par with the interstate roads, railroads, port projects that defined our commerce in the last century. But, we have yet to treat the deployment of broadband with any kind of seriousness that it deserves its spotty, industrial, you know, high return, and then occasionally somebody throws out, "Well, we'll put it in this rural county," and I can't buy that. I simply can't buy that. The world is passing us by, building more robust systems with greater bandwidth, more possibilities for education, entertainment, and entrepreneurship. This is not something to be proud of in this country. The time has come for a different discussion, a discussion that recognizes the viable role of the government in ensuring open broadband networks for all of our citizens, a discussion that brings along with it the prospect of real consumer protection, a discussion that truly fosters competition, and a discussion that ensures that the Internet will remain a creative source that takes inspiration and benefits from the great genius of our citizens.

I think we have a lot of work to do on this. I look forward to it. And I thank the Chair.

The CHAIRMAN. Thank you very much.

Senator Thune?

STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM SOUTH DAKOTA

Senator THUNE. Thank you, Mr. Chairman and Mr. Vice Chairman, for calling today's hearing on the future of the Internet, or, more specifically, the outlook for additional regulation on network providers.

Without question, the Internet's become an essential part of most Americans' daily lives. In fact, just a few years ago, individuals and businesses used the Internet to simply exchange information over e-mail and to post information on static Websites. Today, advances in technology and broadband deployment has led to an online revolution and transformed the role of the Internet in our everyday lives.

Peer-to-peer networking, iTunes, YouTube, and downloading HD videos were hardly envisioned just a few years ago. And by 2010, the average household will be using 1.1 terabytes of bandwidth each month, which, incidentally, Mr. Chairman, is an amount equal to 1,000 copies of the Encyclopedia Britannica. At that rate, just 20 homes would account for more bandwidth than the entire Internet in 1995.

Now, throughout this period of exceptional innovation, there's been very little regulation on the Internet. At this time, and by most accounts, the Internet is thriving. In several respects, the light regulatory touch of the Federal Government, as succeeded. Revenues from Internet sales of goods and services have grown to more than $135 billion in 2007, which represents a 20-percent increase from 2006. And, in fact, in the last year, online video viewing has increased 66 percent. Moving forward, Congress should continue to incentive broadband access nationwide, with particular emphasis on rural areas where broadband is essential to economic growth. And Congress also ought to be promoting investment in innovation in Internet networks through a variety of business models, and ensure the free flow of information through advanced networks.

I appreciate the testimony that we're going to receive today from today's witnesses. Your input on this important issue is going to be critical and help this Committee adjust our policies in accordance with the very dynamic Internet community.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

Senator Pryor?

STATEMENT OF HON. MARK PRYOR,
U.S. SENATOR FROM ARIZONA

Senator PRYOR. Thank you, Mr. Chairman.

Mr. Chairman, last time you offered for me to make an opening statement and I declined, Senator Sununu came over and criticized me for not making an opening statement.

[Laughter.]

Senator SUNUNU. I just wanted to hear from you.

[Laughter.]

Senator PRYOR. So, I guess I'm reminded of a saying that Congressman Marion Berry from Arkansas has, where he says, "Everything has been said, but not everybody has said it." And I think that——

[Laughter.]

Senator PRYOR.—the opening statements that we all have made today really cover the issues I want to talk about.

But, I do want to thank Chairman Martin for coming in. It's always great to have you before the Committee. And, Chairman Martin, I want to especially thank you for the courtesy visit that we had several days ago, and I just appreciate the tasks and the challenges you have there, and look forward to hearing your thoughts on the future of the Internet. And, obviously, rural broadband is very, very important to many of us on this Committee, and I look forward to hearing your thoughts on that.

Thank you.

The CHAIRMAN. Thank you very much.

Senator Smith?

STATEMENT OF HON. GORDON H. SMITH, U.S. SENATOR FROM OREGON

Senator SMITH. Thank you, Mr. Chairman.

In the interest of time, I'll put my longer statement in the record, with your permission——

The CHAIRMAN. Without objection.

Senator SMITH.—and my colleagues' assent.

Let me just sum my concerns into three parts. I think the question, moving forward, is whether the public interest is served by heavy-handed government regulation or policies that will empower agencies with the agility and tools to go after unfair and anticompetitive behavior on the Internet.

It's my belief that innovation and investment are encouraged through less, rather than more, government regulation. I also believe that anticompetitive behavior on the Internet must be met with swift and decisive responses from Federal agencies charged with policing such conduct. I, finally, Mr. Chairman, want to emphasize one piece of this debate that I think we need to keep in mind as the debate moves forward. I think that intellectual property rights must be part of any discussions that consider the future of the Internet. Illegal content distribution over the Internet is a large part of the economic harm caused by piracy each year.

Thank you, Mr. Chairman, and I'll put the rest in the record.

The CHAIRMAN. Without objection.

[The prepared statement of Senator Smith follows:]

PREPARED STATEMENT OF HON. GORDON H. SMITH, U.S. SENATOR FROM OREGON

Thank you, Chairman Inouye, for holding this important hearing on the Future of the Internet.

Competitiveness

I think we are all well aware on this Committee that several nations are now outpacing the United States in broadband deployment. There are severe economic consequences in failing to keep pace with the broadband infrastructure being deployed in other parts of the world. If we do not invest in the broadband, companies will move jobs overseas where the infrastructure meets their needs in the 21st century. Innovative technologies will be invented elsewhere. It is vital to our continued competitiveness in the global marketplace that we have a frank discussion on our Internet policies today in order to restore our global leadership in broadband networks tomorrow.

Congress must act now to define a national broadband strategy. At a minimum this strategy must include: (1) identifying where broadband is and where it is not; (2) reforming funding mechanisms to support broadband, (3) maximizing spectrum efficiencies to expedite deployment of wireless broadband solutions and (4) removing barriers to community broadband deployment. I am proud to have introduced bi-partisan legislation that advances each of these objectives.

Net Neutrality

I think we are all also aware on this Committee that it has proved difficult to enact any real national broadband policies with the specter of a net neutrality debate looming. My hope is that today's public discussion on net neutrality will reveal that there is more common ground here than some folks would suggest and perhaps a path down which we can proceed for the common good. For instance I think we could all agree that our Internet policies should:

- advance innovation at the edges *as well as* investment in networks;

- allow for legal peer-to-peer file sharing applications *while* strictly safeguarding against the theft of intellectual property online; and
- empower network operators with the freedom to address increasing congestion in their pipes *while* rigorously ferreting out and punishing anticompetitive behavior.

We should settle the debate about the ends and get serious in the debate about the means—how we go about encouraging broadband deployment and preserving the open and interconnected Internet. The question moving forward should be about whether the public interest is served through heavy handed government regulation, as some have proposed, or policies that will empower agencies with the agility and tools to go after unfair and anticompetitive behavior on the Internet. I continue to believe that innovation and investment are encouraged through less rather than more government regulation. I also believe that anticompetitive behavior on the Internet must be met with swift and decisive responses from the Federal agencies charged with policing such conduct.

Piracy

Finally, I think that intellectual property rights must be apart of any discussion that considers the future of the Internet. Illegal content distribution over the Internet is a large part of the economic harm caused by piracy each year. In 2005, American workers saw an estimated 141,000 jobs lost and $5.5 billion in lost earnings as a result of motion picture piracy. The economy's losses from illegal music downloading were likewise reported at around $3.7 billion in 2007.

With the Chairman's permission, I would ask that the Motion Picture Association and the Recording Industry Association comments (that were filed at the FCC) be made part of the record. These comments focus on challenges copyright holders face to ensure intellectual property rights are protected over the Internet.

I welcome panelists here today and thank you for your testimony.

The CHAIRMAN. And now, I call upon the Vice Chairman.

STATEMENT OF HON. TED STEVENS, U.S. SENATOR FROM ALASKA

Senator STEVENS. Thank you, Mr. Chairman.

I would like to welcome Chairman Martin. I think it's very important, particularly—we look forward to hearing some comments concerning your meetings in Harvard and Stanford.

Senator Kerry said that this is a problem seeking a solution, but from my point of view, this is a solution seeking some justification. And I certainly hope that the FCC, as well as the Congress, are very careful about taking this first step of going back to really intense—intensive regulation of the Internet. That's what "net neutrality" means to me. Eventually, there would be extension of regulation to the point where it would be, really, interference with the dynamics of the Internet and its future.

I do believe that there are many comments out there. For instance, I'd like to file, for the record, the article entitled, "Network Neutrality and the False Promise of Zero-Priced Regulation," by C. Scott Hemphill and a group of very erudite people at Columbia.*

And it does seem to me that this public discussion that's going on is good for the system. But, to take action based on it, either by the Congress or by the FCC, at this time, I think's entirely unwarranted. The action that Senator Kerry mentioned, that was called to attention, the public indignation, the outcry from the industry showed that the system will right itself if someone really tries to interfere with the free access and, really, fair treatment of everyone using the Internet. So, I do not believe that this is a time

*The document is retained in Committee files and also can be found at *http://papers.ssrn.com/sol3/papers.cfm?abstract__id=1119982.*

to try to put in a law or into a regulation a concept of net neutrality that is not validated yet. If something comes along that really deserves such attention, it will be broad enough and a great enough incentive for us to stop this political division over the concept of net neutrality. It is a political division now, and it's getting more so. It's unfortunate, because I do not think that communications law ought to come about because of political division in an election year.

Thank you very much.

The CHAIRMAN. Thank you very much.

Mr. Chairman, you've heard a full spectrum of views of the Committee. Now it's your turn, sir.

Chairman Martin?

STATEMENT OF HON. KEVIN J. MARTIN, CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION

Mr. MARTIN. Well, thank you. And good morning, Chairman Inouye, and Vice Chairman Stevens, and all the members of the Committee. I appreciate you allowing me to testify before you today.

I thought it important to update the Committee on the work in progress of the Commission with respect to the future of the Internet, particularly after our en banc hearing on the issue, just last week.

Over the past decade, the Internet has had a powerful impact on the economy and on the lives of American citizens. We witnessed the fruits of increased innovation, entrepreneurship, and competition that this technology has helped deliver. Any rules of the road in this area must maintain an open and dynamic Internet, preserving it as an engine of productivity and innovation that benefits all Americans.

The Commission is obligated to preserve and promote the vibrant and open character of the Internet. In 2005, the Commission adopted an Internet policy statement containing four key principles. The goal was to clarify how we would evaluate broadband Internet practices on a going-forward basis. Specifically, the statement says that, "To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to access the lawful Internet content of their choice; consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement; consumers are entitled to connect their choice of legal devices that do not harm the network; and consumers are entitled to competition among network providers, application service providers, and content providers. Now, the Commission explicitly noted that these principles allow for reasonable network management.

As the expert communications agency, it was appropriate for the Commission to adopt, and it is the Commission's role to enforce, this Internet policy statement. The Supreme Court, in its Brand X decision, specifically recognized the Commission's authority to adopt regulations to protect broadband Internet access.

I do not believe any additional regulations are needed at this time, because we have a complaint and adjudication process, but I do believe that the Commission has the responsibility to enforce

the principles that it has already adopted. Indeed, on several occasions, the entire Commission has reiterated that it has the authority and will enforce these current principles.

For example, in 2006, when I appeared before this committee, then-Chairman Stevens asked me whether the Commission had the existing authority to take action if a problem developed, and I responded that the Commission had authority, under Title I, to enforce consumers' unfettered access to the Internet when, one year ago, the Commission committed to enforcing our existing principles—specifically, the Commission stated that, quote, "The Commission, under Title I, of the Communications Act, has the ability to adopt and enforce the net neutrality principles it announced in the Internet policy statement." In fact, we have already taken enforcement action in response to other complaints. In the Madison River complaint, the Commission ordered a telephone company to stop blocking Voice-over-IP calls.

The Commission should address issues of appropriate network management using a consistent framework. There are several factors that I believe the Commission should consider:

First, the Commission should consider whether the network management practices are intended to distinguish between legal and illegal activity. The Commission's network principles only recognize and protect a user's access to legal content. The sharing of illegal content, such as child pornography or pirated material, is not protected. Similarly, applications that are intended to harm the network are not protected.

Second, the Commission should consider whether the network service provider has adequately disclosed its network management practices. A hallmark of whether something is reasonable is whether an operator is willing to precisely and fully disclose what it is they are doing. Application designers need to understand what will and will not work on a particular network, and consumers must be fully informed about the exact nature of the service they are purchasing, and any potential limitations on that service. For example, has the consumer been informed that certain applications used to watch video will not work properly when there is high congestion?

Additionally, consumers need to be assured that the broadband network operators are able to deliver the speeds of service that they are purchasing, and that if Internet access is sold as an unlimited service, do consumers understand that if they use too much of it, they can still be cutoff?

Now, finally, I believe the Commission should consider whether the network management technique arbitrarily blocks or degrades a particular application. Is the network management practice selectively identifying particular applications or content for differential treatment? If so, I believe we should evaluate these practices with heightened scrutiny. The network operators should bear the burden of demonstrating that the practice furthers an important interest and is narrowly tailored to serve that interest. Such an approach would not mean that any action taken against a particular application would automatically be a violation. Rather, it would trigger a more searching review of both the particular concern and whether the network management solution was tailored to resolve that concern in as narrow a manner as possible. Such practices should not

be overly broad in their application so that they become over- or under-inclusive. For example, if the concern is about stopping illegal content, a network provider should not block a particular application to all users if that application transmits both legal and illegal content. Rather, it should filter all of the illegal content and permit the flow of material that is legal.

An analysis considering the factors I've identified would recognize the importance of legitimate network management techniques while providing a framework to analyze whether carriers' actions are reasonable on a case-by-case basis.

Now, consumers have recently alleged that certain operators—and specifically, Comcast—are blocking and/or degrading consumers' access to the Internet by targeting specific peer-to-peer applications. The Commission is still investigating these complaints, and we have not yet determined whether the actions violated our principles protecting consumer access to the Internet. At our hearings in Boston and Stanford, we heard from several engineers and technical experts. According to the testimony at those hearings, Comcast appears to have utilized Internet equipment that blocks certain attempts by subscribers to upload information using particular legal peer-to-peer applications by pretending to be the subscriber's computer and falsifying a reset packet to end that communication. It also degrades the corresponding attempts to download information using the same peer-to-peer applications. Specifically, based on the testimony we have received thus far, some users were not able to upload any content that they wanted.

It does not appear that this technique was used only to occasionally delay traffic at particular nodes suffering from network congestion at that time. Indeed, based on the testimony we have received thus far, this equipment was typically deployed over a wider geographic area or system, and it is not even capable of knowing when an individual cable segment of the network is congested. This equipment blocks uploads of a significant portion of subscribers in that part of the network, regardless of the actual levels of congestion at that particular time.

Now, as the Commission continues its examination of the complaints before it, it's critically important to make sure that we are fully informed, and we need to fully understand what impact the operators' actions are having on consumers' broadband experience so that we may better evaluate the reasonableness of any network management practice.

Thank you, again, for the opportunity to be here, and I look forward to answering any questions that you might have.

[The prepared statement of Mr. Martin follows:]

PREPARED STATEMENT OF HON. KEVIN J. MARTIN, CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION

Good morning, Chairman Inouye, Vice Chairman Stevens, and members of the Committee. Thank you for inviting me here today to provide my thoughts on the future of the Internet and the Commission's current role on some of the issues being discussed today.

Over the past decade, the Internet has had a powerful impact on the economy and on the lives of American citizens. We have witnessed the fruits of increased innovation, entrepreneurship, and competition that this technology has helped deliver. As policymakers, any rules of the road in this area must maintain an open and dy-

namic Internet that will allow it to continue to be an engine of productivity and innovation that benefits all Americans.

I. FCC Principles Protecting Consumer Access to the Internet

The Commission has a duty to preserve and promote the vibrant and open character of the Internet as the telecommunications marketplace enters the broadband age. In 2005, the Commission adopted an Internet Policy Statement containing four principles. The Commission's goal was to clarify how it would evaluate broadband Internet practices on a going forward basis.

Specifically, the Commission established the following principles:

To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet,

- Consumers are entitled to access the lawful Internet content of their choice;
- Consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement;
- Consumers are entitled to connect their choice of legal devices that do not harm the network;
- Consumers are entitled to competition among network providers, application and service providers, and content providers.

The Commission explicitly noted that these principles were subject to reasonable network management.

The Commission was seeking to protect consumers' access to the lawful online content of their choice. The intent of these principles was to foster the creation, adoption and use of broadband Internet content, applications, and services, and to ensure that consumers benefit from that innovation.

II. FCC's Role in Protecting Consumers and Enforcing Our Principles

As the expert communications agency, it was appropriate for the Commission to adopt, and it is the Commission's role to enforce, this Internet Policy Statement.

In fact, the Supreme Court in its Brand X decision specifically recognized the Commission's ancillary authority to impose regulations as necessary to protect broadband Internet access.

I do not believe any additional regulations are needed at this time. But I also believe that the Commission has a responsibility to enforce the principles that it has already adopted. Indeed, on several occasions, the entire Commission has reiterated that it has the authority and will enforce these current principles.

For example, in 2006 when I appeared before this Committee, then Chairman Stevens asked me whether the Commission had the existing authority to take action if a problem developed. And I responded that the Commission had authority under Title I to enforce consumers' access to the Internet.

Moreover, almost exactly 1 year ago, the Republican Majority of the Commission, with the Democrat Commissioners concurring, committed to enforcing our existing principles and the policy statement. Specifically, in April 2007, the Commission expressly stated:

> The Commission, under Title I of the Communications Act, has the ability to adopt and enforce the net neutrality principles it announced in the Internet Policy Statement. The Supreme Court reaffirmed that the Commission "has jurisdiction to impose additional regulatory obligations under its Title I ancillary jurisdiction to regulate interstate and foreign communications." Indeed, the Supreme Court specifically recognized the Commission's ancillary jurisdiction to impose regulatory obligations on broadband Internet access providers.[1]

Finally, the Commission has already taken enforcement action in response to other complaints. In the Madison River complaint, the Commission ordered a telephone company to stop blocking VoIP calls.

Contrary to some public claims about Commission's approach generally, for the Commission to take enforcement action against a telephone company for blocking and degrading a particular application but refuse to pursue enforcement action against a cable company blocking or degrading a particular application would unfairly favor the cable industry.

I believe that the Commission must remain vigilant in protecting consumers' access to content on the Internet Thus, it is critically important that the Commission take seriously and respond to complaints that are filed about arbitrary limits on

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[1] *Broadband Industry Practices,* WC Docket No. 07–52, Notice of Inquiry, 22 FCC Rcd 7894, 7896, para. 4 (2007) (internal footnotes omitted).

broadband access and potential violations of our principles. Indeed, I have publicly stated that the Commission stands ready to enforce this policy statement and protect consumers' access to the Internet.

III. Framework for Evaluating Reasonable Network Management Complaints

The Commission should address issues of appropriate network management using a consistent framework. There are several factors that I believe the Commission should use when analyzing complaints and concerns about network management practices by broadband operators.

First, the Commission should consider whether the network management practices are intended to distinguish between legal and illegal activity. The Commission's network principles only recognize and protect user's access to legal content. The sharing of illegal content, such as child pornography or content that does not have the appropriate copyright, is not protected by our principles. Similarly, applications that are intended to harm the network are not protected.

Second, the Commission should consider whether the network service provider adequately disclosed its network management practices. A hallmark of whether something is reasonable is whether an operator is willing to disclose fully and exactly what they are doing.

Adequate disclosure of the particular traffic management tools and techniques—not only to consumers but also to the designers of various applications and entrepreneurs—is critical.

Application designers need to understand what will and will not work on a particular network. For example, does an application developer know that the operator may actually insert reset packets during a session masking the network operator's identity?

Consumers must be fully informed about the exact nature of the service they are purchasing and any potential limitations associated with that service. For example, has the consumer been informed that certain applications used to watch video will not work properly when there is high congestion?

Particularly as broadband providers begin providing more complex tiers of service, it's critical to make sure that consumers understand whether broadband network operators are able to deliver the speeds of service that they are selling. For example, if Internet access is sold as an unlimited service, do consumers understand that if they use too much of it they can still be cutoff?

Finally, the Commission should consider whether the network management technique arbitrarily blocks or degrades a particular application. Is the network management practice selectively identifying particular applications or content for differential treatment? If so, I believe that we should evaluate the practices with heightened scrutiny, with the network operator bearing the burden of demonstrating that the particular practice furthered an important interest, and that it was narrowly tailored to serve that interest.

Such an approach would not mean that any action taken against a particular application would automatically be a violation. Rather, it would trigger a more searching review of both the particular concern and whether that network management solution was tailored to resolve the particular harm identified to the network in as narrow a manner as possible.

In a manner similar to the way in which restrictions on speech are analyzed, network management solutions would need to further a compelling or at least an important/legitimate interest and would need to be tailored to fit the exact interest. Such practices should not be overly broad in their application so that they become over or under inclusive. For example, if the concern is about stopping certain illegal content, a network provider should not block a particular application to all users if that application transmits both legal and illegal content.

Such an analysis would recognize the importance of legitimate network management techniques while giving the Commission the framework to analyze carriers actions on a case-by-case basis. As we move into an era in which network operators are taking particularized actions against individual applications and content, the Commission should evaluate such practices under sufficient scrutiny to ensure that whatever actions the operators are taking are actually furthering a legitimate purpose and are narrowly tailored to serving that legitimate purpose.

IV. Pending Comcast Complaint

Consumers have alleged that certain operators, and specifically Comcast, are blocking and/or degrading consumers' access to the Internet by distinguishing between applications.

The Commission has heard from several engineers and technical experts who have raised questions regarding the network management techniques used by Comcast for peer-to-peer traffic.

The Commission is still investigating these complaints and we have not yet determined whether the actions violated our principles protecting consumer access to the Internet. However, Comcast appears to have utilized Internet equipment from Sandvine or something similar that is widely known to be a relatively inexpensive, blunt means to reduce peer-to-peer traffic by blocking certain traffic completely. In contrast, more modern equipment can be finely tuned to slow traffic to certain speeds based on various levels of congestion.

Specifically, this equipment: (1) blocks certain attempts by subscribers to upload information using particular legal peer-to-peer applications by pretending to be the subscriber's computer and falsifying a "reset" packet to end the communication, and (2) degrades the corresponding attempts to download information using the same peer-to-peer applications.

Based on the testimony we have received thus far, I think it is important to clarify a few points.

Contrary to some claims, it does not appear that cable modem subscribers had the ability to do anything they wanted on the Internet. Specifically, based on the testimony we have received thus far, some users were not able to upload anything they wanted and were unable to fully use certain file sharing software from peer-to-peer networks.

Contrary to some claims, it does not appear this network management technique is "content agnostic." Indeed, Comcast has publicly stated that it will migrate to a "protocol" (content) agnostic approach to traffic management in the future, and thus conceded that the techniques currently in use are not "content agnostic."

Contrary to some claims, it does not appear that this technique was used only to occasionally delay traffic at particular nodes suffering from network congestion at that time. Indeed, based on the testimony we have received thus far, this equipment is typically deployed over a wider geographic or system area and would therefore have impacted numerous nodes within a system simultaneously. Moreover, the equipment apparently used does not appear to have the ability to know when an individual cable segment is congested. It appears that this equipment blocks the uploads of at least a large portion of subscribers in that part of the network, regardless of the actual levels of congestion at that particular time.

Finally, contrary to some claims, it is not clear when they will actually stop using their current approach. They claim that they will deploy this new solution by the end of the year but it is unclear whether they will be finished deploying their solution or just starting that migration. Indeed the question is not when they will begin using a new approach but if and when they are committing to stop using the old one.

V. Next Steps

As the Commission continues its investigation into the complaints before it, the most important and first step that we can take in fulfilling our responsibility is to make sure that we are fully informed. At the very least, we need to obtain greater information to more fully understand what is happening and what impact operators' actions are having so that we may better evaluate the reasonableness of any network management practices at issue.

The CHAIRMAN. Thank you very much.

Chairman Martin, you've just testified that you believe the FCC has sufficient enforcement authority to resolve network neutrality issues. Now, if you proceed to use this authority, I suppose you would expect subsequent litigation challenging your ability to act in this area. If your answer is yes, do you believe that additional authority from the Congress is necessary, or is there sufficient authority at the present time?

Mr. MARTIN. I think that the Commission has sufficient authority. I did ask several witnesses at the hearing in Cambridge, at Harvard, about whether they thought we had the authority. Some of the carriers testified that they did. Verizon responded that they thought we did have the authority. Comcast said they wanted to

get back to us, and they've subsequently filed a letter saying they do not believe we have the authority.

I believe we do have the sufficient authority to do that, but I believe you are right, that there may be subsequent litigation by some of the carriers as a result. At least that's what they seem to indicate in their most recent response to me.

The CHAIRMAN. Senator Stevens?

Senator STEVENS. Mr. Chairman, I have a conflict, and I would hope that I'd be able to submit my questions for the record for all the witnesses.

Thank you.

The CHAIRMAN. Without objection.

Senator Dorgan?

Senator DORGAN. Mr. Chairman, thank you very much.

Before Senator Stevens leaves—he indicated that nondiscrimination rules represented intensive regulation. The Internet was created——

Senator STEVENS. I said it would lead to intensive regulation. It would lead to——

Senator DORGAN. Right, the restoration. But, my point was, we're restoring——

Senator STEVENS. It would lead to intensive——

Senator DORGAN.—we are restoring that which previously existed. My question is the nondiscrimination requirements with respect to service, that preceded your determination by the FCC, that "information services shall not be subject to the nondiscrimination rule," did that nondiscrimination requirement represent intensive regulation, in your judgment, as the Internet was created and developed and flowered?

Mr. MARTIN. I'm not sure that nondiscrimination represented intensive requirements. I believe that some of the common-carrier regulations that went beyond that, that were attached to that telecommunications service category, might——

Senator DORGAN. Right, but I'm talking now about the nondiscrimination rules——

Mr. MARTIN. No, I don't think it means that it leads to an intensive requirement. I would say that I would be cautious about a pure nondiscrimination requirement, because there are positive attributes of discrimination; for example, in saying that voice packets might be preferable because of the need for that being able to be delivered on a timely basis——

Senator DORGAN. I understand that.

Mr. MARTIN.—over other kinds of data.

Senator DORGAN. No, I understand that. And I understand the issue that you've raised about the management of the system and various things. I think Senator Snowe and I and others, like Senator Kerry, who have tried to advance this legislation understand the need to be able to manage the system, but, my point is we've heard a lot this morning about—that this is re-regulation and potentially intensive regulation. My point, very simply, is that to restore that which previously existed in the earlier formation of the Internet—it was not intensive regulation, it simply said that, over the entire range of these services, the nondiscrimination rules would apply.

Now, I'd like to ask you—first of all, as you have indicated, Comcast has filed a decision they have made that—or at least their interpretation—that you do not have the authority on the matter that is before you with respect to Comcast. Isn't that correct?

Mr. MARTIN. That's correct.

Senator DORGAN. So, at this point, a very large provider, who, with a lot of legal resources, says you don't have authority—well, let me ask you, Do you believe that you need this authority? You believe you have it. I assume you believe you have it, and you believe you need it, correct?

Mr. MARTIN. That's correct. I think——

Senator DORGAN. So——

Mr. MARTIN. I think it's important that we have that.

Senator DORGAN. So, what if a court says they agree with Comcast and you don't have it? You will come to us and ask that we restore that capability?

Mr. MARTIN. Obviously, I think it is important that we have the ability to ensure that consumers have unfettered access to the Internet, and if a court said that we did not have that authority, I think someone needs to be ensuring——

Senator DORGAN. So, would giving you that authority be regulating, as some of my colleagues have suggested—re-regulating——

Mr. MARTIN. I don't——

Senator DORGAN.—intensive regulation?

Mr. MARTIN. I don't believe that just merely providing us the authority, without requirements that we do anything with it, particularly adopting rules, would be re-regulating. No, sir.

Senator DORGAN. Now, let me talk about a network service provider—the Commission should consider whether the network service provider adequately disclosed its network management practices. I distinguish on "management practices," as I understand that, that they may have a whole class of services that they have to manage in a certain way—voice versus data, and so on. But, let's say that a network service provider disclosed to me, as a consumer—and I'm living in a part of the country where I have probably one or two opportunities to get my broadband, so very little competition, which is the case in most parts of this country, I might say—and the network service provider came to me and said, "Well, here's the way we do business. You can get to most of the Internet pretty well, but I'm a provider that has said to the largest content sites out there, 'You've got to pay me a little bit in order to be delivered to the homes that I service,' so you should just know that I've got a little toll that I apply to certain areas." Would that adequately disclose, to consumers, practices that you would think are fine?

Mr. MARTIN. I think that it's important that there be adequate disclosure. Adequate disclosure doesn't make the practice fine; we'd still have to evaluate whether or not it was a reasonable practice. But, I certainly think that failing to disclose it is an unreasonable practice. And I think that's the way I would describe it. So, in your hypothetical, if a carrier was not disclosing to consumers that they were preventing you from going to a Website unless that Website paid them, I think that that would be a problem. However, if they

disclosed it, we would have to analyze the exact facts of what they were doing to determine whether it was a reasonable action.

Senator DORGAN. But, Chairman Martin, you believe you need the authority to take action in these cases. I'm trying to understand what kind of provocations would incite you to action. But——

Mr. MARTIN. Well——

Senator DORGAN.—let me, just for a moment, and then I'm going to ask you to answer——

I want to describe, Mr. Chairman, why I think this is important. And I want to do it—I'll use a big content provider, Google. OK? Google's a behemoth out there, right? Didn't used to be. And my understanding is, in I believe it was 1998, Larry and Sergei, two guys that were in a dorm room, moved to a garage that had a garage-door opener, because it was such an exciting thing. They had eight employees, or whatever it was, and they moved to a garage with a garage-door opener. Ten years later, that company is larger than General Motors, Ford Motors, and Coca Cola, combined, in market valuation. Now, that's pretty unbelievable.

The question is this. When Whitacre or somebody says, "You know, I want to start charging a company that big for the pipes," well, you start charging for pipes and charging content providers and so on. Are there other kids in a college dorm room out there that have another new idea that will never have access to the rest of this country if we've got content providers that say, "I'm at the end of the funnel, and I'm, by God, going to decide who gets through and who doesn't get through, based on how much money I get, who gets put in a bus lane, who gets put in a fast lane," just describing the determination of how they want to treat content. My question is whether this doesn't inevitably defeat the opportunity—unfettered opportunity for innovation in this country. And again, I will say, those who have argued so vociferously this morning against the Internet Freedom Act are saying, "We don't like the issue of nondiscrimination." By virtue of their argument, they must be standing up for discrimination. If so, what kind? What will that mean? How will that change the Internet?

So, I'm trying to—first of all, I appreciate your being here, and I appreciate your testimony. I believe what you are saying is that you believe you need authority to take action in these areas. And I'm just telling you, one of the biggest content providers says, "You don't have that authority." So, shouldn't you ask us to do something to get that authority, in the event that this is unclear and you spend the next 3 or 4 years in court?

Mr. MARTIN. Well, as I said, I believe we do need the authority. I think that we do have the authority to do it. I think the courts have said that. But, I certainly agree with you, we need the authority. I think you asked me to give you some sense of what actions I think would be unreasonable, and I certainly think if a network operator was saying that every time you type in "Google"—you wanted to go to Google, they were redirecting you to Yahoo!, because Yahoo! was paying them and Google wasn't, I think that would be a problem. And I think that would be a problem whether they disclosed it or not. Merely telling consumers that they were doing that would not turn it into a reasonable practice. So, that's

the kind of action I think we would need the authority to take action against.

Senator DORGAN. Mr. Chairman, I've taken longer than I should, but I have one final point. The issue of discrimination is a very important provision here. A provider, in my judgment, could decide to deliver voice packets faster for a certain reason, based on prioritization, in order to manage their network, and that would not be discrimination. They can do that without being discriminatory. But, a provider that decides, as the fellow from—I was reading, this morning, about the fellow from England who's setting up a company, Virgin something or another, saying, "You know, I'm"—I don't think I have the quote here, but he's essentially saying, "Look, I have every right to be charging the content folks out there." I know that's another country, but it's exactly the same principle of why we're trying to determine how we might legislate, here, to restore that which always existed in the creation of the Internet: nondiscrimination rules.

I find it unbelievable that this is controversial. Who on earth is standing up for discrimination? I mean, it's just unbelievable to suggest that this is some sort of intensive regulation. It is not. It is a restoration of something that has great common sense. Open architecture of the Internet, open innovation, and nondiscrimination rules that always existed prior to the FCC taking action identifying it as an information service. Let's finally do the right thing.

And, Mr. Chairman, I've taken more than my time. I appreciate it.

The CHAIRMAN. Senator Kerry?

Senator KERRY. Thank you, Mr. Chairman.

Let me pick up, a little bit, if I may, Chairman Martin, on some of this line of questioning.

First of all, it seems to me obvious, on the face of it, that, as an administrative agency, if there is a lack of clarity as to whether or not you have authority, and you are already on notice by a major player in this sector that they believe you don't, you're looking at a lawsuit.

Mr. MARTIN. I think that's right. That carrier has said that they do not want us to take action, and that we don't have the authority to do it, and it's in a complaint that's in front of us today.

Senator KERRY. And isn't it standard procedure within the legislative process that if there is a lack of clarity as to something within a federally constituted agency, that it is up to the Congress to—if it has an intent it wants to have enforced, to clarify what that intent is?

Or to state the intent, ab initio, that—from the beginning.

Mr. MARTIN. Sure. Absolutely. I think part of the reason——

Senator KERRY. Well, don't just gloss over that. You say, "Sure. Absolutely." I mean, that's a very fundamental point.

Mr. MARTIN. No, I think it is, but I also think Congress has given us that authority. And I guess I'm not as deterred, potentially, by the lawsuit. Almost every action the Commission takes, we get taken to court, where someone challenges our authority.

Senator KERRY. Well, here are the differences——

Mr. MARTIN. That's the reason why I'm probably not as hesitant, in that sense.

Senator KERRY. Well, you see, I think what's happened is, there's a lot, obviously, that's in a gray area here, that, in effect, the Internet policy statement has four fundamental principles, which I think are good principles. I'm not arguing with them. In fact, they are encompassed within the legislation. But, let me give you, sort of, a side-by-side on them. Your principles that you keep referring to in the Internet policy statement are, "To encourage broadband deployment, preserve and promote the open interconnected nature of the public Internet, consumers are entitled to access the lawful Internet content of their choice." So, you have "a content of their choice." Now, that's—they're entitled to it. There's not a lot of clarity in that.

In our legislation, we say, "With respect to any broadband service offered to the public, each broadband service provider shall"—required—"not block, interfere with, discriminate against, impair, or degrade the ability of any person to use a broadband service to access, use, send, post, receive, or offer any lawful content, application, or service made available via the Internet." Do you have any disagreement with that?

Mr. MARTIN. I think that the only hesitation I have is that, when you say they're not allowed to discriminate, as I said, there are some good techniques, for example, favoring voice packets over data packets to make sure that the voice communications can occur in a realtime basis. I think that one of the things that I've talked about in the past, that would concern me is if it were an explicit requirement that had no flexibility to it.

Senator KERRY. And you view that as discrimination. But, if you were to take out the word "discriminate" or further describe the word "discriminate" adequately, do you have any objection to that fundamental objective of that word?

Mr. MARTIN. No, I think it's very similar to our fundamental objective.

Senator KERRY. All right.

The second one you have is that—"Encourage broadband deployment, preserve, promote the open interconnected nature of the public Internet. Consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement." We all agree with that.

Here's paragraph 2 of the bill, "Shall not prevent or obstruct a user from attaching or using any device to the network of such broadband service provider only if such device does not physically damage or substantially degrade the use of such network by other subscribers." Do you have an objection to that?

Mr. MARTIN. Again, I think it's very similar to what we adopted.

Senator KERRY. So do I. But, it's a law.

Mr. MARTIN. Yes.

Senator KERRY. Third, "To encourage broadband deployment, preserve and promote the interconnected nature of public Internet, consumers are entitled to connect their choice of legal devices that do not harm the network." That's part of what we just read. That's number three of yours, correct?

Mr. MARTIN. That's correct.

Senator KERRY. Do you agree with that in the same paragraph?

Mr. MARTIN. Of course.

Senator KERRY. Fourth—and these are the only ones you have—fourth, "Internet consumers are entitled to competition among network providers, application and service providers, and content providers." So, you want competition in the field. So do we.

We say, "Enable any content, application, or service made available via the Internet to be offered, provided, or posted on a basis that is reasonable and nondiscriminatory, including with respect to quality of service, access, speed, and bandwidth; be as at least equivalent to the access speed, quality of service, and bandwidth that such broadband service provider offers to affiliated content"—in other words, we want fair competition—"applications, or services made available via the public Internet; and (c) does not impose a charge on the basis of the type of content, applications, or services made available via the Internet into the network of such broadband service provider." In other words, that's real neutrality; we're not going to have a content that starts playing games with people's, you know, type of content or the application, because that does become discriminatory.

Now, do you disagree with any of those?

Mr. MARTIN. Again, it had some of the nondiscriminatory language, and I think that I'd have some of the same concerns I had before.

Senator KERRY. Well, let's presume that we could sharpen this word "discriminatory"——

Mr. MARTIN. Right.

Senator KERRY.—so that we understand exactly what we're trying to prevent, and we don't become inadvertently—the law of unintended consequences—we don't create something that, in fact, is beneficial to the system, where you're actually making a choice between something that everybody would agree, in terms of the provision of service, is positive. It's hard to see how that would happen and have a free market and be letting the market decide, but assume we tried to do that. Would you have an objection with the fundamental direction of that?

Mr. MARTIN. I don't have an objection to the fundamental direction.

Senator KERRY. So——

Mr. MARTIN. I have one question about the—part (c), I think you said, where they weren't——

Senator KERRY. Yes.

Mr. MARTIN.—allowed to charge anything. I'm not sure I understood the full implications of that. There are providers today, not even the network providers, but some people who host servers on the edges of the network, for example, to try to increase the speeds for consumers downloading information from those servers. And I don't think I'd want to limit network operators', for example, ability to provide that same commercial service that is being provided by others today.

Senator KERRY. We wouldn't want to do that. I would agree with that. But, we also don't want to have a situation where a network provider is creating tiers and actually, you know, preventing people from getting access under certain——

Mr. MARTIN. Oh, as I said to Senator Dorgan before, I agree. I don't think they should be able to say to a Google, "Unless you pay me, I'm going to redirect your traffic to Yahoo!" I think that's right.

Senator KERRY. Well, it seems to me that we ought to be able to skin this cat; I mean, we ought to be able to find a way to deal with this one concept, that reasonable people ought to be able to find a way to protect the public interest here and to provide you with sufficient clarity as to what the congressional intent is and what is expected, so that everybody knows what rules we're playing by.

Right now, if I were in the business, I would be tempted to want to sue you, because there is a discretionary gray area, there's a complete lack of clarity as to why you might be deciding what you're deciding, what you're basing it on. And in the absence of the clarity of that congressional intent, I think we're inviting delay.

To speak to, I think, Senator Ensign, when I was out of here, mentioned that I had mentioned that the company corrected it. Yes, they did. But, you want to not have a situation where you have to find an advocacy group that calls it to our attention and screams about the unfairness, and months go by, and, after a while, you correct it. It would be better for everybody, wouldn't it, if you had that established and clear and everybody knows where the money is going to flow, how the capital is going to be repaid? There's a kind of certainty in the marketplace that comes from that, isn't there?

Mr. MARTIN. Oh, I agree that certainty about our ability to enforce this is only positive. As I said, I think the Commission has been clear that we will be enforcing our current principles, which are fundamentally in the same direction. As you said, I think there are some issues that reasonable people would continue to work on, but that even with some differences, fundamentally they're in the same direction.

I think the Commission has tried to provide the clarity that we will enforce it, but I don't disagree that making sure that the Commission has the authority is not, in and of itself wrong; there's nothing wrong with that. It's something the Commission has already said that we intend to be doing.

Senator KERRY. Well, I congratulate you on that. I think the basic principles you've laid out—I think they're incomplete, and I don't think they allow you to go the distance here or to provide the marketplace the clarity it needs and deserves. But, I do think it's moving in the right direction, and I certainly applaud you for holding those principles.

I'd like to see us, Mr. Chairman, hopefully, provide that clarity and that certainty to the marketplace.

I think we ought to try to find a way to work with you—and I'm sure you're willing to work with us—to, maybe, you know, work on how we define that discriminatory concept a little bit more.

Mr. MARTIN. Thank you.

Senator KERRY. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Senator Pryor?

Senator PRYOR. Thank you, Mr. Chairman.

Chairman Martin, let me ask—you mentioned, in your statement, the Madison River Communications case. And as I understand it, you have at least a couple of other matters that have come before you, and, I guess, are pending now. One is Comcast, where they were delaying some messages; I'm not quite sure of all the details on that. And Verizon apparently—currently has matters pending before your Commission. How is that working? Right now, we're—you're doing this on a case-by-case basis. How is that working?

Mr. MARTIN. Well, as I said, we've adopted the principles that I was just going through with Senator Kerry, and I believe that we're enforcing those through an adjudication process. I think that is how we would probably enforce, any kind of similar principles. And I think that it, thus far, is working fine. The Commission has acted in the past, as I testified to, in the context of stopping a telecommunications carrier from limiting the consumer's access to a Voice-over-IP service. I think that we have, as you said, two complaints with us now, that I think the Commission will take action on, as well.

Senator PRYOR. Because there's no statute on this issue, are you seeing companies trying to test the water and figure out what the boundaries are?

Mr. MARTIN. You know, we weren't. And, indeed, when the Supreme Court upheld our information service classification, they explicitly stated that they believe we had authority under Title I of the statute, so we had statutory authority to adopt any rules we would deem necessary to adequately protect consumers' broadband access rights. So, I believe we do have that statutory authority.

Up until the hearing at Harvard, and Comcast's subsequent letter, I don't believe there had been anyone who had asserted that we did not have that authority.

Senator PRYOR. OK. And you mentioned, you know, Madison River and Comcast and Verizon. Are you confident that those are the only three companies out there that are trying to restrict content in some way?

Mr. MARTIN. Those are the only ones that have been brought to our attention. I believe Vuze released a press release yesterday saying that they thought that the equipment that was being used to block applications to peer-to-peer by Comcast was also more prevalent in the network. There was an analysis done of domestic networks and of networks abroad. So, that particular practice may be more prevalent. We don't have any specific facts or allegations against another company.

Senator PRYOR. Now, when BellSouth and AT&T merged—I guess, last year; I don't remember exactly when that was, the Commission required them to do a—what—a 2-year, I guess you say, moratorium, or a 2-year requirement on certain business practices. Is that company—is AT&T behaving differently than the rest of the market right now?

Mr. MARTIN. Well, there are no allegations against them right now, so we're not aware of anything that they are doing, and there aren't any allegations that they were, for example, interfering with peer-to-peer content or blocking the uploading ability of individuals

using peer-to-peer, or degrading the ability for someone to download using peer-to-peer.

Senator PRYOR. Let me ask about investment out there. Because I have a lot of rural areas in my State, as do many of the Senators here today, you know, I know that investment—the money tends to go where the people are, where the business is. And, you know, one of the concerns I have is that the investment in rural broadband will not flow in such a way that rural broadband will really have equal access to more urban areas in this country. Do you share that concern?

Mr. MARTIN. Oh, sure. I think it's a significant challenge to make sure that we have policies in place that are trying to ensure that, ultimately, people who live in rural areas don't get left behind those that live in urban areas. And I think that that actually was embodied in Congress's enactment of the universal service provisions of the Telecom Act, where they said that people there should be entitled to advanced services, ultimately similar to what's provided in urban areas.

Senator PRYOR. Are there policies that you need to change, or that the Congress needs to change, relating to broadband that would allow more investment to flow out to rural America?

Mr. MARTIN. We've tried to change some policies. We actually recently adopted provisions for gathering more information to establish the current floor of what people have, very similar to Chairman Inouye's bill, to try to gather more information. We actually also adopted rules recently to change the definition of basic broadband to increase the speed for it. That was something that I voted for, along with the two Democratic commissioners, to increase the speed of what constitutes basic broadband. I think that those are important to evaluate where we actually are. Another policy change that I think that we need, and have supported in the past, is legislation that would, for example, remove some of the franchising limitations that may have stifled the carrier's ability to invest in networks to be able to provide a competitive video alternative. Bidding on video services is an important component of that infrastructure investment, and I think that's an important policy change that I've supported in the past, that I think that Congress could end up doing.

Senator PRYOR. That's all I have, Mr. Chairman. Thank you.

The CHAIRMAN. Thank you very much.

Senator Smith?

Senator SMITH. Thank you, Mr. Chairman.

And, Chairman Martin, thank you for being here. I—as I listen to our—my colleagues and our questions to you, it seems like it's—it could easily be framed as those who are for discrimination, those who are against discrimination. I don't really see it that way. What I see it as is that we're all pro-deployment of more broadband to urban and rural areas. And as I contemplate how to best encourage deployment, not just to urban areas, but to rural areas, as well, I can't think of anything that would be more discouraging to investment in rural broadband deployment than if we take a regulatory approach right up front. My own judgment is that if you can pursue the adjudicatory approach swiftly as these cases arise, then we will do—we will provide the market certainty that Senator Kerry

is talking about. That's the objective, as I see it; not whether you're for or against discrimination. We want the Internet to be open.

Now, I understand that you're holding several investigative hearings about some complaints that occasionally do arise. I'm not going to ask you particulars on that, but you apparently questioned a network operator as to whether the FCC has the authority to pursue these investigations, to which, I believe, the response was, no, you do not. They later clarified their response, that the Powell Principles, what I believe are the floor of consumer rights on the Internet, were simply a statement of policy and not regulations; hence—and hence, not subject to enforcement through, say, injunctions or foreclosures. Now, I've read your statement, and I know that you disagree with the position articulated at that field hearing. My question to you is, Does the FCC have the authority to enforce the Powell Principles? Or, put another way, must the Powell Principles be codified?

Mr. MARTIN. Well, I think that we do have the authority, and, indeed, the Commission has expressly stated that. Almost a year ago, in April of 2007, the majority of the Commission very expressly stated that we have the authority to both adopt and enforce the network neutrality principles it announced in the Internet policy statement.

Senator SMITH. Have Federal courts affirmed that?

Mr. MARTIN. It hasn't come before the courts——

Senator SMITH. Is there litigation heading that way?

Mr. MARTIN. Well, I think that the concern that has been raised is, as a result of Comcast now claiming that we don't have that authority, will that lead to litigation. As I said, lots of the actions the Commission takes end up in the courts, run through litigation, and we follow whatever the courts end up clarifying.

But, I believe that the Supreme Court, in its Brand X decision, very clearly articulated that we had ancillary authority, under Title I of the 1996 Telecommunications Act, to take these actions.

Senator SMITH. On a separate but related matter, you currently have an open proceeding that considers industry network management practices. It seems that much of the network congestion is derived from massive amounts of illegal print pirated material. I surmise from your statement that narrowly tailored network management practices designed to protect intellectual property is an acceptable practice by network operators. Can you be more specific as to what types of network management should be allowed to combat trafficking in illegal materials?

Mr. MARTIN. Well, there have been several carriers who have talked about, and been in discussions with, content providers about putting on filters that would distinguish between material that had the appropriate copyright and those that didn't stop pirated content. I think that's fundamentally different from a network management practice that focused on a particular application, that actually said, "We're going to stop this kind of practice, peer-to-peer practice, or more—even more particularly, any kind of peer-to-peer using this certain technology." I think those kinds of practices would be both over- and under-inclusive; it would stop some use of that technology to distribute legal content, and it wouldn't catch other technology that was still distributing illegal content.

So, if your goal is to stop pirated content, you would need to put some kind of filter on that would try to identify that. Our Internet principles are only designed to protect the access to legal content, and that would be a perfectly reasonable kind of network management practice.

Senator SMITH. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Wicker?

STATEMENT OF ROGER F. WICKER,
U.S. SENATOR FROM MISSISSIPPI

Senator WICKER. Mr. Chairman, I will simply submit questions for the record and allow you to move on to the next panel.

Thank you.

The CHAIRMAN. Without objection.

Senator Dorgan?

Senator DORGAN. Mr. Chairman, I just wanted—as we allow Chairman Martin to leave, I wanted to hold up the two pieces, because several of us have spoken of this.

This is—it describes the docket, "The Internet policy statement did not create enforceable rules." This, from Comcast Corporation to the FCC, number one.

Number two, again, comments about the FCC's authority, by Comcast, at their filing, "The Commission's statutory authority to regulate broadband Internet services is limited. The exercise of Title I authority over network management practices would also constitute an abrupt departure from the Commission's numerous consistent and successful precedents. Absent a reasoned explanation for its conduct, such a sharp departure from established Commission policy would be arbitrary and capricious, in violation of the APA."

The reason I wanted to put that up is, you know, the allegation is made—and I understand this may or may not be right, but at least it creates the question of uncertainty, here, about whether your principles are enforceable by you. I don't know whether they are or not, but I think most of us would believe that, whether the codification of these principles or the passage of the Internet Freedom Act, something is necessary to make certain that we resolve this. This—I mean, you say you have the authority, but you may well not have the authority. You may not find that for years. You may be litigating for a long period of time.

Chairman Martin, I appreciate your coming.

And, Mr. Chairman, thank you for allowing me to describe what we had previously discussed.

Senator SMITH. Mr. Chairman, if I may respond, I'd be happy to introduce a bill with Senator Dorgan to codify the Powell Principles.

Senator DORGAN. Well, it's short of what we need to do, but I—you know, I think we can talk about that in the context of an Internet freedom bill and other things.

The CHAIRMAN. Thank you very much, Chairman Martin——

Mr. MARTIN. Thank you.

The CHAIRMAN.—appreciate your participation.

Our next panel, made up of the Vice President of Communications, Christian Coalition of America, Ms. Michele Combs; the Ex-

ecutive Director of the American Enterprise Institute, Center for Regulatory and Market Studies, Dr. Robert Hahn; the President of the Writers Guild of America, West, Mr. Patric Verrone; Actress, Writer, and Producer, Ms. Justine Bateman; the President and CEO, National Cable and Telecommunications Association, Mr. Kyle McSlarrow; and Professor Lawrence Lessig, of Stanford Law School.

[Pause.]

The CHAIRMAN. And the Chair recognizes Ms. Michele Combs.

Ms. Combs, welcome to the Committee.

STATEMENT OF MICHELE COMBS, VICE PRESIDENT OF COMMUNICATIONS, CHRISTIAN COALITION OF AMERICA

Ms. COMBS. Good morning, Mr. Chairman and distinguished members of the Committee on Commerce, Science, and Transportation. My name is Michele Combs, and I am the Vice President of Communications for the Christian Coalition of America. Thank you for inviting me to testify today.

Use of the Internet has allowed the Christian Coalition to amplify the voices of millions of hardworking pro-family Americans in a way that has revolutionized their ability to be heard and engaged in political process. Consequently, the reason the Christian Coalition supports net neutrality is simple. We believe that organizations such as the Christian Coalition should be able to continue to use the Internet to communicate with our members and a worldwide audience without a phone or cable company snooping in our communications and deciding whether to allow particular communication to proceed, slow it down, block it, or offer to speed it up only if the author pays extra to be on the fast lane.

Unfortunately, in the last 6 months we have seen network operators block political speech, block content, and block the most popular applications on the Internet. In every instant, the network operators have claimed that these actions were for network management purposes.

As you know, in October 2007 the news organization, Associated Press, reported that Comcast was blocking consumers' ability to download the King James Bible using a BitTorrent technology. It has also been pointed out that Comcast's bad behavior just so happens to block access to video distribution applications that compete with Comcast's own programming. If Comcast were to create a Christian family channel, would the FCC allow it to block access to a competing product from the Christian Coalition that was distributed by a BitTorrent application?

I have heard the cable companies argue that network neutrality rules would prevent them from protecting consumers from child pornography and other illegal content. I am not a network engineer, but it is my understanding that every major net neutrality proposal would allow the network operators to block illegal content. No one I know opposes that. The cable companies' argument is disingenuous, and, frankly, it offends me, and I respectfully suggest that it ought to offend you.

Right now, the cable companies are not subject to network neutrality regulation, yet family groups continue to criticize the amount of pornography that cable companies make available on

their systems, and even profit from. Yet, the cable industry would have us believe that if you impose network neutrality rules, suddenly they're going to try and block illegal content, but would be hindered. Let's remember, it was the King James Bible that Comcast blocked, which caused the current controversy.

At the FCC hearing in Palo Alto last week, one witness noted that if Comcast removed just two pay-per-view pornography channels and allocated that space for the public Internet, it would solve their so-called bandwidth problems. Why do you think the pornography industry has not supported network neutrality? Arguably, any unsavory producer of content should be worried that its content could be disadvantaged in a non-neutral network. I suggest that the answer is, the pornography industry knows that it will be able to pay premium prices to be on the fast lane, with exceptional quality of service provided by the cable industry. You know who won't have the deep pockets to compete in this non-neutral world? Nonprofit family organizations like the Christian Coalition.

The Christian Coalition does not seek burdensome regulations. We generally believe that less government is better than more government, and we do not believe that government should censor speech. But, let's be clear, right now the telephone and cable companies are investing in and using the exact same censorship and content discrimination technologies that are being used by the Chinese government to censor speech. In fact, the Chinese government is currently using the same technologies to block the Christian Coalition's speech from being received by its citizens. The FCC should make it clear that it will not allow cable and phone companies to use these technologies to block the lawful speechwriters of the Christian Coalition and others.

Increasingly, faith-based groups are turning to the Internet to promote their political rights to engage in what Ronald Reagan called "the hard work of freedom." We should not let the phone and cable companies interfere with that work. We should all try to make the Internet a safe environment for our future, our children, and our grandchildren.

[The prepared statement of Ms. Combs follows:]

PREPRARED STATEMENT OF MICHELE COMBS, VICE PRESIDENT OF COMMUNICATIONS, CHRISTIAN COALITION OF AMERICA

Good morning, Mr. Chairman and distinguished members of the Committee on Commerce, Science, and Transportation, my name is Michele Combs, and I am the Vice President of Communications for the Christian Coalition of America. Thank you for inviting my organization to testify at this hearing on the "Future of the Internet."

The Christian Coalition of America is the largest and most active conservative grassroots political organization in the United States. We offer people of faith a vehicle to be actively involved in shaping their government. Christian Coalition of America is a political organization, which is made up of pro-family Americans who care deeply about becoming active citizens for the purpose of guaranteeing that government acts in ways that strengthen, rather than threaten, families.

Our hallmark work lies in voter education. Prior to the last election, the Christian Coalition of America distributed a record 70 million voter guides throughout all 50 states. These non-partisan guides gave voters a clear understanding of where various candidates stood on the issues important to them. With this knowledge, millions of voters went to the polls to make their voices heard.

Use of the Internet has allowed the Christian Coalition to amplify the voices of millions of hard-working, pro-family Americans in a way that has revolutionized their ability to be heard and to engage in the political process.

The Internet connects people all over the world in a manner, scope, and ease of use that would be impossible anywhere but online. It provides a voice for even the most modest members of society to disseminate ideas on a scale traditionally reserved only for the most powerful.

Consequently, the reason the Christian Coalition supports Net Neutrality is simple. We believe that organizations such as the Christian Coalition should be able to continue to use the Internet to communicate with our members and with a worldwide audience without a phone or cable company snooping in on our communications and deciding whether to allow a particular communication to proceed, slow it down, block it, or offer to speed it up if the author pays extra to be on the "fast lane."

Unfortunately, in the last 6 months, we have seen network operators block political speech, block content, and block the most popular applications on the Internet. In every instance, the network operators have claimed that these actions were for "network management" purposes.

Verizon Wireless Blocking Political Speech. Last fall, Verizon Wireless censored text messages sent by the pro-choice advocacy group, NARAL, to its own members who had voluntarily signed up to receive them. When NARAL protested, the phone company claimed the right to block any content "that, in its discretion, may be seen as controversial or unsavory." When this did not satisfy the concerned, Verizon Wireless said not to worry, because the company would also block the speech of pro-life advocates such as the Christian Coalition.

After news of Verizon's censorship hit the front-page of the *New York Times*—sparking a loud public outcry—the company quickly backpedaled, issuing an apology and blaming the blocking on a "dusty internal policy,"—while still reserving the right to block text messages in the future at its own discretion.

AT&T Blocking Political Speech. In August 2007, AT&T censored a webcast of a concert by the rock band Pearl Jam just as lead singer Eddie Vedder started talking about politics. The company claimed it was a glitch—as were at least three other instances when AT&T cutoff political speech during live concerts.

Comcast Blocking Access to the King James Bible. In October 2007, the news organization Associated Press reported that Comcast was blocking consumers' ability to download the King James Bible using a popular file-sharing technology. Comcast at first denied that it was engaging in such discrimination. After independent tests confirmed that Comcast was indeed engaging in this behavior, Comcast claimed that it was simply conducting routine network management. This "routine network management" has launched two petitions at the Federal Communications Commission, a consumer complaint at the FCC, at least two class action lawsuits, an investigation by a state attorney general, and countless complaints in the blogosphere. Yet Comcast continues to argue it has the right to discriminate against such applications. It is my understanding that it now argues that the FCC has no legal authority to do anything about it. And, I understand that some cable companies have argued to the FCC that not even Congress has the Constitutional authority to protect consumers from such bad behavior.

It has also been pointed out that Comcast's discriminatory conduct just so happens to block access to video distribution applications from companies like Vuze that compete with Comcast's own programming.

If Comcast were to create a Christian family channel, would Washington allow it to block access to competing programming distributed through the Christian Coalition website?

While the cable companies complain to the FCC about their rights to "manage their network" without interference, I ask you to consider the speech and commerce rights of organizations like the Christian Coalition, NARAL, consumer groups, technology companies, and millions of users of the Internet.

I have heard the cable companies argue that network neutrality rules would prevent them from protecting consumers from child pornography and other illegal content. I am not a network engineer, but it is my understanding that every major net neutrality proposal, including legislation offered by Senators Dorgan and Snowe, would allow the network operators to block illegal content. No one I know opposes that.

It seems that the cable companies' argument that they are merely engaging in "legitimate network management" is disingenuous, and frankly it offends me. And I respectfully suggest that it ought to offend the Committee.

Right now, the cable companies are not subject to a network neutrality regulation, yet family groups continue to criticize the amount of pornography that cable companies make available on their systems and even profit from. Yet, the cable industry would have us believe that if you impose network neutrality rules, it will suddenly clean up the Internet?

Let's remember, it was the transmitting of the King James Bible that Comcast blocked, which caused the current controversy. It was not as if the company was trying to protect consumers from inappropriate content.

Why do you think that the pornography industry has not supported net neutrality? Arguably, any unsavory producer of content should be worried that its content could be disadvantaged in a non-neutral network. I suggest that the answer is that the pornography industry knows that it will be able to pay premium prices to be on the fast lane with exceptional quality of service provided by the cable industry.

You know who won't have the deep pockets to compete in this non-neutral world of special deals? Non-profit, family organizations like the Christian Coalition.

The Christian Coalition does not seek burdensome regulations. We generally believe that less government is better than more government. And, we do not believe that governments should censor speech. But let's be clear. Right now, the telephone and cable companies are investing in and using the exact same censorship and content discrimination technologies that are being used by the Chinese government to censor speech.

In fact, the Chinese government is currently using these same technologies to block the Christian Coalition's speech from being received by its citizens. The Christian Coalition is merely asking Congress to create simple rules of the road that make it clear that it will allow cable and phone companies to block the lawful speech rights of the Christian Coalition and others.

Increasingly, faith-based groups are turning to the Internet to promote their political rights, to engage in what Ronald Reagan called "the hard work of freedom." We should not let the phone and cable companies interfere with that work.

The CHAIRMAN. Thank you very much, ma'am.

Dr. Hahn?

STATEMENT OF ROBERT W. HAHN, PH.D., EXECUTIVE DIRECTOR, CENTER FOR REGULATORY AND MARKET STUDIES, AMERICAN ENTERPRISE INSTITUTE

Dr. HAHN. Thank you, Chairman Inouye and Ranking Member Stevens and distinguished Members of this Committee. I am pleased to appear before you today to present my views on a small subject: The Future of the Internet.

I'm an economist who has studied regulation for more than 25 years. I now direct the AEI-Reg Markets Center. I've also served on the faculties at Harvard and Carnegie Mellon.

Most of you saw "The Graduate," in which Dustin Hoffman was told, in one word, the key to the future: plastics. Well, at the risk of making a similar mistake, I want to leave you with two words today: pricing freedom.

Let me begin with a fictional story about the importance of "pricing freedom." Imagine there was a firm named Oogle, and it wanted to bring together sellers and consumers on the Net through text advertising. The only problem was that Oogle had to figure out a way to make money to invest the billions needed to bring all these folks together and to become a leader in Internet search.

Oogle's insight was to charge advertisers a penny each time a consumer clicked on an Internet ad, and charge consumers zero. This was brilliant, and Oogle revolutionized the Internet, as we know it, and made lots of money.

But, now imagine, in the interest of so-called "advertiser neutrality," the advertisers effectively lobbied Congress to stop Oogle from charging them and only charged consumers instead. Would we have the Internet, as we know it? I seriously doubt it.

Oogle was successful, in part, because it was given the pricing freedom to figure out what economic model would work best for

consumers, sellers, and itself. The same logic holds true in the world of net neutrality.

Net neutrality is a policy proposal that would regulate how network providers manage and price the use of their networks. While the concept sounds great, I believe that it is downright dangerous.

Proposed legislation would mandate that Internet service providers exercise no control over the content that flows over their lines, and would bar those providers from charging content providers for certain enhancements, such as priority delivery, like FedEx offers. Applications ranging from telemedicine to online games could be jeopardized by such regulation.

The AEI-Brookings Joint Center issued a position paper on net neutrality, signed by 17 distinguished economists, and I'd like to discuss two of our recommendations.

First, firms should be allowed to experiment with different pricing schemes for providing Internet access, just like the hypothetical company Oogle did. One key advantage of giving Internet service providers pricing flexibility is that it gives them an incentive to lower broadband access prices for consumers, a point several legislators seem to have missed. A second advantage is that it gives them an incentive to develop enhanced service offerings that will enable realtime applications to flourish.

Our second recommendation was that Congress and Federal regulators should promote policies that foster Internet innovation. One such policy is spectrum liberalization. Highspeed Internet that uses wireless networks may be the next big thing. The FCC should make additional licensed spectrum available for flexible use as soon as possible so these networks can be improved.

Both Congress and the FCC should refrain from imposing special conditions on spectrum licenses, such as the recent openness requirement that was introduced in the last FCC auction. This requirement would allow third parties with wireless applications to piggyback on a licensee's network at no charge. While openness, like net neutrality, may sound good, the cost of mandatory openness for end users is likely to be significant and has never been compared against the benefits.

My bottom line is that the issues raised in the net neutrality debate can be effectively addressed by allowing Internet pricing freedom, fostering more efficient use of spectrum, and using antitrust authority where appropriate.

Allowing pricing freedom is likely to be the best way to ensure efficient innovation on the information superhighway.

Thank you very much.

[The prepared statement of Dr. Hahn follows:]

PREPARED STATEMENT OF ROBERT W. HAHN,* EXECUTIVE DIRECTOR, CENTER FOR REGULATORY AND MARKET STUDIES, AMERICAN ENTERPRISE INSTITUTE

1. Introduction

I am pleased to appear before this Senate Committee to present my views on the future of the Internet. I have studied and written about regulation for more than

*Robert Hahn is Executive Director of the Reg-Markets Center and a senior fellow at AEI, and a non-resident senior fellow at Brookings. He would like to thank Caroline Cecot and Molly Wells for research assistance. This testimony builds on research that I have done with a number of colleagues, including Robert Crandall, Robert Litan, Hal Singer, and Scott Wallsten. The

two decades. I also have done a great deal of work on telecommunications and Internet regulation.[1]

About a decade ago, I helped organize a cooperative effort between the American Enterprise Institute and the Brookings Institution to study regulation. The result was the AEI-Brookings Joint Center for Regulatory Studies, which I directed. I now direct the AEI Center for Regulatory and Market Studies, which is the successor to the Joint Center.[2]

A primary objective of the center is to hold lawmakers and regulators more accountable by providing thoughtful, objective analysis of existing regulatory programs and new regulatory proposals. The Reg-Markets Center and the Joint Center have been at the forefront of outlining principles for improving regulation and enhancing economic welfare.[3]

In its short history, the Internet has grown at an astounding pace. This growth is seen in the bandwidth consumed by the video sharing site YouTube. By some estimates, YouTube consumed as much bandwidth in 2007 as the entire Internet combined in 2000![4]

That growth is expected to continue. Traffic on the Internet is expected to nearly double every 2 years.[5] Much of this growth will be driven by peer-to-peer network traffic, which is expected to quadruple by 2011.[6] Internet traffic will also continue to grow as high-definition video and other traditional commercial video services are delivered via IP within a single network.[7] Consumer video services are expected to grow from 18 percent of consumer Internet traffic to 43 percent.[8]

Since I only have 5 minutes, let me cut to the chase. As America's lawmakers, you have the ability to dramatically affect the future of Internet growth and innovation.

That's both good news and bad news. The good news is that if you choose policies wisely, and regulate with a very light hand, we will continue to enjoy the immense benefits that this medium has offered all of us. If, on the other, you choose policies that dramatically interfere with the workings of the marketplace, you could significantly reduce the pace of Internet innovation, leading to losses for consumers that could be in the billions of dollars. Applications ranging from telemedicine to online

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views expressed in this paper reflect solely those of the author and do not necessarily reflect those of the institutions with which he is affiliated.

[1] *See* William J. Baumol *et al., Economists' Statement on Net Neutrality* (AEI-Brookings Joint Center for Regulatory Studies, Related Publication No. 07–08, 2007) [hereinafter Baumol et al.]; Elizabeth E. Bailey *et al., Economists' Statement on U.S. Broadband Policy* (AEI-Brookings Joint Center for Regulatory Studies, Related Publication No. 06–06, 2006) [hereinafter Bailey et al.]; Robert Hahn & Scott Wallsten, *The Economics of Network Neutrality,* 3 THE ECONOMISTS' VOICE, n. 6, article 8 (2006); Robert Hahn & Robert Litan, *The Myth of Network Neutrality And The Threat to Internet Innovation,* MILKEN INST. REV. 28, First Quarter (2007); Robert Hahn *et al., The Economics of Wireless Net Neutrality,* 3 J. COMPETITION L. & ECON. 399, n. 3 (2007); Robert Hahn & Anne Layne-Farrar, *Is More Government Regulation Needed to Promote E-commerce?,* 35 CONN. L. REV., n. 1 (2002); Robert Hahn & Anne Layne-Farrar, *The Law and Economics of Software Security,* 30 HARV. J. L. & PUB. POL'Y 284, n. 1 (Fall 2006); Robert Hahn *et al., Bandwidth for the People,* 127 Pol'y Rev. 67, (October/November 2004).

[2] All Reg-Markets Center and Joint Center publications can be found at *http://www.reg-markets.org.*

[3] *See* Arrow *et al., Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?,* 272 SCIENCE 1569, n. 5268 (1996).

[4] Steve Lohr, *Video Road Hogs Stir Fear of Internet Traffic Jam,* N.Y. TIMES, Mar. 13, 2008, at 1.

[5] Cisco Systems White Paper, *Global IP Traffic Forecast and Methodology, 2006–2011,* Jan. 14, 2008, at 1, available at *http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/net implementation white paper0900aecd806a81aa.pdf* ("After a brief mid-decade slowdown, IP traffic will nearly double every 2 years through 2011. Total IP traffic will nearly quadruple in the four-year period from 2007 to 2011." at 1. "Consumer IP traffic generated by the transport of cable and IPTV video-ondemand (VoD) content will grow faster than consumer Internet traffic.").

[6] *Id.* at 2 ("Peer-to-peer traffic still dominates Internet traffic and growth is not slowing. traffic is not expected to decrease over the forecast period. Instead, it will nearly quadruple from 1,330 petabytes per month in 2006 to 5,270 petabytes per month in 2011, driven by the global increase in high-speed broadband penetration, the increasing use of peer-to-peer for standard-definition video file exchange, and the advent of high-definition video file exchange and television content via peer-to-peer.").

[7] *Id.* at 1 ("Consumer IP traffic generated by the transport of cable and IPTV video-on-demand (VoD) content will grow faster than consumer Internet traffic. Consumer IPTV and IP VoD traffic will grow at a CAGR of 81 percent, while consumer Internet will grow at a rate of 42 percent.").

[8] *Id.* ("In 2011, only 57 percent of consumer IP traffic will be Internet traffic, while 43 percent will be traffic generated by the delivery of traditional commercial video services over IP within a single operator's network. This is a dramatic shift from the composition of 2006 consumer IP traffic, over 82 percent of which is Internet traffic.").

games could be jeopardized by regulation that seeks to bar contracting for prioritized delivery—a critical ingredient for these applications to run effectively. Without the ability to set prices freely, these applications, along with their associated benefits for the economy, may never be introduced. But, fortunately, you have the opportunity to make wise choices.

So how to choose policies wisely, some of you may ask? That is a good question, and one that I would like to focus on today. I am an economist, so my basic answer is that you need to look carefully at the benefits and costs of various policy interventions, and choose those for which you believe the benefits are likely to exceed the costs.

In the interest of time, I would like to focus my remarks on the issue of net neutrality. I will conclude with a couple of observations about the current controversy over network management, which is related to the net neutrality issue.

2. Network Neutrality [9]

Network neutrality is a policy proposal that would, among other things, regulate how network providers manage and price the use of their networks.

Net neutrality proponents assert that if Internet service providers are allowed to charge content providers for enhanced service offerings, those content providers that cannot afford the "toll" will be forced to exit—thus impairing innovation at the "edges" of the Internet. In contrast, net neutrality opponents suggest that allowing experimentation with new business models is the key to: (1) Internet innovation at both the "core" and the "edge" of the network, and (2) the deployment of more intelligent networks needed to handle rapidly growing Internet traffic.

Congress has introduced several bills on network neutrality over the last few years.[10] Proposed legislation generally would mandate that Internet service providers exercise no control over the content that flows over their lines, and would bar service providers from charging content providers for certain enhancements such as prioritized delivery. For example, senators Byron Dorgan and Olympia Snowe introduced network neutrality legislation in 2006 and again in 2007, which, had it passed, would have prevented any contracting between access providers and content providers.[11] Several scholars have uncovered the unintended consequences of such a prohibition, including higher prices of Internet service for end users and decreased innovation in application markets.[12]

These proposals must be considered carefully in light of the underlying economics. My basic concern is that most proposals aimed at implementing net neutrality are likely to do more harm than good.

Analysis

Regulation of prices and services has often resulted in costs that exceed benefits, especially in competitive markets. Highly dynamic markets, such as those for high-speed Internet services, pose particular problems because they change so quickly. In such dynamic markets, it is difficult for regulators to determine appropriate prices because technology and consumer demands are difficult to forecast; and introducing price regulation risks discouraging the healthy process of risk-taking innovation—which is especially important in telecommunications.

The market for high-speed Internet services, or broadband, is the key concern. Before jumping to conclusions about market power, one should look carefully at the data. And the data suggest that there is robust and growing competition in the market for highspeed Internet services in both the wireline and wireless space. Prices for digital subscriber line service dropped by roughly one-third between 2001 and 2006. In the case of cable modem service, the quality-adjusted price declined significantly, as cable connection speeds increased significantly while prices held steady. In March of this year, the FCC reported that high-speed lines increased by 22 percent during the first half of 2007, from 82.8 million to 100.9 million lines in service, following a 27 percent increase, from 65.3 million to 82.8 million lines, during the second half of 2006.[13] Virtually the entire U.S. population lives in a zip code where a high-speed service provider operates, and numerous service providers compete in the major population centers. And this is to say nothing of the boom in handheld devices, like blackberries, that provide wireless access to the net.

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[9] This section draws heavily on the AEI-Brookings net neutrality statement. *See* Baumol *et al., supra* note 1.

[10] H.R. 5273, 109th Cong. § 2(10) (2006). S. Res. 2360, 109th Cong. § 4(a)(6) (2006).

[11] *Dorgan, Snowe Take Another Stab at Net Neutrality Legislation,* TR Daily, Jan. 9, 2007.

[12] *See, e.g.,* Robert Litan & Hal J. Singer, *The Unintended Consequences of Net Neutrality,* 5 Journal on Telecommunications and High Tech Law 533 (2007).

[13] FCC, High-Speed Services for Internet Access as of June 30, 2007, released March 2008.

In most, but not all, cases, I believe these markets are workably competitive. Moreover, even if some service providers could exercise some market power, the multi-sided nature of the market and the geographic scope of most Internet content means that they still have powerful incentives not to block content. In particular, providers need content in order to attract subscribers. If a provider restricted access, its product would be less valuable and attract fewer subscribers. The point is that even firms with market power in one part of the market will not necessarily be able to control content.

Recommendations

I offer two recommendations related to pricing flexibility and facilitating more competition.

Recommendation 1: Firms should be allowed to experiment with different pricing schemes for providing Internet access.

One advantage of giving Internet service providers pricing flexibility is that it will give them incentives to make new investments in network intelligence, which will support a range of real-time applications from telemedicine to online games. Without such innovations, these real-time applications may never see the light of day.

Another advantage of pricing freedom is that it can lead to lower subscription prices for end users. Most economic models of "two-sided platforms" show that platform owners have strong incentives to subsidize the most price-sensitive customers, which in this case would be end users.

There is not one right way to charge different customers in these high-speed markets. That is precisely why broadband providers should be allowed to charge market prices on *both* sides of the market, unless there is a clear showing that the optimal pricing policy from the perspective of platform owners is not consistent with the socially optimal pricing policy. Not only do we lack empirical proof of this proposition, there does not appear to be any theoretical basis.

Recommendation 2: Congress and Federal regulators should promote policies that increase the opportunities for competition and foster Internet innovation. One such policy would be spectrum liberalization.

High-speed Internet connections may be provided using wireless networks. Much valuable spectrum, however, is not available for its most productive uses. The Federal Communications Commission should make additional licensed spectrum available for flexible use as soon as possible and allow it to be traded so that spectrum can be allocated to its highest-valued applications.[14]

Both Congress and the FCC should refrain from imposing special conditions on spectrum licenses, such as the recent openness requirement that was introduced in the last FCC spectrum auction for certain licenses. This requirement would allow third-parties with wireless applications to piggyback on the licensee's network at no charge. While openness may sound good, the cost of mandatory openness is significant, and to this day, has never been compared against the benefits.

One measure of the size of the costs imposed by an open-platform requirement is provided by the recent FCC spectrum auction itself. Bidders offered less for the C-block than for other, roughly comparable spectrum. Indeed, one other block went for almost triple the price per potential customer.[15] Multiplying these price differences by the population in the United States (286 million) and the size of the C block (22 megahertz), we can infer that bidders estimated that the openness requirement would reduce the value of the C block by between $2.5 billion and $12 billion. That lower value translates into lower auction revenue, which from a pure budgetary perspective, is not good news for taxpayers.

3. Network Management

The issue of managing high-speed Internet networks has been in the news lately. Congressman Ed Markey introduced the "Internet Freedom Preservation Act of 2008."[16] At about the same time, the Federal Communications Commission held hearings at Harvard to consider whether network management practices of Internet providers should be regulated in some way. The Commission released a policy statement promoting open access to the Internet. The policymakes an exception for "reasonable" network management, but does not define what is meant by reasonable.

A key catalyst for the interest in this seemingly arcane subject is the recent controversy stemming from Comcast's decision to limit its customers' use of BitTorrent,

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[14] *See* Bailey *et al., supra* note 1.

[15] Spectrum in the A block sold for about $0.40 per "megahertz-pop" (a measure of spectrum quantity adjusted for the potential population it can serve) than spectrum in the C block. Similarly, B-block spectrum sold for an average of $1.91 more.

[16] See Robert Hahn, *The Internet Freedom Act* (Reg-Markets Center, Policy Matters No. 08–03, 2008) for an analysis of this proposal.

a file-sharing application. Most scholars agree that a firm like Comcast should not be allowed to simply disconnect a user from the network, or slow the delivery of content, unless the firm and user agreed to those contract terms upfront.

But a funny thing happened recently in this controversy that should give lawmakers and regulators reason for optimism in the marketplace. That funny thing was that Comcast and BitTorrent came to an agreement. Comcast also reached an agreement with Pando Networks, the leading managed peer-to-peer content delivery service, which will lead to the creation of a peer-to-peer "Bill of Rights and Responsibilities" for peer-to-peer users and Internet service providers. Such agreements provide a path for resolving thorny network management issues in a voluntary and collaborative market-driven process.

Conclusion

The issues raised in the net neutrality and network management debates can be effectively addressed by using antitrust authority where appropriate, allowing Internet pricing flexibility, and fostering more efficient use of spectrum to facilitate entry into the broadband market.

My basic message is that government should allow firms to experiment with different business models for Internet services. Allowing such market flexibility is likely to be the best way to ensure efficient innovation on the information superhighway.

The CHAIRMAN. I thank you very much, Dr. Hahn.

And now may I call upon Mr. Verrone.

STATEMENT OF PATRIC M. VERRONE, PRESIDENT, WRITERS GUILD OF AMERICA, WEST

Mr. VERRONE. Thank you, Chairman Inouye, Vice Chairman Stevens, members of the Committee, all of you. My name is Patric Verrone. I am the President of the Writers Guild of America, West. We represent nearly 8,000 writers of motion pictures, broadcast and cable television shows, and, as of a few weeks ago, new media. And the question is asked, "Who writes this stuff?" the answer is, for better or for worse, "We do," including "The Graduate."

[Laughter.]

Mr. VERRONE. I had hoped to bring some of the Southern California weather with me, but it appears its flight was delayed. This is not a problem for today's hearing.

We are here to talk about the subject of the future of the Internet. As you know, we at the Writers Guild recently completely a 100-day strike over the place of entertainment writers in that future. Also, I believe, I am the only panelists to have written a feature film scrip about a robot poker tournament in space Vegas in the year 3009, so I think my expertise on the future is unquestionable.

[Laughter.]

Mr. VERRONE. Future of the Internet—thank you for laughing—the future of the Internet is a cautionary tale. I begin by invoking the Ghost of New Media Past. It is, of course, April, so, naturally, Dickens' "Christmas Carol" comes to mind.

A hundred years ago, new media was motion pictures; 75 years ago, radio; 50 years ago, it was broadcast television. I started working in the entertainment industry about 22 years ago, writing for Johnny Carson. And, like other 7-year-olds at the time, I saw almost 30 separate companies independently producing and distributing television on the new media of cable TV. Yet, today we are down to about seven vertically integrated conglomerates controlling, not only cable TV, but also broadcast TV, film, radio, and even the news. Concentration of power was triggered by a series of pol-

icy choices; most recently, about 15 years ago, when the FCC began a process of unraveling the financial and syndication rules of FIN–SYN, allowing production and distribution to be jointly owned. As a result, media companies have consolidated, conglomerated, and congealed into a handful of multinational entities that today employ nearly everyone working in our industry.

The axiom in Hollywood is that content is king, but those who control access to the king control the kingdom. Because of Federal regulations, or lack thereof, that control is in the hands of neither the consumer-viewer nor the content creators, but, rather, the distributors.

Which bring us to the Ghost of New Media Present; namely, the Internet. The jurisdiction and compensation for our content on the Internet was what we fought for and won in our recent strike. But, what was most notable about the strike was not what we won; rather, how we won it. We used the Internet to win the Internet. When traditional media is in the hands of the same corporations that employ you, it's a little hard to get your message out. We had 4,000-person rallies that got less and later coverage on the local news than a dog wedding.

As such, the Internet proved to be a powerful tool for communication. E-mails, blogs, Websites, podcasts, video clips were passed along the Net, giving our members updates and informing the world about our cause. In an era of so-called "reality television" and user-generated content, the studios had hoped to show that they could create programming without writers, yet the strike proved that we could use the Internet to create programming without the studios.

The Internet holds incredible potential to resurrect a vibrant industry of independent creators with free access to, and distribution of, democratic, with a small "d," content.

And so, we look to the Ghost of New Media Future. Will the Internet's open and free-speech forum be turned into a walled garden of content control? Will entertainment information and marketing platforms be available to all, or just to those who can afford to pay for them? Will the new media be dominated by the gatekeepers that dominated the old media, be they multinational monopsonies of TV and film or regional duopolies of cable and television service? Stay tuned. Hopefully, there is a happy ending, one which is open to diverse, independent, and original voices and visions, where consumers can pick and choose for themselves the content and services they want, where content is king, and the king roams free.

This future, we believe, relies on net neutrality. The policy decisions that triggered the consolidation of old media have not yet been made for new media. There is still time to protect the rights of content producers and consumers. We need to dethrone the gatekeepers and once more make content king.

We, at the Writers Guild, West, believe that the Internet Freedom Preservation Act ensures that future. We support it. We also support public investment in the broadband networks. The show must go on, and it must be taken on the road.

In an industry filled with oxymoron, from jumbo shrimp to Hollywood accounting, we believe we must win a fight for neutrality.

I will reserve the rest of my time if any of you have any screen plays that you'd like me to read.

[Laughter.]

[The prepared statement of Mr. Verrone follows:]

PREPARED STATEMENT OF PATRIC M. VERRONE, PRESIDENT, WRITERS GUILD OF AMERICA, WEST

Thank you Chairman Inouye, Vice Chairman Stevens, and members of the Committee.

My name is Patric M. Verrone, and I am the President of the Writers Guild of America, West. We represent nearly 8,000 writers of motion pictures, broadcast and cable television shows, and, as of a few weeks ago, new media.

Thank you for inviting me to speak on the subject of "The Future of the Internet." As you know, we recently completed a 100-day strike over the place of entertainment writers in that future. Also, I believe I am the only panelist to have written a film about a robot poker tournament in space Vegas in the year 3009 so I think my expertise in the area is unquestionable.

The future of the Internet is a cautionary tale. I begin by invoking the ghost of new media past. A hundred years ago, that was motion pictures. Fifty years ago, it was broadcast television.

I started working in the entertainment industry 22 years ago. Almost thirty separate companies independently produced and distributed television on the "new media" of cable TV. Today we are down to about seven vertically integrated conglomerates, controlling not only cable TV, but also broadcast, film, and even news.

This concentration of power was triggered by a policy choice. About 15 years ago, the fcc began the process of unraveling the financial and syndication rules (or FIN–SYN) allowing production and distribution to be jointly owned.

As a result, media companies consolidated, conglomerated, and congealed into the handful of multinational entities that today employ nearly everyone working in our industry and decimating independent production and content diversity.

The axiom in hollywood is that "content is king" but those who control access to the king, control the kingdom. Because of Federal regulations—or lack thereof—that control is in the hands of neither the consumer nor the content creators, but the distributors.

This brings us to new media present—namely, the Internet.

Jurisdiction and compensation for our content on the Internet was what we fought for—and won—in our strike. What was most notable about our strike was not what we won, but how we won.

We used the Internet to win the Internet.

When traditional media is in the hands of the same corporations that employ you, it's hard to get your message out. We had four thousand attend rallies that got less—and later—coverage on the local news than a dog wedding.

As such, the Internet proved to be a powerful tool for communication. E-mails, blogs, websites, podcasts, and video clips were passed along on the net, giving our members updates and informing the world about our cause.

Through the "speechless" campaign, a series of online videos in which no words were spoken, the public saw the crucial role writers play in media creation.

In an era of so-called reality television and user-generated content, the studios hoped to show that they could create programming without writers, but the strike proved only the opposite: that writers could create programming without studios.

The Internet holds incredible potential to resurrect a vibrant industry of independent creators with free access to, and distribution of, democratic (with a small d) content.

And so we look to the new media of the future.

Will the Internet's open and free speech forum be turned it into a walled garden of content control? Will entertainment, information, and marketing platforms be available to all or just those who can afford to pay for them? Will the new media be dominated by the gate keepers that dominate the old media (be they multinational monopsonies of TV and film or regional duopolies of cable and telephone service)?

Thankfully, there is a happier ending. One which is open to diverse, independent, and original voices and visions. Where consumers can pick and choose for themselves the content and services they want. Where content is king, and the king roams free.

But this future relies on "net neutrality."

The policy decision that triggered the consolidation of old media has not yet been made for new media. There is still time to protect the rights of content producers and consumers. We need to establish clear net neutrality rules to ensure that the Internet remains a level playing field for all. We dethrone the gatekeepers and once more make content king.

We at the writers guild west believe that the Internet freedom and preservation act ensures that future and we support it.

In an industry filled with oxymorons from jumbo shrimp to Hollywood accounting, we must win the "fight for neutrality."

The CHAIRMAN. I thank you very much.

Now may I recognize Ms. Bateman.

STATEMENT OF JUSTINE BATEMAN, ACTRESS, WRITER, PRODUCER AND CO-FOUNDER, FM78.tv

Ms. BATEMAN. Thank you, Chairman Inouye, Vice Chair Stevens, and other members of the Committee. I want to thank you for your service to this country, first of all, and I'm honored to be asked to testify today.

Net neutrality and an open online marketplace are critical to the future of the Internet and to the preservation of our rights. My name is Justine Bateman, and I am an actress, writer, and producer. I've acted in many projects, from TV's "Family Ties" to, more recently, "Desperate Housewives," and am a founding partner of FM78.TV, a new online media venture.

When I started acting, in the early 1980s, creativity in TV and film was still rampant, and the innovation of ideas and performance were exalted. The demise of this creative setting is directly proportional to the increase of media consolidation, which is, in large part, due to the repeal of the financial interests and syndication rules. Now we have too many executives, too many notes, until there is no artistic voice, no point of view, and little entertainment value left in the projects we work on. On top of this, there are fewer jobs.

In today's TV market, a show like "Family Ties" would never make it to TV. Media companies not only have a monopoly over distribution, but they insist on ownership and control of content which strongly interferes with the production of high-quality creative product.

Corporate consolidation has actually pushed the audience away from the traditional media outlets and driven them to the Internet and videogaming world. In May 2007, the online video market reached 8 billion streams. Download revenue from TV and film is expected to reach $3 billion in 2010. And gaming reported a $17.9-billion revenue in 2007. This is why, a few months ago, I, along with three other content creators, started FM78.TV to make and distribute professional high-quality content directly for the Internet. We hope we can find a faithful audience online, as other Internet innovators have, and not be stymied by a private taxation, if you will, by the telecom companies.

The Internet has been defined by innovation. The Internet itself was a product of American innovation. Google was created, as has been said, in a garage, by two college students; eBay was created by a hobbyist. How successful might those two sites have been without the freedoms we enjoy on the Internet today?

In entertainment, I believe we're on the verge of a creative renaissance, and the Internet is the grid upon which the renaissance can rest, because, unfortunately, the business grid of TV and film today cannot support that. Traditional media is now like a swimming pool over which a pool cover has been placed, causing those wild ducks that used to swim around at night in your pool to go elsewhere. And that's a true story about my pool, and I'm sorry we don't see those ducks anymore. Those ducks, I'm sure, have now found an open body of water in which to swim, much like we content creators have found open distribution on the Internet. And the idea of your site succeeding or failing being based on whether or not you pay the telecom companies enough to carry your material or to allow quick access is appalling. And, honestly, I can't help but think of extortion when I imagine that kind of arrangement.

Net neutrality will allow for we, creators, to continue owning and controlling our content in a way we have not been able to since the repeal of the financial and syndication rules of our industry. A whole new class of small-business owners will emerge, providing thousands of new jobs in a sector that desperately needs them. And with innovation comes competition, and net neutrality would ensure a level playing field for that.

I've heard the arguments against net neutrality. First and foremost, I do not believe that net neutrality is government regulation. By requiring the telecom companies to allow access and to not discriminate against any legal content on the Internet, the government is clearly stating its intention for all Americans to continue to freely access content on the Web.

And, second, piracy is obviously a major problem around the world. And, of course, the Internet has exacerbated the problem of illegal downloading. I applaud the work of the MPAA, the copyright allowance, and others to ensure creators are protected. I understand the threat of piracy, that the content I create can be stolen. All new-content creators understand this. But, the solution is not in establishing new rules that may prevent me from competing at all. Instead, let the market continue to find solutions, such as digital watermarking, and define ways to generate income from sponsors that decrease the financial problems of piracy, but does not restrict competition.

In conclusion, I want to tell you, I am a big fan of capitalism. I know these companies here want to make money, as do I. They are, after all, being responsive to their stockholders and their interests. But, trying to restrict Internet—constrict Internet access, I don't believe that's a viable revenue option.

And, frankly, not to steal any thunder from the Christian Coalition, but the idea of these corporations coming together to attempt to constrict access reminds me of the story of the Tower of Babel, where large forces conspired to unite and do what they pleased. The fear was that "now nothing they propose to do will be withheld from them." Well, we know how that story ended.

Frankly, I don't believe for a second, that any on this Committee really, truly want to block or constrict the flow of information, education, or creativity to the American people. And I hope your support of net neutrality will dramatically illustrate to the American public your continued support of their freedoms.

Thank you very much for your time and for the honor of addressing you.

[The prepared statement of Ms. Bateman follows:]

PREPARED STATEMENT OF JUSTINE BATEMAN. ACTRESS, WRITER, PRODUCER, AND CO-FOUNDER, FM78.TV

Thank you, Chairman Inouye, Vice Chair Stevens, and other members of the Committee. I first want to thank you for all your service to this country and I am honored to have been asked to testify today. Net neutrality and an open online marketplace are critical to the future of the Internet and to the preservation of our rights.

My name is Justine Bateman and I'm an Actress, Writer, and Producer. I have acted in many projects, from TV's "Family Ties' to more recently, "Desperate Housewives," and I am a founding partner of FM78.tv, a new on-line media venture.

When I started acting in the early 1980s creativity in TV and film was still rampant and innovation of ideas and performance were exalted. The demise of this creative setting is directly proportional to the increase of media consolidation, which is in large part due to the repeal of the financial interest and syndication rules. Now we have too many executives and too many notes given until there is no artistic voice, no point of view, and little entertainment value left in the projects we work on. On top of this there are fewer jobs. In today's TV market a show like Family Ties, may never make it to TV. Media companies not only have a monopoly over distribution, they then insist on ownership and control of content which strongly interferes with the production of hi-quality, creative product.

Corporate consolidation has actually pushed the audience away from the traditional media outlets and driven them to the Internet and video gaming world. In May 2007, the online video market reached 8 billion streams. Download revenue from TV and film is expected to reach $3 billion by 2010. And gaming has reported a $17.9 billion in revenue for 2007.

That is why a few months ago, I, along with three other content creators, started FM78.tv—to make and distribute professional, high-quality content directly for the Internet. We hope we can find a faithful audience on-line as other Internet innovators have and not be stymied by a private taxation, if you will, by the telecom companies. The Internet has been defined by innovation; the Internet itself was a product of American innovation. Google was created in a garage by two college students. EBay was created by a hobbyist. How successful might those two sites have been without the freedoms we enjoy on the Internet today?

In entertainment, I believe we are on the verge of a creative renaissance and the Internet is the new grid upon which this renaissance can rest, because unfortunately the business grid of TV and film today cannot support that. Traditional media is now like a pool over which a pool cover has been placed causing those wild ducks that used to swim around in your pool to go elsewhere. (True story about my pool. I'm sorry we don't see those ducks anymore.) Those ducks now I'm sure have found an open body of water in which to swim, much like we content creators have been found open distribution on the Internet. And the idea of your site succeeding or failing based upon whether or not you paid the telecom companies enough to carry your material or allow quick access is appalling. Honestly, I can't help but think of extortion when I imagine that kind of arrangement.

Net neutrality will allow for we creators to continue owning and controlling our content in a way that we have not been able to since the repeal of the financial and syndication rules. A whole new class of small business owners will emerge, providing thousands of new jobs in a sector that desperately needs them. And with innovation comes competition. Net neutrality would insure a level playing field for that.

I have heard the arguments against net neutrality.

First and foremost, net neutrality is NOT government regulation. By requiring the telecom companies to allow access and to not discriminate against any legal content on the Internet, the government is clearly stating its intention for all Americans to continue to freely access content on the Web.

Secondly, piracy is obviously a major problem around the world and of course the Internet has exacerbated the problem of illegal downloading. I applaud the work of the MPAA, the Copyright Alliance and others to insure creators are protected.

I understand the threat of piracy; that the content I create can be stolen. All new content creators understand this. But the solution is not establishing new rules that may prevent me from competing at all.

Instead, let the market continue to find solutions, such as digital watermarking, and to find ways to generate income from sponsors that decrease the financial problems of piracy but does not restrict competition.

In conclusion, I want to tell you that I am a big fan of capitalism. I know these companies here want to make money, as do I. They are after all being responsive to their stockholders and their interests. But trying to constrict Internet access? I don't believe that that is a viable revenue option. Frankly, and not to steal any thunder from the Christian Coalition, but the idea of these Corporations coming together to constrict access reminds me of the story of the Tower of Babel where large forces conspired to unite and to do what they pleased. The fear was that "now nothing they propose to do will be withheld from them." (Gen 11:4). Well, we all know how that story ended. Finally, I don't believe for a second that any of you want to block or constrict the flow of information, education, or creativity to the American people and I hope your support of net neutrality will dramatically illustrate to the American public your continued support of their freedoms. Thank you very much for your time and for the honor of addressing you all.

The CHAIRMAN. I thank you very much, Ms. Bateman.

Mr. McSlarrow?

STATEMENT OF KYLE MCSLARROW, PRESIDENT AND CEO, NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION

Mr. MCSLARROW. Thank you, Mr. Chairman and distinguished members of the Committee.

We've heard from several representatives of the content community, or those whose voices want to be heard. And I want to come back to that in a second. But, I do think, as many members have said in their opening statements, it's important to think about all of this from the perspective of the consumer.

When a consumer sits down in front of a computer and turns on their broadband service, what is it they actually experience, and what have they experienced over the last 5 years? Over the last 5 years, they sit down, it's always on, they have an increasing array of Websites, they have blog sites, they have social networking sites, they have all kinds of applications—obviously, we've talked about Google a number of times today—search engines, applications that people didn't even dream about. And when they sit down at that computer, it all just works. It's always on. It's there. People love their broadband service.

On the other side of that computer, it's the Wild, Wild West. You have spam, viruses, denial-of-service attacks. One my larger members defeats, every 2 days, a billion spam e-mails. And one of my smaller operators does a billion each month. You've got the problem, in certain areas of networks, where just a very few people are consuming such enormous amounts of bandwidth that it's actually slowing down the system for the vast majority of users. And it's a small enough number sometimes that network operators are actually on a first-name basis with these folks. You've got the emergence of peer-to-peer traffic, which—as I've said previously, technology is agnostic; it's not bad or good, it's the uses to which you put it. Peer-to-peer is often used by many of my companies who partner with peer-to-peer, but it's also an emerging engineering challenge that people are only coming to grips with, and you've got every network operator in the country—phone companies, cable companies, wireless operators—who are trying to manage congestion on the network, and trying to manage, particularly, peak congestion.

Now, I said I would come back to the idea of the voices that want to be heard. And, with all due respect, I've heard many statements—some today, and others before this hearing—that describe a world that is a complete fantasy. Every single person here has a blog or a Website or has content that has distribution and has enabled consumers, millions of them around this country, to enable that content. And no one is blocking them. The cable industry invested over $100 billion to provide this country's first nationwide broadband system. We are in front of 92 percent of American households. They don't all take it, but it's there.

We want as much content, we want as many applications to succeed as possible. That's what makes our broadband service attractive to consumers. And if we ever engaged in conduct that consumers were outraged about, they do have a choice: they can go somewhere else. There's at least a phone company, and usually there's a satellite provider, and now, with the spectrum being auctioned, there's going to be emerging wireless broadband services. We all know this.

At bottom, the debate that we've had today has been about whether or not network management, per se, is some nefarious practice that has anticompetitive overtones. First of all, let me just say, there is not just a little or a modest amount, there is zero evidence that any operator is engaging in anticompetitive conduct. The case just hasn't been made.

You can criticize, justly—and lots of people have—whether or not the network management techniques used today are the best ones. I think that's fine. I'm not the least defensive about it. And I should note that many telephone/cable operators, Internet applications, providers, peer-to-peer networks are coming together to try to see whether or not there are better ways of: (a) providing disclosure to consumers, and (b) developing new techniques. That's all good. But, that's all taking place in the marketplace.

So, at bottom, I don't think there's a problem. I think this committee is absolutely right to continue exercising oversight. Shining a spotlight on this is a good thing. But, I don't think we're at a stage where there is any market failure that justifies government intervention.

Thank you very much.

[The prepared statement of Mr. McSlarrow follows:]

PREPARED STATEMENT OF KYLE MCSLARROW, PRESIDENT AND CEO, NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION

Good morning, Chairman Inouye, Ranking Member Stevens and members of the Committee. My name is Kyle McSlarrow and I am the President and Chief Executive Officer of the National Cable & Telecommunications Association. NCTA represents cable operators serving more than 90 percent of the Nation's cable TV households and more than 200 cable program networks. The cable industry is the Nation's largest provider of high speed Internet access, making cable broadband service available to 92 percent of Americans, and has invested $130 billion to build a two-way interactive network with fiber optic technology. Cable companies also provide state-of-the-art digital telephone service to more than 15 million American consumers. Cable operators are committed to delivering an open and satisfying Internet experience to their customers, and the dramatic growth in cable broadband subscribers is evidence of their success in doing so.

The cable industry has consistently demonstrated its commitment to policies that ensure all Americans have access to affordable broadband. We supported, for example, proposals advanced by Senator Dorgan and Senator Stevens to create a fund

tailored to expanding broadband into unserved areas. We support Senator Inouye's Broadband Data Improvement Act, because we believe that improving Federal data collection and dissemination regarding where broadband services have been deployed in the United States is necessary in order to achieve the goal of ubiquitous broadband availability for all Americans. And we continue to support:

- Tax credits or other tax incentives to providers that build out in rural areas that are unserved by an existing broadband provider.
- Reform of the RUS broadband loan program so that funding is targeted specifically to unserved areas.
- Expansion of the FCC's Lifeline and Link-Up Programs to help ensure that broadband access is extended to low-income households.
- Public-private partnerships to provide broadband in unserved areas.

We support these initiatives because we recognize that the government can play an important role in making certain that the economic and social benefits of broadband connectivity are extended to all areas of this country, and we look forward to working with you further to achieve these goals.

But while broadband deployment to every community in America merits the full attention of policymakers, legislation calling for "network neutrality" or government intervention into the operation of networks would undermine the goals of broadband deployment and adoption. The development of the Internet, expansion of broadband networks, and creation of innovative Internet applications we have seen would not have occurred at such a rapid pace if providers were restricted in how they could engineer their networks to accommodate these dynamic developments. The government's consistent light regulatory touch since the introduction of broadband has worked. And only that continued regulatory freedom is likely to spur the investment and innovation that consumers have come to expect.

Today, I would like to focus on three points that illustrate why the Internet and broadband services should not be subject to greater and more intrusive government regulation.

First, cable broadband providers have demonstrated and remain committed to providing Americans the very best broadband service available.

Second, every cable modem subscriber today can access the content he or she seeks over the Internet. Broadband providers do not block access to content. Reasonable network optimization techniques not only enable the growth and development of the Internet, they protect consumers and their legitimate expectations.

Finally, the national policy of leaving the Internet unregulated has been a resounding success. Government intervention in broadband network management would only slow the pace of innovation and prevent the natural development of traffic solutions that is already occurring today.

I. Cable Brought Broadband to America

The industry's commitment to the deployment of broadband is reflected in the plain statistics. By any benchmark, the cable industry is leading efforts to spur broadband use and deployment.

Investment. The cable industry has done more to stimulate broadband growth and innovation than any other industry. Cable operators have invested $130 billion in private capital since the passage of the Telecommunications Act of 1996 to build broadband networks across the United States. Today 92 percent of American households, or about 117 million homes, have access to cable broadband service,[1] including 96 percent of American homes to which cable television service is available.[2] This investment and expansion took place without any government subsidies.

Competition. The cable industry's efforts to deploy broadband have stimulated tremendous investment in the provision of Internet access by competing providers, first by telephone companies and now wireless and satellite companies. This competition has spurred cable broadband providers and their competitors to develop better and better networks and applications to meet consumer demand and compete for their business. As former FTC Chairman Timothy Muris has explained, "competition [among providers] spurs producers to meet consumer expectations because the market generally imposes strict discipline on sellers who disappoint consumers and thus

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[1] National Cable & Telecommunications Association, Broadband Deployment Statistics (reporting that cable broadband had passed 117,700,000 U.S. housing units as of December 2007) available at *http://www.ncta.com/Statistic/Statistic/CableBroadbandAvailability.aspx.*

[2] *High-Speed Services for Internet Access: Status as of June 30, 2007,* Report, Industry Analysis & Tech. Division, Wireline Competition Bureau, at 3 (Mar. 2008) available at *http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC–280906A1.doc* ("2007 High Speed Internet Access Report").

lose sales to producers who better meet consumer needs. These same competitive pressures also encourage producers to provide truthful information about their offerings."[3]

Most notably, as the availability of broadband service has grown, the price-per-megabit has fallen significantly, and the speeds cable broadband offers have shot up dramatically. When cable first offered high-speed broadband service as an alternative to dial-up access in the mid-90s, the speeds were approximately 1–1.5 Mbps. Today, most cable operators offer broadband speeds topping 5 Mbps and some operators, such as Cablevision and Comcast, offer speeds up to 50 Mbps. Comcast and Cox Communications also offer a service that provides for "boosts" of higher speeds that double the throughput on an on-demand, capacity-available basis.

Now the cable industry is on the verge of making the next leap—from "broadband" to "wideband"—with a technology which can enable dramatically higher download and upload speeds well above 100 Megabits per second. Several weeks ago, for example, Comcast launched a "wideband" service in Minneapolis-St. Paul that offers speeds of 50 Megabits per second. Comcast expects to have wideband available to 20 percent of its systems by year-end 2008 and to all homes passed by mid 2010.

Increased Use and Demand. The high quality and easy availability of cable broadband has led to the widespread adoption of broadband use. Today, the cable industry has more than 35 million broadband customers.[4] Overall, approximately 64 million broadband households nationwide have broadband service, and that number continues to grow.

New Content, Web Services, and Applications. The efforts of broadband network providers to build larger and faster networks have helped ensure the success of countless numbers of new Internet businesses and applications—online video services, social networking websites, data-sharing services, and online interactive game services, to name a few. Despite concerns about alleged limited access to broadband, use of Internet video on demand has grown at the most dramatic rate. In July 2006, 107 million Americans watched video online and about 60 percent of Internet users downloaded more than 7 billion videos off the Internet.[5] In February 2008, nearly 135 million U.S. Internet users spent an average of 204 minutes viewing 10.1 billion online videos. YouTube represented 34 percent of those online videos, or nearly 3.5 billion in total.[6] To put it into context, in 2006, YouTube consumed as much bandwidth as the entire Internet consumed in the year 2000.[7]

Television networks are now offering cable modem and other broadband customers video online, such as NBC Universal and News Corp.'s new Hulu service. Book retailers are now offering online digital novels; and music sales websites, such as iTunes, continue to grow. Social networking websites, where users share home videos, pictures, and music content, are also on the rise—in 2007, an estimated 126.5 million people in North America participated in an online social networking website.[8] Internet commerce also continues to grow. Last year, over $135 billion was spent purchasing goods and services over the Internet.[9]

For years, net neutrality proponents have argued that without government intervention, broadband providers would stifle competing services and content providers;

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[3] Statement of Timothy J. Muris, Foundation Professor, The George Mason School of Law, before the Workshop on Broadband Connectivity Competition Policy, U.S. Federal Trade Commission, Feb. 28, 2007, at 12; *see id.* at 13 ("Introducing new sellers—i.e., competition—can only improve things from the consumer's perspective. Either the new producer offers the consumer a better deal (*e.g.,* lower price, better quality), or it does not get the sale. This ability to shift expenditures imposes a rigorous discipline on each seller to satisfy consumer preferences."); *id.* at 14–15 ("Competition motivates sellers to provide truthful, useful information about their products and drives them to fulfill promises concerning price, quality, and other terms of sale . . . In a competitive market, a consumer deceived by one seller on one purchase can always turn to a different seller the next time.") (internal citations omitted); *id.* at 16–17 (noting significant competition in broadband access market).

[4] National Cable & Telecommunications Association, Broadband Deployment Statistics (reporting that the total cable high-speed broadband customers reached 35,600,000 as of December 2007) available at *http://www.ncta.com/Statistic/Statistic/Statistics.aspx*.

[5] FCC Adopts 13th Annual Report to Congress on Video Competition and Notice of Inquiry for the 14th Annual Report, News Release at 4 (Nov. 27, 2007) available at *http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC–278454A1.pdf.*

[6] Todd Spangler, Net Video Views Topped 10 Billion in February, MULTICHANNEL NEWS, Apr. 16, 2008.

[7] Michael Dell, Founder and Chairman, Dell Inc., Keynote Address at 2007 Consumer Electronics Show (Jan. 9, 2007) (transcript available at *media.podtech.net/media/2007/01/PID_001851/Podtech_v_1875-ces–2007-dell-launches-.html*).

[8] Jon Swartz, *Social-networking sites going global,* USA TODAY, Feb. 10, 2008.

[9] *Quarterly Retail E-Commerce Sales, 4th Quarter 2007,* U.S. Census Bureau News Release (Feb. 15, 2008) available at *http://www.census.gov/mrts/www/data/pdf/07Q4.pdf.*

Internet development and usage would stagnate; and consumers would be unable to use their broadband connections to download video or access other emerging applications. In fact, cable's investment in broadband has driven innovation and investment in new content and applications at the edge—the exact opposite of what was predicted by advocates of net regulation.

There is no better proof that there presently exists no "problem" needing a "solution" than YouTube. YouTube would have been a pipe dream in 2002. Six years later, however, YouTube—the proverbial "two guys in a garage" who allegedly could not survive, let alone thrive, unless the Internet were regulated—has become a multi-billion dollar enterprise. And YouTube is now owned by Google, which itself has grown to become one of the largest companies in the world with a market capitalization of $169 billion.

Here's an incontrovertible truth: the staggering growth of these companies would not have occurred without cable's investment in and deployment of the reliable high-speed broadband service that provides the ecosystem in which Google, YouTube, Yahoo! and other Internet services can flourish.

II. Network Optimization Enhances and Enables the Internet Experience

In 2006, I testified before this Committee and stated that cable operators do not and would not block subscribers' access to any lawful content, applications or services. That statement remains true today. Cable modem subscribers have the ability to do anything they want to on the Internet. They can download or stream videos, upload and send pictures to friends, or call family across the world. They can also attach gaming devices, or any other computing device they want to use to the network. They can use file-sharing software from peer-to-peer networks. If they couldn't do what they wanted, they would soon not be cable modem subscribers. They would go to our competitors.

Cable subscribers can enjoy the most advanced and cutting-edge Internet sites and applications because of the extensive efforts cable operators constantly undertake to make all content and applications flow smoothly and work seamlessly together over the network. In 1999, there were only 2 million households with broadband service in the United States; today there are approximately 64 million. This is a great success story—but with this success comes the need to manage the network so that every household has good user experience.

Cable providers built a smart infrastructure that has the capability to evolve and meet the challenges of multimedia, file sharing, and other bandwidth-intensive applications. But cable broadband subscribers currently enjoy the full benefits of broadband only because cable operators manage their networks on a content-agnostic basis to provide seamless connectivity, deter spam and viruses, and make sure that a tiny minority of users don't slow down the Internet for everyone else. Various estimates are that as few as 5 percent of customers use from 50 to 90 percent of the total capacity of the network. In Japan, it is estimated that 1 percent of Internet users consume 47 percent of the total Internet traffic.[10] Faced with these voracious bandwidth consumers, cable operators may engage in reasonable, content-agnostic network management practices—triggered by objective criteria based upon network traffic levels—to ensure that the relatively few customers who utilize bandwidth-heavy applications do not degrade or otherwise adversely affect broadband Internet access for the vast majority of customers.

There have been some recent concerns that network management practices affecting certain high-bandwidth-consuming peer-to-peer (P2P) applications are "discriminatory." P2P traffic can consume a disproportionately large amount of network resources—far, far more than any other Internet use. If even a small fraction of customers are using these bandwidth-intensive applications at the same time, it can interfere with the ability of the vast majority of all other customers in that area to surf the web, watch streaming video, make voice-over-IP calls, or engage in other routine uses of the Internet.

Providers can't build their way out of this problem—in spite of increasing capacity, many P2P protocols are written specifically to commandeer as much bandwidth as is available. Instead, providers optimize their networks in order to balance the needs of all of their customers. Far from inhibiting access, smart network techniques protect the ability of our customers to make the greatest and most flexible use of the Internet. They are a reasonable response to an identified congestion problem that has the benefit of allowing all other applications—particularly latency-sensitive applications like VoIP and streaming video—to work better. As the Institute for Policy Innovation recently stated, "[i]n almost all cases, network management

[10] George Ou, citing Haruka Saito, Japanese Counselor for Telecom Policy, *http://blogs.zdnet.com/Ou/?p=1063.*

today is unnoticed by consumers. The opposite, a total lack of management, would not be true. If network operators were precluded from managing their networks, consumers would be negatively affected."[11] Sound network management is essential to ensuring a stable broadband platform. Google, Yahoo!, Amazon, and service providers like Vonage could not carry on their businesses if bandwidth-consuming applications were allowed to block customers from accessing their Websites or completing their transactions. Because of network management, such businesses can develop business models that hinge on the expectation that their service will not be crowded out by congestion caused by heavy bandwidth-using software. Far from being "neutral," a network that is not managed simply allows those who want to demand all the bandwidth for themselves to do so unchecked.

Reasonable network management practices are also vital to combating the well-documented, illegal distribution of copyrighted material on the Internet. We cannot ignore the problem of piracy. It is a problem that affects not just broadband service providers, legitimate broadband application providers and content providers, but also law-abiding consumers. Ultimately they are the ones that bear the burden of congestion caused by those who abuse their network access to engage in the widespread distribution of infringing works. Technology is agnostic, but, according to one source, 90 percent of P2P downloads are pirated material.[12] Broadband providers, content owners and others all have a stake in exploring technology solutions that address piracy in ways that respect our customers' expectations and respect the copyright owner's rights, not simply to curtail congestion but for reasons of fairness to those who invest in content and make an important contribution to our economy. Government action that would inhibit development of innovative approaches to thwarting piracy and enhancing the online experience for the vast majority of Internet users would harm content creation and ultimately consumers.

So, is there evidence that these challenges are insurmountable and require more government regulation? Quite the contrary. The same technological innovation that gives rise to some of these challenges has produced creative ways to fight spam and viruses. The same private sector collaboration that allowed the countless number of networks that make up the Internet to exchange traffic and engage in peering, has and continues to focus on new challenges.

Some P2P developers are creating new ways to make that technology more bandwidth-efficient and network-friendly, so that it may continue to emerge as a useful way to distribute legal content. Cable companies and other broadband providers are working hard to find ways to address concerns about network congestion and create consumer-friendly options that allow the majority of users to access content at the speeds needed. The "P4P Working Group"—a collaborative industry effort to develop network management solutions that benefit cable and other broadband operators, P2P software firms, and consumers—is one such effort.

Broadband providers have also begun testing and dialogue with P2P applications providers to make networks and P2P applications friendlier to one another. For example, Verizon has been working with Pando Networks, a P2P software developer, and the P4P Working Group to develop a more bandwidth efficient file sharing protocol.[13] Just last week, Comcast and Pando announced their intention to lead an industry-wide effort to create a "P2P Bill of Rights and Responsibilities."[14] And Comcast and BitTorrent recently reached an agreement in which Comcast pledged to adopt a capacity management technique based on individual users' consumption during peak periods rather than based on a particular protocol.

Broadband providers and Internet content and service providers have mutual incentives to develop workable solutions that enhance customers' Internet experiences. Cable operators' tremendous investments have laid the foundation for robust broadband networks that have spurred the remarkable explosion of new services and innovations on the Internet. In turn, the vast array of applications and services now available on the Internet drive more and more people to become broadband users.

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[11] *Broadband Industry Practices,* WC Docket No. 07–52, Institute for Policy Comments at 2 (filed Feb. 13, 2008).

[12] Associated Press, *Peer-to-peer networks go legit, but piracy is still rampant,* siliconvalley.com, March 14, 2008, available at *http://www.siliconvalley.com/latestheadlines/ci_8575851.*

[13] Peter Svensson, *Verizon Gets Cozy With P2P File-Sharers,* March 14, 2008, available at *http://biz.yahoo.com/ap/080314/p2p_verizon.html.*

[14] Stephen Lawson, *Comcast, Pando Call for Pact on P2P Rights,* Apr. 15, 2008, available at *http://news.yahoo.com/s/pcworld/20080416/tc_pcworld/144680.*

III. The Government Should Continue to Refrain From Regulation

Congress should resist calls to interfere with broadband providers' freedom to manage their respective networks in order to satisfy the evolving needs of American consumers. Cable modem service has never been subject to regulation. Six years after the FCC classified cable's broadband offering as an unregulated information service [15] and nearly 3 years after the FCC determined that no regulation was needed to encourage broadband deployment and preserve and promote Internet usage and demand,[16] there has been no evidence of any practices that would change those conclusions or warrant government intervention generally or specifically with respect to permissible network management activities. The disaster scenarios voiced by network neutrality proponents for many years have never happened. In fact, the opposite has happened—the Internet is booming without regulation. There is quite simply no problem requiring a government solution.

Under the guise of preventing discrimination, "net neutrality" proponents would have the government determine which network management techniques are permissible. But putting every network management strategy up for debate before regulators would severely hamper the ability of network providers to ensure high-quality and reliable Internet access for their subscribers. Depriving network operators of certain bandwidth management tools only makes the network less efficient for everyone. Ultimately, interfering with an operator's ability to manage its network would harm consumers and prevent them from accessing the content they desire. Adept network optimization techniques are fundamental to creating and preserving the stable "ecosystem" for online service providers that ensures an optimal customer experience.

Government intervention in a fast-changing technological world could result in very real problems developing very quickly. Network management practices are constantly changing and evolving—as networks grow, consumer usage patterns change, and new technologies emerge. It would be impossible for any regulation to keep up with these changes. Nor does the government have the expertise or resources to second-guess the thousands of network management decisions broadband network engineers must make every day. It is far more likely that government interference in the development of the market could foreclose or prevent the emergence of cross-industry efforts that are more likely to get the solutions right.

Conclusion

Misplaced concerns over legitimate and reasonable network management practices do not justify the enactment of open-ended regulation of the Internet, particularly where the costs of such regulation are foreseeable and substantial. Given the growth of broadband competition and the breathtaking pace of technological change, government intervention is unwarranted. As the Federal Trade Commission has warned, regulation of Internet access at this stage of market development could have "potentially adverse and unintended effects," [17] including reduced product and service innovation. And net neutrality requirements would frustrate the Federal policy of "preserv[ing] the vibrant and competitive free market that presently exists for the Internet . . ., unfettered by Federal or State regulation." [18] Today's hands-off policy has given us the flexibility to innovate and respond to consumer demand. By contrast, proposals for "net neutrality" amount to regulation of the Internet that would undermine—not promote—consumer choice and welfare.

Thank you again for inviting me to speak to you today.

The CHAIRMAN. Thank you very much.
And our last witness, Professor Lessig.

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[15] *Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities,* 17 F.C.C.R. 4798 (2002), *aff'd sub nom. Brand X Internet Servs.* V. *FCC,* 545 U.S. 967 (2005).

[16] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities; Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services; Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review—Review of Computer III and ONA Safeguards and Requirements; Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities,* Policy Statement, 20 FCC Rcd 14986, ¶4 (2005); FCC Press Release, *"FCC Adopts Policy Statement; New Principles Preserve and Promote the Open and Interconnected Nature of Public Internet"* (rel. Aug. 5, 2005).

[17] *Broadband Connectivity Competition Policy, Federal Trade Commission Staff Report,* at 11 (June 2007) available at *http://www.publicknowledge.org/pdf/FCC–05–151A1.pdf.*

[18] 47 U.S.C. § 230(b)(1).

STATEMENT OF LAWRENCE LESSIG, C. WENDELL AND EDITH M. CARLSMITH PROFESSOR OF LAW, STANFORD LAW SCHOOL

Mr. LESSIG. Thank you, Mr. Chairman.

I had the honor to be at this Committee's first hearing, 5 years ago, when the words "network neutrality" were uttered. And it's extraordinarily rewarding to see the progress that's been made in the understanding around this issue in the last 5 and a half years.

But, I do want to start by remarking what strikes me as a fundamental misunderstanding about the history of the Internet, which is pressed by the Senators who were to my left earlier today; in particular, by Senator Sununu.

The Internet began in a context where its code, the architecture of the Internet, and the regulation of government through Title II in the narrow-band Internet context, created a platform of fundamental neutral competition. The technology was incapable of allowing ISPs to discriminate among content and applications, and the government took a very active role in guaranteeing that Internet service providers provided neutral access to the Internet.

Now, of course, that context has changed dramatically. Because of changes in regulation, instead of having about 6,000 ISPs in this nation, we essentially have, in any district, one, maybe two. And so, that context has radically changed. But, as it has changed, it has changed, not just because the law has changed; it's changed because the technology has increasingly enabled providers to discriminate among content and applications.

So, imagine, for example, if the electricity grid, which, right now, is a neutral platform—when you plug your Sony TV in, it doesn't know the difference between that and a Panasonic TV—imagine if it, when you plugged it in, asked the question to the television set, "Are you Sony or are you Panasonic?" and the price differs depending upon whether you're Sony or Panasonic, or whether it's a television or a radio, or whether it's public TV or private TV. The point is, it's possible the electricity grid would become discriminatory in exactly that way. And the question is what Congress would do if, in fact, that's where the electricity grid went.

Now, another point that's been made consistently by those who oppose network neutrality regulation is, we should sit around and wait to see the discrimination; and when we see the discrimination, let's do something about it. But, that point fundamentally misunderstands how investment decisions are made in Silicon Valley. In Silicon Valley, investment decisions are made today depending on what the investors believe the network will look like in 5 years. And if, today, they believe the owners of the network will have the freedom to pick and choose which applications will run or which content will be permitted, they will not invest in applications today which are fundamental and different from the kind of applications the network owners want to allow.

So, it's fundamentally mistaken to say that there's no cost to competition or innovation or the economy from doing nothing. The cost is the extraordinary uncertainty investors face about what the future of the network will look like and what exactly their opportunity to compete will be.

Now, finally, to the Senators who are still on my right here, I would say I support, fundamentally, the move to enact network

neutrality legislation. I think, 5 years into this debate—it's actually 10 years since this issue was first framed—is long enough, and Congress needs to take a very clear policy position that supports an infrastructure of abundance for the network and does not envision the network becoming a network where owners try to leverage scarcity to produce value.

But, it's extraordinarily important that, whatever regulation is placed on this network be as minimal and clear as possible. And I get very anxious with the use of words like "reasonable" in this context, without clear specification of the problem.

So, in my view, the core problem is addressed by the four principles that Chairman Powell originally envisioned, and Chairman Martin has adopted, plus one more. And that one additional principle would ban discriminatory tiering by network owners for providers of content and applications. And those, it seems to me, define the minimal regulation necessary to guarantee the principle to continue an environment of extraordinary competition that the Internet originally gave us.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Lessig follows:]

PREPARED STATEMENT OF LAWRENCE LESSIG, C. WENDELL AND EDITH M. CARLSMITH PROFESSOR OF LAW, STANFORD LAW SCHOOL

Introduction

Mr. Chairman, and members of the Committee, my name is Lawrence Lessig, and I am a Professor of Law at Stanford Law School. For more than a decade, I have been studying the relationship between technology and Internet policy, and in particular, the relationship between the architecture of the Internet and innovation. I am honored to have the opportunity to address the question that is before this Committee—the future of the Internet.

This is the third time that I have addressed this Committee about essentially the same question. In October, 2002, I testified about "network neutrality." That was, I believe, the first time that idea had been presented to this Committee. In February, 2006, I testified at a hearing devoted to "network neutrality" exclusively. And in my view, the question before this Committee today, "The Future of the Internet," is directly tied to the future of network neutrality.

Yet while these questions are not new, in my view, Congress has yet to address them adequately. For the reasons I outline below, this failure to act continues to threaten the growth and economic vitality of the Internet. Thus, I would urge Congress to enact legislation that sets the basic framework for this critical economic infrastructure in a way that assures the greatest innovation and economic growth. That framework would embed a design principle that gave birth to the Internet—network neutrality.

"Network Neutrality"

The term "network neutrality" was introduced into the academic debate by Professor Tim Wu in early 2003.[1] But the idea behind the term has been a central focus of network theorists since the early 1980s. "Network Neutrality" builds upon a fundamental recognition about the relationship between a certain network design (what network architects Jerome Saltzer, David Clark, and David Reed called the "end-to-end"[2] principle) and economic innovation. As former FCC Chief Economist, Professor Gerald R. Faulhauber, described the relationship at a Stanford conference in 2000,

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[1] Tim Wu, *Network Neutrality, Broadband Discrimination,* 2 J. Telecomm. & High Tech. L. 141 (2003).

[2] [29] See J. H. Saltzer, David Clark, and David Reed, "End-to-End Arguments in System Design," available at *<http://web.mit.edu/Saltzer/www/publications/endtoend/endtoend.pdf>*; David P. Reed *et al.,* "Active Networking in End-to-End Arguments," available at *<http://Web.mit.edu/Saltzer/www/publications/endtoend/ANe2ecomment.html>*.

> "if I translate this into . . . economics, ["end-to-end"] in engineering is the equivalent of . . . perfect competitive market [in] economi[cs]. It's the thing that makes it all transparent, open, [where] anybody can do anything."[3]

"End-to-end" or, to update the language, "network neutrality" is the equivalent of perfect competition because it creates an environment, or platform, upon which competition among applications and content happens with minimum interference by the network or platform owner. Like a traditional marketplace, or a modern stock market, a neutral network assures that in the negotiation between buyer and seller, or innovator and consumer, the network itself plays little or no substantive role. All the power within this negotiation is shifted to the edge, to those economic actors directly responsible for innovation and growth in network applications and content—namely, consumers and innovators.

The original Internet achieved this architecture of competition unintentionally. The framers of the network's original design were not economists. They were not focused on building an engine of economic growth. Yet that was the consequence of a technical design intended to facilitate development flexibility. A network designed to enable anyone to develop new applications to run was also a network designed to maximize competition among applications and content.[4]

The reason for this is simple but technical: under the Internet's original design, there was no easy way within the network to discriminate among applications or content. The network was built without the knowledge to discriminate built in. Just as the Post Office can't cheaply pick and choose which letters to deliver based upon the sentiments expressed in the letters, so too the original Internet couldn't easily pick and choose which packets of data to send based on the content of those packets. It was blind to that content. That blindness encouraged a wide range of innovation.

This technical feature of the original network is now changing. Network owners increasingly have the ability to in effect open the Internet's letters—to peek inside the packets, and choose which go faster, or which get blocked. And while there are plenty of legitimate reasons why a network owner might need to "manage" network behavior, there are anti-competitive, or strategic reasons as well. Which reason motivates a network owner turns upon the business model that the network owner has adopted—either a business model of abundance and neutrality, serving whatever legal applications and content users and innovators want, or a business model of scarcity and control, leveraging financial return out of the scarcity their gate-keeping role allows them to create or maintain. If policymakers were confident network owners were following a model of abundance, there would be less reason to be concerned about how they manage the packets on their network. But because policymakers are uncertain about the ultimate motive for this "management," extensive inquiry into the technical questions of network management become important.

In my view, Congress could substantially simplify this area by setting a strong policy in favor of networks with a business model of abundance and neutrality. A clear set of network neutrality principles would do just that. If Congress made it perfectly clear that the FCC had the charge and authority to assure that the providers of this critical economic infrastructure were deploying this infrastructure with abundance in view, businesses would conform to that requirement. The economic question here is much more important than the financial returns to one particular industry. A powerful and vibrant broadband infrastructure is crucial to the economic growth of the Nation generally.

In addressing the question before this Committee, I would offer four points to consider.

1. The question of effective regulation for critical economic infrastructure did not begin with the Internet.

Though the Internet is certainly "new" within the history of critical economic infrastructures, the regulatory questions it raises are as old as the Republic. Throughout our history, policymakers have weighed how best to encourage the spread of critical economic infrastructure, recognizing that sometimes subsidy is required, and at other times, simple regulation is sufficient. The Post Office, for example, was perhaps this Nation's first communication infrastructure, and as many have noted, the Federal Government played a critical role in assuring that that infrastructure supported the rapid growth of commercial newspaper and periodical publications, both

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[3] Conference Proceedings, The Policy Implications of End-to-End, Stanford University, December 1, 2000, available at <*http://cyberlaw.stanford.edu/e2e/ papers/e2e.panel5.pdf*>.

[4] See Barbara van Schewick, ARCHITECTURE AND INNOVATION (forthcoming MIT Press, 2008). See also Lessig, THE FUTURE OF IDEAS 34–35 (2001).

for economic and political reasons.[5] Likewise with the telegraph, railroads, electricity, the national highway system, and telephones: In each case, the policy question was how best to encourage broad scale, and relatively inexpensive infrastructure to support critical economic growth. How, in other words, to encourage an infrastructure of abundance rather than an infrastructure of scarcity.

Throughout this history, to achieve abundance it has sometimes been necessary to limit the freedom of infrastructure providers. Common carrier regulation did that substantially. But even without common carrier regulation, some limits have been essential to assuring that the interests of those who build this economic infrastructure are aligned with the interests of the Nation that depends upon it.

One critical limitation has been upon the ability of infrastructure owners to discriminate. Consider, for example, the infrastructure for electricity. As I have testified before, the electricity grid is a fundamentally neutral network. Innovators (like Sony, or Panasonic) are invited to develop applications (televisions, and radios) that use that network. They don't need permission from the network owners (PG&E, Commonwealth Edison) to deploy those innovations. When you plug your television set into an outlet, the network doesn't ask (as it well could, given modern technology) whether the television set is made by Sony or Panasonic. It doesn't ask whether the function of the appliance is to provide television or radio service. Instead, so long as application developers develop appliances that comply with the protocols of the network, the electricity grid will provide service to those appliances neutrally. That doesn't mean for free—for obviously, we all pay for the electricity we consume. It doesn't mean unmetered—obviously, we pay more if we use more. But it does mean that Sony doesn't need to pay a special tax to PG&E for the right to develop Sony television sets, or digital music players. Sony, in this model, is free to innovate without permission from the infrastructure owners—the electricity network.

We could of course imagine a different system. And indeed, we could well build that different system into our electricity grid right now. The electricity grid could be architected to ask the application who made it, or what its function is. The network could then decide whether or how to serve electricity depending upon the answer to that question. Providers of appliances could then be taxed depending upon the elasticity of demand for their products. Electricity providers could then enjoy greater revenue for their product from this tax.

I take it there are few who believe that this alternative electricity system would be better thanthe system we have today—even though economists could well describe the conditions under which this alternative may well be more "efficient."

My point, however, is not about whether those conditions obtain, either for the electricity grid, or the Internet. It is instead to emphasize the value of being conservative in policymaking in both contexts. Anyone arguing that the electricity network should be rebuilt to permit PG&E to discriminate among applications using its network should bear a significant burden before that change was allowed. And likewise for anyone arguing that the core competitive feature of the original Internet should be altered: he or she too should bear a significant burden before that change is allowed to alter the critical competitive environment that the Internet presents.

Giving up on network neutrality would be like permitting PG&E to tax appliance manufacturers for the privilege of using electricity on its network: No doubt, that would be a boon for PG&E, and its shareholders. It would not be a boon for the economy.

2. Policymakers should adopt policies that drive network providers toward business models of broadband abundance rather than business models that exploit scarcity.

There are at least two clear business models for broadband deployment—one that drives to broadband abundance, the other that leverages broadband scarcity to maximize network provider returns. There is a critical economic justification for government to try to tilt broadband providers toward the model of abundance.

Again, the broadband Internet is infrastructure. Like electricity grids, and national highways, it supports a wide range of economic and social activity. As scholars have demonstrated, private actors providing public infrastructure but focused on private gain alone would rationally maximize their own return at the expense of this broader public gain.[6] Interventions that create the incentive among infrastruc-

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[5] See, *e.g.,* Paul Starr, THE CREATION OFTHE MEDIA 83–113 (2004).

[6] See, *e.g.,* Brett M. Frischmann and Barbara van Schewick, *Network Neutrality and the Economics of an Information Superhighway: A Reply to Professor Yoo,* 47 JURIMETRICS J. 383–428 (2007); Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management,* 89 MINN. L. REV. 917, 1007 (2005).

ture providers to support these broader interests produce real economic return to the economy, even if they mean less financial return to the infrastructure providers.

For example, consider by contrast policy decisions affecting the growth of cable. Though cable television obviously provides valuable free speech opportunities and economic return through the incentives it creates to produce new content, it is plausible that cable television is not a core infrastructure technology, since it does not generate a diverse range of technology and applications building upon the cable platform. For this reason, it may well have been sensible for Congress to grant to cable owners an almost unlimited range of freedom to structure production decisions as they want, and develop cable offerings and prices as the market will bear. The product of these policy decisions is obviously not uncontested—families continue to resist the bundling of cable providers, making it hard, for example, for parents to select a mix of content that minimizes advertising; consumers generally resist significant price increases; developers of independently produced content point to the radical drop in independently produced television content after the relaxation of government ownership regulations. All of these "problems" are the predictable result of allowing cable owners the degree of economic freedom the law now permits them. And while I share with many the wish that things were different, I can well understand that there are limited public policy reasons for regulatory intervention.

But when the platform is not just a video delivery system, but instead, a general purpose digital innovation platform, the justification for regulatory intervention changes dramatically. In the world of entertainment, cable TV is just one option. But in the world of digital communication infrastructures, the Internet is everything. And assuring that this infrastructure gets built with maximum capacity at the lowest cost, and with minimal burdens on application and content developers, is a critical public policy objective.

3. Investment decisions by venture capitalists are driven by expectations offuture, not present, behavior.

In both of the earlier hearings at which I was invited to testify about network neutrality issues, critics of regulation argued that there was no reason to intervene, because there was no actual evidence of discrimination. In the 2-years since my last testimony, however, network owners have provided this Congress with a significant number of examples of exactly the kind of harmful discrimination that network theorists have long predicted. In 2005, the FCC was forced to intervene to stop a DSL provider from blocking voice-over-IP technologies. In 2007, AT&T technologists acted to block the audio of Pearl Jam performer as he criticized the President in a webcast carried by AT&T. Verizon has been accused of blocking text messages that it found too controversial. And most recently, Comcast has been shown to be blocking particular Internet applications that might compete with its video service, using network management practices not approved by any independent standards body. If "network neutrality" was "a solution in search of a problem" in 2002, and 2006, the network owners have been very kind to network neutrality advocates by now providing plenty of examples of the problem to which network neutrality rules would be a solution.

But there is one very practical point that this debate about whether there is significant current discrimination misses. Venture capitalists don't chose whether to invest in new innovation based upon what is happening on the Internet *today*. They base their decisions upon what they expect behavior on the Internet will be *tomorrow*. They decide, for example, whether to fund a new Internet application today based upon whether they believe the entrepreneur will be able to deploy that application profitably in 2 or 5 years. That question in turn will depend upon whether network owners will be free to discriminate against that application in the future. Or more generally, whether network owners will be free to tax that application, to extract some portion of that application's profit. If venture capitalists believe that network owners will have that freedom tomorrow, then for a certain range of innovations, they will choose not to invest in that innovation today.

It is for this reason that I and others have consistently argued that Congress could well be slowing the growth of the Internet economy by not setting today a clear principle about the rules that will govern Internet innovation tomorrow. This "wait and see" attitude ignores that sector of the economy that can't afford to wait and see: investors. The "wait and see" argument is thus oblivious to the real economic costs that uncertainty here creates.

If Congress were clear in its direction to the FCC about the policy the FCC is required to implement, then any uncertainty about network owner behavior could be eliminated. And any costs from that uncertainty could also be eliminated. So long as a simple and clear rule signaled to the markets that network owners would be in the business of producing abundant broadband by encouraging innovation rather

than leveraging value from scarcity, markets would react to that signal in a way that encouraged greater investment in new innovation.

4. Congress should direct the FCC to implement, with the minimal regulatory intervention necessary, a policy that drives network providers to a business model ofabundance.

It has been my view for the past decade that Congress needs to signal a clear policy supporting neutral and abundant broadband growth. Without doubt, however, such a policy can go too far. The objective of regulators must be the minimum intervention necessary to steer broadband providers to a business model of abundance rather than scarcity, while recognizing the limited competence of regulators in any field of new technological innovation. That limited competence means regulators should focus on the behavior that they can monitor well, using the levers they have over that regulable behavior, so that they can have confidence about behavior at the layers of the network that they can't regulate as well.

Congress can achieve that end by setting out clear neutrality principles in legislation, while charging the FCC with the responsibility for carrying those principles into effect. Congress' principle, again, should be to encourage broadband abundance, by steering providers away from a business model that leverages scarcity. But in pursing that clear legislative objective, the FCC should proceed in a careful and limited way, escalating regulatory intervention only when existing strategies have been proven to fail. Put differently, if a clear objective has been set by Congress, then an FCC strategy of "shock and awe" is both unnecessary and counter productive. Instead, the interventions by the FCC should be directed to the end of convincing broadband providers that the legislative policy choice of Congress will be achieved. A consistent regulatory practice to that end will convince investors of the only profitable broadband investment strategy. That will drive providers to the economically optimal broadband strategy.

As I testified in 2006, in my view that minimal strategy right now marries the basic principles of "Internet Freedom" first outlined by Chairman Michael Powell, and modified more recently by the FCC, to one additional requirement—a ban on discriminatory access tiering. While broadband providers should be free, in my view, to price consumer access to the Internet differently—setting a higher price, for example, for faster or greater access—they should not be free to apply discriminatory surcharges to those who make content or applications available on the Internet. As I testified, in my view, such "access tiering" risks creating a strong incentive among Internet providers to favor some companies over others; that incentive in turn tends to support business models that exploit scarcity rather than abundance. If Google, for example, knew if could buy a kind of access for its video content that iFilm couldn't, then it could exploit its advantage to create an even greater disadvantage for its competitors; network providers in turn could deliver on that disadvantage only if the non-privileged service was inferior to the privileged service.

Put differently, "fast lanes" on the Internet are only valuable if "slow lanes" are really slow. Depending upon the market, this fact can create a perverse incentive among network providers not to build the fastest network possible.

Conclusion

As I testified in 2002 and 2006, the Internet was the great economic surprise of the 20th century. No one who funded or initially developed the network imagined it would have the economic and social consequences that it has had.

But though the success of the network was a surprise, policy-makers have yet to learn just why it was a success: Built into its basic design was a guarantee of maximum competition. A free market in applications was coded into its architecture. The growth of that network followed from this basic design. The world economy benefited dramatically from this growth.

The threat facing the Internet today is that network owners will convince regulators to go back on that original design. Through regulatory policies that permit broadband providers to act however their private interests dictate, these regulatory policies would threaten the economic potential of the network generally. New innovation always comes from outsiders. If insiders are given both technical and legal control over innovation on the Internet, innovation will be stifled.

Unlike many other industrialized nations, we in the United States have failed to preserve the extraordinary competition among ISPs that characterized early Internet growth. But despite that loss in access competition, network neutrality still provided significant opportunity for application and content competition. The changes now being spoken of by the effective duopoly of broadband providers will weaken that application and content competition.

It is my view that any policy that weakens competition is a policy that will weaken the prospects for Internet and economic growth. I therefore urge this Committee to secure and supplement the work begun originally by Chairman Powell, and continued now by Chairman Martin, by enacting legislation that sets a clear policy to protect the environment for Internet innovation and competition.

The CHAIRMAN. Thank you very much.

Senator Dorgan?

Senator DORGAN. Professor, what you just described, the four principles plus the nondiscrimination piece, is exactly what I and others described was necessary when last we took up this issue, I believe, in a markup. And I believe the vote was 10 to 10—it was tie vote, anyway, either 11 to 11, or 10 to 10—to advance the amendment on net neutrality, or Internet freedom. I want to make just a couple of brief comments.

First of all, I don't—well, there's been some discussion here that might lead someone to believe this—I don't think this is a discussion, at the moment, about bad actors. There are a lot of good companies out there, they've invested a lot of money. I'm going to, this evening, turn on a switch and watch a great hockey game, I hope, on television. I get my Internet provided by the same company. I mean, there are a lot of good companies out there doing a lot of things.

I think it's also the case, however, that the companies are bigger, stronger. I think, when you have fewer competitors, major competitors in the marketplace, there is a clogging of the arteries of the marketplace. And, Dr. Hahn mentioned antitrust enforcement. I would say, if anybody can find the names of anybody that's really enforcing antitrust laws, be sure and send them here.

[Laughter.]

Senator DORGAN. I've threatened to put the pictures of public employees we're paying for antitrust enforcement on the side of milk cartons, because it appears to me that they have vanished for a good number of years. So, there is no antitrust enforcement of any consequence at all.

I want to ask a couple of questions. Obviously, Mr. McSlarrow, when you were sitting in the audience, you would have fully expected me to ask this question of you. The Chairman of the Federal Communications Commission comes to us and says, "Here are our principles, and we believe we have the authority to make them stick." Comcast says, "We don't believe you have the authority to make them stick. We don't believe you have that authority at all." What's the position of the Cable Association?

Mr. MCSLARROW. I appreciate the question, because I think the Chairman is modestly confused. The letter that people have talked about from Comcast is very precise. The question posed was whether or not the FCC has authority today to enjoin conduct under any existing rule. And it's not even a close call. The answer is no. The policy statement that everybody keeps talking about, which we supported, in terms of the principles embodied in it, is, by its terms, not a rule and not enforceable. And the Chairman himself, the day it was issued, said it's not an enforceable document. That is the question they answer.

Different question, broader question going to the one I thought you asked earlier, whether or not the FCC has generic authority.

And there, both the Supreme Court and the FCC itself has said it's an open question. They have a proceeding, where they have teed up whether or not, and to what extent, they have ancillary authority to regulate in this space. And I'm not going to assume what the answer is, except to say I think they have some authority. It's probably more limited than people might imagine. But, whether or not there's a rule on the books today, there's——

Senator DORGAN. Do you support—does your industry support the four principles?

Mr. MCSLARROW. Not only do we support the four principles, they embodied our practice——

Senator DORGAN. Do you believe that——

Mr. MCSLARROW.—prior to——

Senator DORGAN.—they should be enforceable?

Mr. MCSLARROW.—statement. No. I don't.

Senator DORGAN. You support them, but don't believe they should be enforceable?

Mr. MCSLARROW. No, I think if—if there is anticompetitive conduct or deceptive advertising, I think there are rules on the books that should and could be enforced.

Senator DORGAN. Professor Lessig, we've heard from some of my colleagues and others today, "Let the marketplace decide. The marketplace will take care of all this." I mean, the marketplace is a wonderful allocator of goods and services. Having taught some economics, I think it's a terrific allocator of goods and services. But, I also believe that the marketplace needs a referee from time to time. But, "Let the marketplace decide," what's wrong with that argument?

Mr. LESSIG. Well, the marketplace is extraordinarily important, but we have never, historically, relied upon the marketplace alone when we're talking about critical economic infrastructure for the Nation. And that's exactly what the Internet is. The Internet is not just entertainment, it's not just like the cable system's entertainment component. It is, instead, infrastructure. And to make sure that infrastructure encourages the widest range of competition, you need to guarantee the platform is open to that competition.

The technology used to do that. Now that the technology doesn't do that, there's an important reason for the government to insist on that neutrality.

Now, I must insist—my colleague Dr. Hahn has uttered what is a fundamental confusion about what this issue is about, by his initial example about Oogle and whether Oogle is free to charge for advertising. Oogle is at the edge of the network. It is one of the competitors on the network. I fundamentally support the right of every competitor on the network to discriminate however it wants. Let it build its own business model.

Senator DORGAN. You're talking about content providers.

Mr. LESSIG. That's right. What we're talking about is the platform itself and whether that highway should be able to discriminate against Ford trucks in favor GM trucks or in favor of American trucks versus Toyota, foreign trucks. The point is, that highway has to be neutral. And that what has encouraged the competition which defines the growth of the Internet.

Senator DORGAN. I'm going to ask you to respond, Dr. Hahn, but I want to ask you a question as you respond, because you started by saying, "What we really need here is just price freedom." So, let me ask you this question. Let's assume the American Enterprise Institute creates a site, because you want to make some money, and the site is the American Enterprise Institute for T-Shirt Sales. And your popular T-shirt that you're selling has a slogan that says, "Free Monopolies from Regulation." And the provider takes a look at that and says, "You know, we don't like that you're implying somehow that we're a monopoly, so we won't prevent you from getting your site out, but you're going to have to pay us a little extra to get your site up, because we don't like you personally, number one; number two, we don't like the message of your T-shirt, and we've just decided to charge you more in order to get your message out." So, is that OK? I mean, the marketplace would then try to figure out what happens to you?

Dr. HAHN. I think the answer is that you need to look at the broader context. As you pointed out with antitrust earlier, it's important to look at the competitive structure of the market. And in this case, we're talking about, I think, the broadband market. So, let me cite a little data that's in my testimony.

Prices for digital subscriber lines—that's DSL service—dropped by roughly a third between 2001 and 2006. In the case of cable modem service, the quality-adjusted price declined significantly as cable connection speeds increased significantly, while prices held steady. The FCC reported that highspeed lines increased by 22 percent during the first half of 2007, from 82 million to over 100 million, following a 27-percent increase, from 65 million to 82 million, during the second half of 2006. This strikes me, this suggests to me that the industry is subject to a lot of dynamic competition. It's not a perfectly competitive lemonade stand, but we need to look at how the industry is actually behaving and what their——

Senator DORGAN. But——

Dr. HAHN.—incentives to invest are.

Senator DORGAN. But, Dr. Hahn, you didn't respond to my question. In any event, with response to the statistics you've described, I could show you data from Asia that shows you pay half as much to get ten times the speed. So, I mean, I think that is not germane to the question here.

But, I do ask the question again. Let's assume that you've set up your American Enterprise T-Shirt Shop because you feel monopolies are being discriminated against, you don't want monopolies to be regulated, and so, the service provider—and, by the way, there aren't a lot of service providers, you probably have a choice of one or two in your hometown where you're trying to get this going—and they say, "You know, we just don't like you, personally, and we don't like your T-shirts. We're going to charge you something, a little extra than we charge others. That's our choice. It's my company. It's my choice." What's wrong with that?

Dr. HAHN. Well, it could violate antitrust laws. You'd need to—you'd need to take a serious look at that. But, my point is, not only do you have robust competition in the broadband market, you have competitive threats from wireless and satellite, as Mr. McSlarrow

said. So, you need to look at the market in the broader context and see what's actually——

Senator DORGAN. Well, Dr. Hahn, though, no one would suggest there's robust competition in the marketplace for a good many Americans. Half of North Dakotans have only two choices with respect to providers. I mean, you, no one can really suggest there's robust competition. There's certainty robust competition out there in every direction with respect to content providers. I mean, there are people today, in some garage someplace, with stars in their eyes, because they're starting up a company, and they want to provide content. But, that is not the case with providers. And so——

Dr. HAHN. It may not—I'm sorry.

Senator DORGAN. Yes, I would ask a couple of other questions. But, I want you to be able to respond.

Dr. HAHN. It may not be the case in North Dakota. I concur with you. But, if you look at the pattern over time, there seems to be more competition from different kinds of industries. And if you look at major metropolitan—major population centers throughout the U.S., they're served by multiple providers, according to the——

Senator DORGAN. Yes. Well, you know, we had a hearing on a different subject recently. We had a guy sit at that table from California, and he said, "In my office in California"—he was talking about cable television—"In my office in California," he said, "we have basic tier service with 48 channels"—and I believe he said 42 of them are owned by the same five or six major companies that we would expect. So, he said, you know, this issue of many voices from one ventriloquist. So, whether it's cable to Internet, we do have more, most everyone would say we have more concentration.

I want to, without abusing my time, say, Mr. Verrone, I wish you'd do some writing for me from time to time. Your testimony was interesting and compelling.

And, Ms. Bateman, thank you, as well. And I understand that in this area of independent material on the Internet and cable and so on coming from independence is dramatically decreased. So, I understand the question that you pose to this committee about competition on the side of those that are trying to continue to provide content.

You want to respond, either you or Ms. Bateman?

Mr. VERRONE. Well, I want to thank you for complimenting my testimony. I just hope my staff has run out and reserved the URL for Oogle.com, because I have a feeling it's going to be popular after Dr. Hahn's testimony.

Clearly, when we talk about the fundamental considerations here of competition, and when you're dealing in the industry in which Ms. Bateman and I work, we've found, over the past 20 years, that there's been a consolidation of the distribution. When the production and distribution providers congeal and consolidate, then you limit the independent voices. And one of the arguments made at the time was, "Well, you know, there's the Internet. Just because the same people own cable and broadcast and satellite and—well, you can always go out and get access and get your views published through the Internet." And now it's a case of some of the same companies with whom we were bargaining during our negotiation that are looking now to control that content distribution. And so, it is,

it is very much of a piece of media consolidation in this country and on this planet that the Internet be protected as a free and open means of expression.

Senator DORGAN. Mr. Chairman, a vote has now started, and I will submit a series of questions to witnesses, and ask that they respond in writing.

But, I do just want to say that the substantial increased consolidation, and that's undeniable, there's just dramatic consolidation; that's another subject that I've been involved in. It does require, it seems to me, without tarnishing everybody as bad actors—that's not the intent, it's not my intent—it does require us, however, as a governing body to thoughtfully regulate. Not to inhibit, not to try to stop innovation, but to thoughtfully regulate on behalf of the public interest. The public interest here is important.

So, I want us to progress. I want us to be a country that has the best access in the world, the best content, and have companies that provide us wonderful things as we want to access Internet and cable and so on. But, I do think there's an essential need here—and I think we've described it this morning with the Chairman of the FCC, and the need to have some certain regulatory capability. And I hope this hearing demonstrates that.

I apologize that we have less time than we had hoped, but I will submit questions in writing.

The CHAIRMAN. Senator Klobuchar?

STATEMENT OF HON. AMY KLOBUCHAR,
U.S. SENATOR FROM MINNESOTA

Senator KLOBUCHAR. Thank you very much, Mr. Chairman. I am up against the vote, so I'll try my best, here.

Professor Lessig, in your remarks, or your prepared remarks, you talked about how, "Unlike other industrialized nations, we, in the United States, have failed to provide the high level of competition among Internet service providers that characterized early Internet growth." And could you talk a little bit more about that and what other industrialized nations are doing that we aren't doing? And how does your own view of this relative lack of competition affect this debate?

Mr. LESSIG. Sure. So, our competitors—Japan and Europe, in particular—adopted essentially the regulatory strategy that we adopted in 1996. But, in Japan, in particular, they made that regulatory strategy actually work. So, it sustained enormous competition among ISPs, providing increasing service at lower cost for broadband access. And so, in Japan right now, there's a significant opportunity to select among competitors if your broadband service is no good or you don't like the blocking that's existing on the broadband service. And that's a critical part of what's made that market work so well.

The United States adopted a different strategy. We backed away from the open access requirements that were originally part of the vision for broadband provision on Title II, and never imposed it under Title VI, and one predicted consequence of that would be, we'd have exactly the consolidation that we've had. And now, I think it's just not credible to assert that there's real competition in access to broadband at the fast levels that we're talking about.

In my city, San Francisco, not a backwater, even though I come from South Dakota, not a backwater in provision; I have one choice—exactly one choice—for fast broadband, and that's cable. So, we have lost that competitive opportunity.

And just recognize how much more difficult that makes Chairman Martin's job; because when you don't have competition among ISPs, then, when there's a problem, the only choice the consumer has is to come to the government and say to the——

Senator KLOBUCHAR. Well——

Mr. LESSIG.—government——

Senator KLOBUCHAR.—how about this idea that I think Mr. McSlarrow was referencing, and maybe in discussions I've had, that wireless and satellite companies will enhance competition? Do you think that that's true, that that will eventually happen?

Mr. LESSIG. I don't think that the satellite is going to deal adequately with the latency problem, with the slowness problem for certain applications. It might be that wireless, if deployed correctly, will. But, still, we need to recognize, it's a tiny fraction of 1 percent right now out there, and we need to have real competition in the major markets right now in order to get the kind of growth that is necessary.

Senator KLOBUCHAR. And do you think that—I'd say this does. I'm very interested in wireless providers, and have been working on this Cell Phone Bill of Rights. Currently, the FCC doesn't have a consistent policy that applies to the different platforms when it comes to this. And if Congress is going to maximize the value of Internet policies, do you think that these policies should apply to both wired and wireless Internet providers?

Mr. LESSIG. I do. I think the open-access requirement that's been suggested, in the context of wireless, would be very good to encourage lots of competition here. Now, the contexts are different. The platform in wireless was never the neutral, open platform that the Internet was. So, in the Internet context, we're talking about preserving something. In the wireless context, we're talking about adding a kind of open access—openness. But, I think it would be valuable to do it, especially because Congress has not supported the idea of expanding the amount of unlicensed wireless. The greatest growth in applications in wireless has been, for example, in the Wi-Fi space, unlicensed wireless spectrum. And by not encouraging a wider growth in that, I think that we risk not using the wireless technology in the most efficient way to spur broadband growth.

Senator KLOBUCHAR. I'm just—and, Dr. Hahn, maybe you're going to comment on this, but you know, seeing my daughter, at age 12, and her friends, legally downloading some of these things and all these movies at once, and all these things—I do understand why you could suddenly have this sudden rush on the system. And one of things I wanted you—I know you're going to answer what he said, but could you talk about—a little bit about the fast lane and the slow lanes, and how fast the fast lane is, compared to the slow lane? I always seem to be on the slow lane. So, that's why I was wondering.

Dr. HAHN. So do I. Can I respond to Professor——

Senator KLOBUCHAR. Yes.

Dr. HAHN.—Lessig and your question, first?

I'm currently working on this problem, related to openness and wireless. And I suspect that several other economists are, as well. And my own view is that it wouldn't be prudent to make public policy decisions before we actually have a serious cost-benefit analysis of this issue. And one hasn't been done yet.

But, I believe the economic impacts of a requirement to have—of an openness requirement in the wireless space, which is already an intensely competitive space, by any measure, is likely to raise—likely to be to raise basic cellular rates. So, I think you want to look at that really, really closely before you do that, because that could have adverse income——

Senator KLOBUCHAR. OK.

Dr. HAHN.—implications.

Senator KLOBUCHAR. And the fast lane/slow lane?

Dr. HAHN. On your fast lane—give me your question——

Senator KLOBUCHAR. How much faster is the fast lane? What's the difference between them?

Dr. HAHN. Well, it depends. I mean, I know some people who actually use dial-up modem, so there's a huge difference.

Senator KLOBUCHAR. Yes.

Dr. HAHN. But, one point I'm—wanted to make with respect to fast lane and slow lane—I realize discrimination is a politically incorrect word, at least in this chamber, but from an economist's point of view, they don't necessarily view it as a bad thing. And, in fact, there is already discrimination out there. If you were—if you were asked, "Do you want a very fast lane?" from one of the Internet service providers, you'd have to pay a few dollars more a month than if you want the medium-fast lane. So, we do have some forms of discrimination now, and it—we have forms of price discrimination all over the place, and economists generally view it as a reasonable way of paying for the fixed costs of investments and giving firms an incentive to invest in future broadband networks.

Senator KLOBUCHAR. Well——

Dr. HAHN. So, it has positive, as well as negative, impacts.

Senator KLOBUCHAR. Thank you.

I just have one last question. I'll, maybe, submit some more, because we have this vote going on.

But, of you, Ms. Bateman—I'm a former prosecutor, so I'm interested in sort of a different issue on the future of the Internet, which is the ability of the creative community to ensure that your content is protected and is not going to be used in violation of copyright laws and otherwise stolen or pirated or co-opted. And I know that you talked—I don't know if you talked about it, I came in at the tail end of your remarks, but in your prepared remarks, about the digital watermarking could be the solution to prevent piracy. Do you want to talk a little bit about that?

Ms. BATEMAN. I'm not as well versed on the technological aspects of those, but I know there are—I mean, I think, from the first day that the VCR machine was introduced, there were concerns about, you know, taking the data off the initial delivery system and sharing it with other people. So, I can't answer that question, technologically, but I do know that there are ways to countermand that, financially, by, you know, having relationships with sponsors and

so forth. And, in that sense, you would want—actually want your stuff scraped and put on other servers, so that that sponsor's ads or embedded—or incorporated product is spread around.

I understand that there are some people who wouldn't want that to happen. And it's an ongoing problem, and it's a problem with CDs and, like I said, tapes and DVDs, and it's not just the Internet.

Senator KLOBUCHAR. Thank you very much.

The CHAIRMAN. Ms. Combs, Dr. Hahn, President Verrone, Ms. Bateman, President McSlarrow, and Professor Lessig, on behalf of the Committee, we thank you very much. Because of the constraint of time, we will have to adjourn at this moment, but I will be submitting questions to all of you. I hope you can get a response to me.

The record will be kept open for 3 weeks. If you do have any amendments you'd like to make to your statements, or addendums, please feel free to do so.

[Whereupon, at 12:14 p.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

Thank you, Chairman Inouye and Vice Chairman Stevens for calling this important hearing.

There are a number of critical issues when discussing the future of the Internet; one is Internet governance. What should the role of Internet Corporation for Assigned Names and Numbers (ICANN) be and what should the role of the U.S. Government be within ICANN?

Another series of questions surround IPV6, the successor to the current version of the Internet Protocol, for general use on the Internet. Why is the new protocol's adoption so slow? And, taking a step further back, how critical is its adoption in the first place to the continued growth of the Internet?

And then there is Internet security, Internet safety, Internet privacy, Internet pricing models, Internet advertising, more broadly, Internet monetization, and the list goes on and on.

But the most fundamental issue regarding the future of the Internet is how to ensure that consumers in all part of the country have a choice of multiple, independently-owned providers for high-speed Internet access.

For example, if there is a well-functioning market for residential consumer broadband services, the discussion over net neutrality would take on a different tone. In an efficient market, if a consumer doesn't like the price or the terms of service, he or she can walk over to a competitor. In today's market, by contrast, most consumers have one or two independent choices for broadband. These broadband providers have a huge amount of market power and consumers do not have much recourse.

Such limited choices limit the value of greater disclosure by broadband providers regarding things such as its network management practices. If a consumer believes the practices cited in the small print are restrictive and unreasonable, they may get upset, but what options do they really have in a market plagued by imperfect competition?

And that leads me to net neutrality.

I appreciate the fact that a broadband provider will be limited in the rate of return it can provide its shareholders if all it provides consumers is the commodity transport of packets. I realize that these providers now typically bundle broadband access with voice, video, and data services riding over the broadband connection.

I also understand that there is a need for reasonable network management to ensure quality of service to customers. Sometimes each class of packets—voice, video, and data—needs to be treated differently. And, sometimes the system architecture used by the broadband provider places unique constraints on the system. But, without transparency, who's to say what is reasonable?

So, where do you draw the line?

A few years back, the FCC issued its four net neutrality principles. At the time they were released, it was clear that these were principles and they were not enforceable. While the Commission does have ancillary authority under Title I of the Communications Act, it is a real stretch to claim that it can be applied to enforcing the net neutrality principles. Given this reality, I was not surprised, when a cable system operator recently criticized for using network management practices contrary to the net neutrality principles, replied, in effect, the emperor has no clothes.

This company's response only confirms the need of a fifth, enforceable net neutrality principle of non-discrimination. It could be as simple as the amendment offered by Senators Snowe and Dorgan during the mark up of the Telecommunication Act of 2006.

With enforceable non-discrimination language, there will be a greater level of trust by consumers and businesses that a broadband provider's network management practices are just that—network management.

No need to remind anyone here that the Internet has thrived, in large part, because innovation has always been on the edge of the network and did not have to be blessed by the network operator. We should keep it that way.

If network operators, under the guise of network management, assert a stronger role, you will see their business arrangements squeeze out innovation by unaffiliated parties. The temptation may prove to be too strong. And when Internet startups seek venture capital funding, investors will be hard-pressed to consider any company not affiliated with a network operator.

Of even greater concern is for the potential for broadband network operators to leverage control over the transmission of packets through their network and act as a gatekeeper for content. While I oppose the illegal distribution of copyrighted material, this is just not the right way of going about it. It raises a whole host of privacy concerns and will no doubt lead to protracted litigation.

I look forward to hearing from the panel.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BYRON L. DORGAN TO HON. KEVIN J. MARTIN

Question 1. Recently, Comcast announced that it is engaging in conversations with Bit Torrent, Inc. and Pando Networks, which distribute content through Bit Torrent applications.

a. Does this demonstrate that the marketplace is addressing the concerns raised by consumers?

b. Do you think that the response may have been influenced by the political scrutiny?

c. Do deals cut with these individual companies solve the problem?

Answer. I am pleased that Comcast has reversed course and agreed that it is not a reasonable network management practice to arbitrarily block certain applications on its network. I also commend the company for admitting publicly that it was engaging in the practice and now engaging in a dialog with BitTorrent. Unfortunately, Comcast originally disavowed any knowledge of any action to block certain applications on its network and only came forward after repeated requests and heightened public scrutiny.

I hope that the negotiations will result in a solution that preserves consumers' ability to access any lawful Internet content and applications of their choice. That ability is fundamental to preserving the open marketplace and innovation that characterizes the Internet.

I am concerned, though, that Comcast has not made clear when they will stop this discriminatory practice. It appears this practice will continue throughout the country until the end of the year and in some markets, even longer. While it may take time to implement its preferred new traffic management technique, it is not at all obvious why Comcast couldn't stop its current practice of arbitrarily blocking its broadband customers from using certain applications. Comcast should provide its broadband customers as well as the Commission with a commitment of a date certain by when it will stop this practice. Unless and until it does so, it is ignoring the concerns raised by consumers.

I believe that the Commission must remain vigilant in protecting consumers' access to content on the internet. Thus, it is critically important that the Commission take seriously and respond to complaints that are filed about arbitrary limits on broadband access and potential violations of our principles.

Question 2. In the last Congress, when this Committee was considering network neutrality legislation in the telecom legislation, the phone and cable companies argued that Congress did not need to enact rules of the road to protect consumers from discrimination. They stated that they would never censor political speech or block lawful applications and content. They said that consumers' concerns about such bad behavior was unfounded and was a "solution in search of a problem." We now have seen some high profile examples of network operators censoring speech and blocking applications. Are the concerns that were raised last year still a "solution in search of a problem?"

Answer. As the expert communications agency, it was appropriate for the Commission to adopt, and it is the Commission's role to enforce, its Internet Policy Statement. Indeed, on several occasions, the entire Commission has reiterated that it has the authority and will enforce these current principles.

In 2007, the Commission committed to enforcing our existing principles and the policy statement. Specifically, in April 2007, the Commission expressly stated:

> The Commission, under Title I of the Communications Act, has the ability to adopt and enforce the net neutrality principles it announced in the Internet Policy Statement. The Supreme Court reaffirmed that the Commission "has jurisdiction to impose additional regulatory obligations under its Title I ancillary jurisdiction to regulate interstate and foreign communications." Indeed, the Supreme Court specifically recognized the Commission's ancillary jurisdiction to impose regulatory obligations on broadband Internet access providers.[1]

I believe that the Commission has a responsibility to enforce the principles that it has already adopted. Indeed, the Commission has already taken enforcement action in response to other complaints. In the Madison River complaint, the Commission ordered a telephone company to stop blocking VoIP calls.

Unfortunately, as you point out, there have been several incidents or problems in which carriers have been accused of blocking applications. I believe that the Commission must remain vigilant in protecting consumers' access to content on the internet. Thus, it is critically important that the Commission take seriously and respond to these complaints that are filed about arbitrary limits on broadband access and potential violations of our principles.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED STEVENS TO HON. KEVIN J. MARTIN

Question 1. Is the FCC aware of any instances where an operator has discriminated against content on a religious or political point of view?

Answer. In September 2007, the press reported that Verizon Wireless rejected a request from NARAL Pro-Choice America to make Verizon's mobile network available for a text-message program that allowed people to sign up for text messages from NARAL. The activities attributed to Verizon Wireless, however, involved wireless text messages rather than access to Internet content. The Commission has sought public comment on a Petition for Declaratory Ruling filed by several public interest groups to clarify the regulatory status of text messaging services, including short-code based services sent from and received by mobile phones.

In addition, it has been reported in the press that AT&T muted remarks made by singer Eddie Vedder of the rock group Pearl Jam criticizing President Bush during a live Webcast of a Pearl Jam performance.

Question 2. Given the size, complexity and cost of the broadband networks, how quickly can a network operator reasonably be expected to migrate to new management technologies? At what cost?

Answer. The Commission has the dual responsibilities of creating an environment that promotes infrastructure investment and broadband deployment and to ensure that consumers' access to content on the Internet is protected. In order to meet these responsibilities, I intend to explore more fully what constitutes reasonable network management practices, including the important ability for network managers to block the distribution of illegal content, including pirated movies and music and child pornography. I note, however, that the Commission has not mandated the adoption of any particular network management technology.

Question 3. What are the unique challenges that are faced by smaller rural providers who may have more stringent capacity issues—is this an area where one size fits all?

Answer. The Commission has not mandated the adoption of any particular network management technology and we would need to consider all of the facts including the capacity issues and unique challenges of rural carriers. Rather, I intend to explore more fully what constitutes reasonable network management practices, including the important ability for network managers to block the distribution of illegal content, including pirated movies and music and child pornography.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. OLYMPIA J. SNOWE TO HON. KEVIN J. MARTIN

Question 1. The FCC has held two hearings, one at Harvard and one at Stanford, to hear from expert panelists regarding broadband network management practices. At Harvard, you mentioned that service providers should be allowed to take reasonable steps to make efficient use of their networks but that such management poli-

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[1] *Broadband Industry Practices,* WC Docket No. 07–52, Notice of Inquiry, 22 FCC Rcd 7894, 7896, para. 4 (2007) (internal footnotes omitted).

cies must be disclosed. Many witnesses at that hearing also voiced concern about the lack of disclosure and transparency. Since the Comcast-BitTorrent incident, Comcast has revised its terms of service and issued a new acceptable use policy. Does this change in Comcast's TOS provide enough information to consumers or developers that may want to create new applications or services to work over the Comcast network?

Answer. First, the Commission still has the Comcast complaint in front of it. I was pleased that Comcast has reversed course and agreed that it is not a reasonable network management practice to arbitrarily block certain applications on its network. I also commended the company for admitting publicly that it was engaging in the practice and for engaging in a dialog with BitTorrent. I am concerned, though, that Comcast has not made clear when they will stop this discriminatory practice. It appears this practice will continue throughout the country until the end of the year and in some markets, even longer.

I have proposed a framework for analyzing complaints and concerns about network management practices by broadband operators. First, the Commission should consider whether the network management practices are intended to distinguish between legal and illegal activity. The Commission's network principles only recognize and protect users' access to legal content. Second, the Commission should consider whether the network service provider adequately disclosed its network management practices. A hallmark of whether something is reasonable is whether an operator is willing to disclose fully and exactly what they are doing. Adequate disclosure of the particular traffic management tools and techniques—not only to consumers but also to the designers of various applications and entrepreneurs—is critical. Finally, the Commission should consider whether the network management technique arbitrarily blocks or degrades a particular application.

If a network management practice selectively identifies particular applications or content for differential treatment, the Commission should evaluate the practice with heightened scrutiny, with the network operator bearing the burden of demonstrating that the particular practice furthered an important interest, and that it was narrowly tailored to service that interest.

Question 1a. Can the company provide more disclosure and not infringe upon proprietary or sensitive company information that would be useful to consumers and developers?

Answer. While we have not yet acted on the Comcast complaint, adequate disclosure of the particular traffic management tools and techniques must be provided to the designers of various applications and entrepreneurs.

Question 2. The Commission is still investigating complaints regarding the Comcast-BitTorrent blocking or degrading incident and has yet to determine whether the actions violated the FCC's principles protecting consumer access to the Internet. However, you stated with respect to the incident it does not appear that cable modem subscribers had the ability to do anything they wanted on the Internet, it wasn't content agnostic, and the questionable network management technique was being triggered regardless of the actual levels of congestion at that particular time. Given this evidence and the testimony of the various witnesses at your two hearings, it seems as if the activities of Comcast were in clear violation of at least two of the FCC's principles—"*Consumers are entitled to access the lawful Internet content of their choice*" and *"are entitled to run applications and use services of their choice,"* does the Commission agree?

Answer. The Commission is still investigating these complaints and we have not yet determined whether the actions violated our principles protecting consumer access to the Internet. However, Comcast appears to have utilized Internet equipment from Sandvine or something similar that is widely known to be a relatively inexpensive, blunt means to reduce peer-to-peer traffic by blocking certain traffic completely. In contrast, more modern equipment can be finely tuned to slow traffic to certain speeds based on various levels of congestion. Specifically, this equipment: (1) blocks certain attempts by subscribers to upload information using particular legal peer-to-peer applications by pretending to be the subscriber's computer and falsifying a "reset" packet to end the communication, and (2) degrades the corresponding attempts to download information using the same peer-to-peer applications.

Based on the testimony we have received thus far, I think it is important to clarify a few points. Contrary to some claims, it does not appear that cable modem subscribers had the ability to do anything they wanted on the Internet. Specifically, based on the testimony we have received thus far, some users were not able to upload anything they wanted and were unable to fully use certain file sharing software from peer-to-peer networks. Contrary to some claims, it does not appear that

this technique was used only to occasionally delay traffic at particular nodes suffering from network congestion at that time. Indeed, based on the testimony we have received thus far, this equipment is typically deployed over a wider geographic or system area and would therefore have impacted numerous nodes within a system simultaneously. Moreover, the equipment apparently used does not appear to have the ability to know when an individual cable segment is congested. It appears that this equipment blocks the uploads of at least a large portion of subscribers in that part of the network, regardless of the actual levels of congestion at that particular time. Finally, contrary to some claims, it is not clear when they will actually stop using their current approach. They claim that they will deploy this new solution by the end of the year but it is unclear whether they will be finished deploying their solution or just starting that migration. Indeed the question is not when they will begin using a new approach but if and when they are committing to stop using the old one.

Question 3. It seems unclear when Comcast will actually stop using their questionable approach to network management. The broadband provider has vaguely claimed they will deploy a new network management solution by the end of the year but it seems as if they are continuing to use their current method. What is the Commission's time-frame with concluding its investigation?

Answer. I am hopeful that the Commission will conclude its investigation into the Comcast complaint by this summer.

Question 4. Isn't it concerning that Comcast is continuing to employ discriminatory network management practices, which many experts have called unreasonable?

Answer. I am concerned that Comcast has not made clear when they will stop this discriminatory practice. It appears this practice will continue throughout the country until the end of the year and in some markets, even longer. While it may take time to implement its preferred new traffic management technique, it is not at all obvious why Comcast couldn't stop its current practice of arbitrarily blocking its broadband customers from using certain applications. Comcast should provide its broadband customers as well as the Commission with a commitment of a date certain by when it will stop this practice.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DANIEL K. INOUYE TO DR. ROBERT HAHN

Question 1. Since 2003, the FCC has been reclassifying broadband services as Title I services under the Communications Act. In 2005, the Supreme Court upheld this approach in its Brand X decision. In light of the FCC's reclassification of broadband services and the Supreme Court subsequently deciding that this approach passes legal muster, do you believe the FCC has adequate authority to stop broadband network providers from engaging in unfair discrimination?

Answer. Let me preface my remarks by saying that I am an economist and not a lawyer. I do believe that the FCC has adequate authority. I also believe that, to the extent there are antitrust issues, the FTC and DOJ can play constructive roles.

Question 2. Broadband capacity plays an important role in the network neutrality and network management discussion. To this end, I would like to ask two questions: Can we worry less about discrimination or content favoritism if there is more broadband network capacity?

Answer. This question avoids the most critical question in the broadband debate—namely, what is the most efficient way in which network owners can expand capacity. A "dumb" large pipe that treats all packets the same may cost significantly more than an intelligent smaller pipe that prioritizes some traffic over others. The higher costs associated with the dumb pipe will likely be passed on to broadband subscribers in the form of higher monthly subscription fees. Regulators should not mandate this outcome because it would likely be inefficient and hurt consumers.

Question 2a. Can broadband network providers add capacity fast enough to meet consumer demand?

Answer. In the absence of a market failure, regulators should not concern themselves with such issues. The market can be counted on to satisfy demand. Some of the legislative proposals limiting pricing freedom are likely to slow the introduction of innovative technologies that can best meet consumer demands.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED STEVENS TO DR. ROBERT HAHN

Question 1. Who benefits from network neutrality regulation?

Answer. This depends on the kind of network neutrality regulation. If we assume net neutrality regulation prevents a platform provider from charging a content provider a positive price for enhanced quality of service, then my sense is that there would be three important economic impacts: (1) Higher bills for end users (*i.e.,* consumers and businesses that use the Internet will likely pay more than they would otherwise because the platform provider cannot recover costs of the network from the content providers); (2) Fewer applications that depend on enhanced quality of service would come to market; and (3) Some content providers would benefit who do not need a higher quality of service because they would not be charged by the platform for providing end users with access to their content.

Regarding item (1), more research needs to be done to estimate the economic impacts on consumers, but preliminary research I have done with Hal Singer suggests that the adverse price impacts on end users could be substantial.

Regarding item (2), consumers who desire applications that require a higher quality of service to perform effectively will be less likely to have that opportunity with net neutrality regulation. Examples include online gaming and telemedicine. There would be social losses and losses to consumers from a reduction in investments aimed at improving quality of service.

Question 2. Net neutrality proponents argue one set of rules for everyone, but doesn't network neutrality impact different consumers differently and different networks differently?

Answer. The impact of particular regulations is an empirical question. Nonetheless, I think it is fair to say that different consumers will be impacted differently as will different networks. I would need to have more precise economic data to say more about this.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. OLYMPIA J. SNOWE TO DR. ROBERT HAHN

Question 1. It has been stated numerous times that there isn't sufficient broadband ISP competition. While some markets (more metropolitan and urban areas) do have robust competition, most markets have an effective duopoly that controls access to high speed Internet connections. How would you assess the current direction of broadband competition given the emergence of wireless broadband and broadband over power lines (BPL) services? Is competition growing?

Answer. This depends on how you define competition. Data I cited in my testimony, contained in the FCC reports, suggest that competition in the wireline broadband space is growing. Moreover, competition between wireline and wireless networks is growing. So, for example, I may use a BlackBerry to get my e-mail or access the Internet, and I might also use my mobile phone. My view of the general "broadband market" is that it is highly dynamic and consumers are benefiting. I cite price and quality of service data in my testimony that makes this point.

Question 2. Why isn't there more competition in the Broadband space? What barriers to entry are hindering new entrants?

Answer. I see a lot of competition in the broadband space. In my testimony and in AEI-Brookings publications, I make suggestions on lowering some barriers to entry. One area that could lead to greater competition in broadband is the auctioning off of more spectrum to the private sector.

Question 3. What specific recommendations do you have for us to craft effective policy that would promote more competition in this market space?

Answer. Let's recognize that regulation that aims to prevent a platform owner from contracting with a website for enhanced quality of service at a positive price will not likely generate more competition among platform owners. Let's also recognize that regulation has costs as well as benefits. Moreover, most economists who have looked at proposals for net neutrality appear to agree that the benefits of such regulation are likely to fall short of the costs.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BYRON L. DORGAN TO PATRIC VERRONE

Question 1. Are network operators a potential threat to new video services on the Internet?

Answer. Network operators are indeed a potential threat to the proliferation of new video services on the Internet. The WGAW believes that the public interest is served by the existence of diverse new media platforms that offer original made-for-online content. Many such sites have been launched and many more are in the works. We must, however, ensure that these new ventures are not placed at a disadvantage by network operators that discriminate or in any way impede the ability of consumers to access their content. Certain network operators have already admitted blocking or otherwise interfering with certain types of web traffic. The WGAW believes the actions of some network operators have set a dangerous precedent and must be immediately counteracted.

Question 2. Should network operators who are also in the business of selling content to their subscribers have the power to discriminate against competing services?

Answer. Absolutely not. This type of interference is a threat to the vitality of the Internet.

The concern of the WGAW and its members is that the service providers will use their resources to create a "walled garden" on the Internet, effectively blocking access to sites that can not afford to pay for distribution, or allowing favored content providers access to a "fast lane." The Internet is the next frontier in the distribution of news and entertainment content. If we want to avoid the problems that have resulted from the extreme consolidation of the Nation's broadcast system, we must allow the Internet to remain true to the principles of openness that animated its creation. We must ensure that independent production and a diversity of viewpoints are not crowded out of the Internet. SB 215 will do just that.

We are also concerned that a lack of competition among Internet service providers could ultimately leave Americans with fewer choices than what is now available on broadcast and cable television. One can imagine a circumstance in which high speed Internet service to a community is offered by only one company. Should that company also be a content producer, or be affiliated with or have an exclusive arrangement with a content producer, the access of consumers to diverse viewpoints could be threatened. We share the Senator's belief that democracy relies on diverse viewpoints. Maintaining the Internet as an open forum will ensure that Americans have access to an inexhaustible source of information and entertainment.

Question 3. Are we in danger of seeing the old media cartel reappear in new media?

Answer. It is not difficult to envision how "old media" conglomerates could use their economic power to carve out significant market share on the Internet, to the detriment of independent producers and small start-ups. The major media companies are actively pursuing online business. Hulu.com and iTunes are two of the most prominent examples of the major studios attempting to capture online market share.

There is a lesson to be learned from the old media consolidation. As I mentioned in my remarks, the companies that control distribution, and now production, have used their market power to own and control the content writers create. If we do not protect the openness of the Internet, we will merely recreate that increasingly closed system, in which distributors use their ability to turn the spigot off and on as a means of controlling content. The dominant players in the new media cartel may be the same conglomerates that control traditional media, or they may be Internet service providers that use their distribution prowess to establish the same hierarchical business model. In either case, such consolidation will be detrimental to small producers, content creators and the American public, which is best served by fostering access to a diversity of views.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JIM DEMINT TO PATRIC VERRONE

Question 1. In your testimony, you argue that the Internet will be "turned into a walled garden of content control" without net neutrality. Of course, currently, there are no net neutrality regulations. In fact, there has been no such regulation on the entire broadband industry for years. Further, cable modem services have never been under such regulations. Have you seen a decrease in the quality, quantity. consumption. or availability of content created by your organizations members online currently compared to 1 year ago? Five years ago? Ten years ago?

Answer. Over the past few months we have experienced an exponential growth in the quality, quantity, consumption and availability of online content. Content made for traditional media is being reused on the Internet, and new sites have proliferated online with original made-for-Internet material. The members of the Writers Guild are poised to take advantage of these new platforms as a means of distributing the next generation of audiovisual content. But as I said in my testimony, in order for writers to create content and compete, we must maintain open access to the Internet.

The growth and impact of online content were illustrated during our recent strike against the major media companies. During the work stoppage, dozens of writers began producing Internet content. These works took many forms: historical analyses, strike updates, parody. Some clips posted by WGAW members received as many as 500,000 online hits.

Writers' interest in producing and distributing original content on the Internet will not subside now that the strike has ended. The Guild is actively negotiating collective bargaining agreements with independent companies that plan to concentrate on new media production.

The WGAW supports net neutrality as a means of protecting the environment that has allowed this new market to emerge. Your question presupposes that 'net neutrality' is government regulation. We have a different view. SB 215 is not government regulation, but a prophylactic measure to preserve an open access and prevent the regulation of the Internet by private companies that have the technical capability to control distribution channels.

Question 2. How do the revenues received by your members from the Internet distribution of their works compare to 1 year ago? Five years ago? Ten years ago?

Answer. While we have seen significant growth in revenues received by members from Internet distribution. the exact results have been difficult to ascertain. Prior to our recent negotiations with the studios, the compensation due for material reused on the Internet was in dispute. With the ratification of our new agreement, there is now a negotiated compensation structure for reuse of material on the Internet. Just as important, we succeeded in negotiating broad access rights allowing us to monitor the volume of Internet distribution as the market develops.

Question 3. Can you share any example of fellow writers' work being blocked by an Internet provider?

Answer. While we do not have an example of a fellow writer's work being blocked, the WGAW is extremely concerned about the dangerous precedent being set by certain Internet service providers. Comcast, AOL, AT&T and others have all been accused of, and in some cases have admitted, network management practices that interfered with consumer access to legal content. The WGAW has learned from its past experience with media consolidation that we must be diligent in our efforts to ensure that these providers are not allowed to restrict the ability of Americans to access content.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BYRON L. DORGAN TO JUSTINE BATEMAN

Question 1. Are network operators a potential threat to new video services on the Internet?

Answer. Internet connection providers are of course a vital part of the Internet experience and an absolute necessity in connecting to it. There is certainly the impression given by these companies that they would very much like to be in the primary business of constraining that Internet experience. There simply cannot be the continuation of innovation we have witnessed so far on-line with the private interest constraints that have been suggested by these Internet providers. The "constraint business" these providers suggest are absolutely threats to new video services. Supply and demand need to be the deciding factors in a new Internet venture's success or failure just like in the brick-and-mortar business landscape. In addition, the blocking and impeding of web traffic that has been perpetrated by specific Internet providers establishes a dangerous precedent and clearly demonstrates the need for the Federal Government to require preserving the Internet as the free and open marketplace it is today.

Question 2. Should network operators who are also in the business of selling content to their subscribers have the power to discriminate against competing services?

Answer. No. If Time/Warner, for example, wants to be in the Internet provider business (as they are) they need to abide by those rules (that will hopefully encompass Net Neutrality). If they also want to be in the content provider business (as

they are), they are welcome to be and to then abide by those rules—you have to be good enough and interesting enough for people to tune in and to continue to tune in. I do not believe that wearing two hats means you suddenly disregard any rules of those hats; it means you now have two sets of rules.

By the way, is this practice currently allowed with regard to the Cable TV services they provide? Are they allowed to block or impede access to programming just because it's not a Time-Warner show or on a Time-Warner network?

Conversely, if each Internet customer had two or more Internet providers to choose from, then perhaps there would be providers supplying only their material, but the most successful provider with the most customers would always be the one offering all the Internet has to offer.

Question 3. Are we in danger of seeing the old media cartel reappear in new media?

Answer. I absolutely believe that the media corporations are spitting mad that they do not have control over the distribution on the Internet and that their current and suggested future practices only hint at the control they wish they could exert over it.

For the entire life of TV and film production until recently, the studios and networks have had almost absolute control over distribution. That held not only the content providers attention, but also that of the advertisers.

But at the same time, al! the media consolidation of the last 15 years has taken the studios and networks out of the decision positions for the most part and put corporate businessmen, far removed from any knowledge about entertainment production, in the decision seats instead. As a result, quality and content have been pillaged in exchange for cold, hackneyed, overused concepts in our TV shows and films. The entire focus of these newly formed Media Collections is to dominate the market and increase financial performance. This in itself is not an unproven business tactic, but it doesn't work in the entertainment business.

So to answer your question, yes, I believe that the media corporations, in an effort to stem this mud-slide of failure they find themselves in, want to position themselves on the Internet in the same dominant way as they've enjoyed off-line. The fact of the matter is that this is not how you regain success in entertainment. The way you regain success in entertainment is to create compelling programming that people want to see over and over again.

So, even if they got their wish and "took over the Internet", nobody would watch, just like they're not watching TV and films like they used to. And we would all be looking for a new way to share our ideas with one another. Once that was established, they would then try to dominate that and so on and so on.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JIM DEMINT TO JUSTINE BATEMAN

Question. Under a net neutrality regulatory regime, no online data (including video) could be prioritized. What impact would such a regime have on the success of your project, FM78.TV, if you could not guarantee that its content reach end consumers with the quality you and they desire?

Answer. The lack of prioritization for data, including video, is exactly what FM78.TV and other online media ventures will rely on in order to be competitive in the new online marketplace. Our biggest worry is that the current set of content producers, mainly the major media companies, will use their largesse to secure a preferred place on the Internet. Should they be able to do that, companies such as mine, which lack the resources to pay for preferential service or prioritization, will be unable to compete with the extraordinary resources of the major media companies. If there is a 'fast lane' on the internet, I worry that only those companies with the financial capacity will be able to spread their content to the public.

The Internet service providers have already expressed their desire to maximize revenues be creating systems where they can provide preferential services to certain content companies in exchange for fees or compensation. Such a scheme could literally mean that a company such as mine is unable to compete. FM78.TV would prefer to maintain the open marketplace the current Internet structure provides. This will allow small business to compete with the large corporations that want to make the Internet the latest iteration of broadcast television—where control over distribution is used to own and control content.

If your question is intended to highlight the lack of broadband capacity in the United States, then I share your concern. I too am worried that companies like mine can not flourish until more Americans have access to high-speed, high-quality Internet service. The fact that we have allowed private companies to build out the cur-

rent broadband network is extremely regrettable and I believe will be a problem for generations to come. Unlike the airwaves that have been deemed public and have been monitored by the Federal Government, we have allowed the next generation of information to be solely controlled by the companies that have laid the groundwork, with nearly no oversight and with no governance. In such a scenario, the least we can do is insure that the companies that control the pipes are not able to interfere with the legal content and information that American's are able to access.

I hope the Federal Government, along with state and local governments, will use every means at their disposal to facilitate the build of the country's broadband infrastructure. Several independent sources have expressed concern that the United States is quickly falling behind other developed countries in terms of access to high speed Internet service. The competitiveness of our economic future depends upon more Americans having greater access to high speed internet. As a nation, we must prioritize greater commitment to insuring that American continues to lead in the new economy, and insuring that every American has access to high speed Internet is critical to that endeavor.'

1 find it troubling that certain telecommunications companies are claiming that net neutrality will stifle the infrastructure development. The same companies that make such a specious argument are the same companies that continue to generate record profits. Additionally, net neutrality simply preserves the ability for companies such as mine to distribute content on the net—it does nothing to interfere with the companies ability to charge consumers for the services.

I sincerely hope governments will prioritize the rapid development of the broadband infrastructure just as I sincerely hope that the founding principle of the internet—an open marketplace—will be preserved for generations to come.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DANIEL K. INOUYE TO KYLE MCSLARROW

Question 1. Since 2003, the FCC has been reclassifying broadband services as Title I services under the Communications Act. In 2005, the Supreme Court upheld this approach in its *Brand X* decision. In light of the FCC's reclassification of broadband services and the Supreme Court subsequently deciding that this approach passes legal muster, do you believe the FCC has adequate authority to stop broadband network providers from engaging in unfair discrimination?

Answer. Whether or not the FCC has the legal authority to regulate network management practices and otherwise enforce "net neutrality" requirements is currently an open question that is being considered by the FCC in an ongoing proceeding. I would also note that the FCC is not the only agency that may have authority to address these issues. In particular, the FTC has claimed authority to address anticompetitive practices by network operators.

Question 2. Broadband capacity plays an important role in the network neutrality and network management discussion. To this end, I would like to ask two questions:

Can we worry less about discrimination or content favoritism if there is more broadband network capacity?

Answer. Broadband consumers expect reliable and high-quality service at a reasonable cost that enables them to access lawful content over the Internet—and that is what cable broadband service provides. Cable broadband subscribers are able to enjoy the full benefits of broadband because cable operators manage their smart networks on a content-agnostic basis to provide seamless connectivity, deter spam and viruses, and make sure that a tiny minority of users who utilize bandwidth-heavy applications don't slow down the Internet for everyone else.

While cable broadband providers are constantly upgrading their capacity, the addition of capacity does not obviate the need for reasonable network management practices. For instance, as I explained in my testimony, many P2P protocols are written specifically to commandeer as much bandwidth as is available, meaning that providers cannot build their way out of the problems caused by these high-bandwidth applications. The best way to ensure that customers have the capability to access applications at desired speeds is to continue to allow broadband providers to manage their networks so as to ensure the best results for their customers.

Question 2a. Can broadband network providers add capacity fast enough to meet consumer demand?

Answer. Cable broadband providers are constantly upgrading their broadband networks to satisfy customer demand for fast and efficient access to new content and new applications, and to win and retain customers in the face of increased competition from many alternative providers. As I noted above, however, the addition

of capacity does not eliminate the need for providers to manage their networks to ensure the best possible broadband experience for their customers.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO KYLE MCSLARROW

Question 1. In your written testimony you raised concerns that any net neutrality rules may slow broadband roll out and adoption. Yet, you also cite the fact that cable already passes by 92 percent of households. Are you saying, in effect, that net neutrality rules will further slow consumer adoption of broadband? I thought it is content, applications, and price that drive consumer adoption of broadband.

Answer. We are very proud of the fact that cable providers have deployed broadband to more than 92 percent of households in the United States using private risk capital. However, cable broadband providers are constantly upgrading their networks to meet consumer demand and to ensure a stable and reliable broadband platform for providers of online content and applications that increasingly need greater transmission capacity and higher speeds. Regulations that would dictate or rule out particular business models or impede a broadband provider's ability to manage its broadband network could deter investments in these upgrades, to the detriment of consumers and service providers alike.

Question 2. Do you believe there to be a competitive market for high-speed Internet access in our country? If so, how many providers do there need to be in a market for you to consider that market to be competitive?

Answer. The market for high-speed Internet access is very competitive. Cable operators, telephone companies, satellite providers, wireless network operators, mobile service providers and others are investing and competing with each other to offer the most compelling and innovative service.

Question 3. Does your organization believe that the FCC's four net neutrality principles are enforceable by the agency? If not, then why not?

Answer. The FCC's four net neutrality principles are not binding and enforceable today, because they were not adopted as rules. Whether or not the FCC has the legal authority to adopt such rules or to regulate network management practices is currently an open question, and is being considered by the FCC in an ongoing proceeding.

Question 4. Does your organization believe that the FCC can use its ancillary authority under Title I of the Communications Act to enforce its four net neutrality principles? If not, then why not?

Answer. Whether the FCC has ancillary authority to enforce its net neutrality principles is being considered in the proceeding mentioned above.

Question 5. As you know, in a footnote to the FCC's four net neutrality principles, there was an escape clause which provides network operators a pass if they can show if they are performing "reasonable network management practices." What does NCTA consider to be "reasonable network management practices?" Does the FCC need to define the term further?

Answer. Cable customers enjoy the full benefits of broadband because cable operators manage their smart networks on a content-agnostic basis to provide seamless connectivity, deter spam and viruses, and make sure that a tiny minority of users do not slow down the Internet for everyone else. In order to ensure a stable and reliable broadband platform, cable operators must have the continued flexibility to adopt and implement content-agnostic network management practices that are reasonable with respect to their particular networks. "Reasonable network management" practices also depend on the types of issues that a particular network is facing. Any government definition of reasonable network management practices would invite confusion and litigation and would serve only to inhibit providers from effectively addressing future network issues. Regulations or a government definition of acceptable network management practices could also inhibit the development of innovative approaches to thwarting piracy and enhancing the online experience for the vast majority of Internet users.

Question 6. My understanding is that one of the ideas the FCC is considering is for broadband providers to disclose their network management policies in its terms of service. I am not sure what that will accomplish because the idea will only work if there is a competitive market for high-speed Internet access, where consumers can switch providers if they do not like the terms of service. Does NCTA support greater consumer disclosure of network management practices in plain English and in readable size font? If a network management practice is disclosed to consumers,

such as blocking or delaying packets, does it make it OK for a network operators to do it?

Answer. As I have frequently stated, the cable industry is always looking at ways to improve upon its disclosure of information to consumers in order for such disclosure to be as clear and helpful as possible. Cable operators believe that keeping their subscribers informed about network management practices is a critical element of customer service, but best left to individual company's policies, rather than government rules. NCTA member companies use a variety of methods to manage their networks and are therefore best suited to determine how to appropriately disclose that information. Cable companies periodically review and revise their disclosure statements to ensure that they are complete and easily understandable, and they do so without any government mandate. Given the intense competition for broadband customers that cable faces from telephone companies and other providers, cable operators strive to ensure that their terms of service are fair and reasonable.

Question 7. Bit Torrent uses peer-to-peer file sharing technology to deliver video content online. My understanding is that the technology is an efficient way to deliver content. Won't the cable industry's transition to DOCSIS 3 point 0 and Switched Digital Video ease some of the bandwidth constraints?

Answer. The transition to DOCSIS 3.0 and switched video technology will enhance the efficiency of broadband networks, but it will not eliminate the need for sound network management practices. Network operators will still need to address and eliminate viruses and spam, and they will still need to ensure that tiny minority of heavy users does not degrade service for the vast majority of customers. Further, as I explained in my testimony, many P2P protocols are written specifically to commandeer as much bandwidth as is available, meaning that added capacity can't eliminate problems caused by these high-bandwidth applications. The best way to ensure that customers have the capability to access applications at desired speeds is to continue to allow broadband providers to manage their networks so as to ensure the best results for their customers.

Question 8. Some public interest groups argue that the reason a cable system operator might want to degrade the lawful peer-to-peer video delivered online is for competitive reasons. How do you respond?

Answer. Those charges are wholly without foundation. In just the last few years, the use of Internet video on demand has grown at a dramatic rate. In July 2006, 107 million Americans watched video online and about 60 percent of Internet users downloaded more than 7 billion videos off the Internet. In February 2008, nearly 135 million U.S. Internet users spent an average of 204 minutes viewing 10.1 billion online videos. YouTube represented 34 percent of those online videos, or nearly 3.5 billion in total. To put it into context, in 2006, YouTube consumed as much bandwidth as the entire Internet consumed in the year 2000.

Competition has driven cable operators to invest in faster and more reliable networks to meet consumer demand for video and other bandwidth-intensive applications. Cable's investment in and deployment of the reliable high-speed broadband service that provides the ecosystem in which Google, YouTube, Yahoo! and other Internet services can flourish.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TED STEVENS TO KYLE MCSLARROW

Question 1. What do consumers expect a network operator to provide for them in terms of service and network management?

Answer. Broadband consumers expect reliable and high-quality service at a reasonable cost that enables them to access lawful content over the Internet. Cable operators have demonstrated their commitment to providing Americans the very best broadband service available, and remain committed to doing so. Cable broadband subscribers enjoy the full benefits of broadband because cable operators manage their smart networks on a content-agnostic basis to provide seamless connectivity, deter spam and viruses, and make sure that a tiny minority of users who utilize bandwidth-heavy applications don't slow down the Internet for everyone else.

Question 2. If a particular bandwidth service or application uses more bandwidth than others, why shouldn't the business owner of that application or service have to pay a fee?

Answer. It may very well be appropriate for a provider of such a service to bear a portion of the costs of delivering the service to its users. The alternative would be for the network provider to pass those costs on to all subscribers, including those

who do not user the service. This could put unnecessary upward pressure on the rates for broadband service and impede broadband adoption. Network and service providers need the flexibility to design and implement business plans that allow them to innovate and respond to consumer demand.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. OLYMPIA J. SNOWE TO KYLE MCSLARROW

Question 1. In a news.com August 2007 article, a Comcast spokesman "flat-out denied" Comcast was filtering or "shaping" any traffic on its network. He went on to state the company doesn't actively look at the applications or content that its customers download over the network. Obviously, the Comcast-BitTorrent incident seems to conflict with that assertion. In another incident last year, Comcast disconnected several high-usage broadband customers. Comcast did contact them prior to discontinuing their services warning to curb excessive bandwidth consumption or risk a one-year service termination but didn't clearly reveal how much bandwidth consumption is allowed. Why didn't Comcast provide more appropriate disclosure with these two incidents?

Answer. As this question is most properly directed to Comcast, we have shared the question with the company and it has provided the following response:

Comcast works hard to ensure that its customers have appropriate disclosure about its need to manage its network in order to prevent certain uses of the network from degrading the experience of other customers. Comcast's network management activities, both with respect to BitTorrent and with respect to excessive users, are consistent with the disclosures its customers receive in the Terms of Service ("TOS") and Acceptable Use Policy ("AUP") they are obligated to review before they may use the service. For years, Comcast's TOS has specified that Comcast High-Speed Internet service is subject to "speed and upstream and downstream rate limitations," and that the service may be used only for "personal, residential, non-commercial purposes." Similarly, for years Comcast's AUP has prohibited the use of the service that "restrict[sl, inhibit[s], or otherwise interfere[s] with the ability of any other person . . . to use or enjoy the [s]ervice, including . . . generating levels of traffic sufficient to impede others' ability to send or retrieve information." And, for years, Comcast's AUP has required customers to ensure that their "use of the Service does not restrict, inhibit, interfere with, or degrade any other user's use of the Service nor represent . . . an overly large burden on the network" Comcast has openly and readily acknowledged that it manages its network, including managing traffic that causes congestion as well as reserving the right to terminate service of those customers who abuse their service after due notice.

"Transparency" on network management issues is incredibly complicated given that Internet applications and services change constantly. Nevertheless, Comcast works to ensure that its disclosures on matters such as network management and excessive usage are timely and in sufficient detail to ensure transparency to our customers while not providing a roadmap to those who would seek to defeat these reasonable network management efforts. Mindful of the views of its customers—and of policymakers—who have urged that the challenges of network management and excessive usage he explained better to consumers, Comcast revised its AUP and FAQs earlier this year to provide even greater transparency on these subjects. We provide more details in our response to the next question.

Ultimately, Comcast's network management practices are undertaken to ensure that its customers continue to receive the world-class service that they have come to expect from Comcast.

Question 2. Comcast has also recently changed its Terms of Service in January where it now states the company "uses reasonable network management practices that are consistent with industry standards" and it temporarily delays peer-to-peer sessions during "periods of high network congestion" which seem vague. Could you elaborate on what the "industry standards" are because it seems as if the techniques Comcast employed with BitTorrent were non-standards based practices—such as spoofing or falsifying IP packets and infringing on consumer privacy by inspecting consumers' data to determine which were from the P2P application?

Answer. As this question is most properly directed to Comcast, we have shared the question with the company and it has provided the following response:

To effectuate its current bandwidth management, Comcast 's network issues instructions called "reset packets"—which involve a communication between two IP

addresses (and, importantly, not between two people)—to temporarily delay the initiation of new P2P file uploads at times of network congestion.

A "reset" is nothing more than a bit in the TCP packet header that is used to signal that there is an error condition within the network and that a new connection needs to be established; the new connection is automatically established by the application or service initiating the connection. The use of resets is commonplace. AT&T has noted that "[t]he 'reset' command has been [around] for more than a quarter century" and "is commonly used to enable one computer to abort a TCP connection with another computer for any of a number of reasons, such as when the communications between the two computers become unsynchronized." And Richard Bennett, a noted network engineer, recently described a reset packet as "the only machine language [P2P protocols] understand [and] this type of technique is common in the networking and software industry where alternatives don't exist." It is the same message that the computer receives when any number of problems occur during a P2P file transfer, and the computer requesting the file automatically knows how to process this message and to retry its request (assuming it has not already downloaded the file from other computers) without the user having to take any additional action, just like a fax machine does when it receives a busy signal. To most end users, these communications will be virtually imperceptible, and, especially in the case of properly functioning P2P protocols, will have no perceptible effect on the end user's experience.

Comcast does not inspect the content of data packets traversing its network, and does not treat data packets differently based on their content. Rather, Comcast, like many other ISPs, inspects the data packets only to the extent necessary to determine whether the packet will cause damage to the network or otherwise degrade the consumer experience. Inspecting data packets to determine whether they are sent by a particular P2P protocol that causes excessive congestion is no different than inspecting the packets to determine whether they contain malicious code, such as viruses, worms, spam, or other firms of malware. Other network functions, including, in some cases, proper routing of the packets, also require this kind of packet inspection. In all cases, such inspection is reasonably limited to look no further than necessary than to determine whether the transmission is using a P2P protocol that causes excessive congestion that can degrade other customers' Internet experiences. There are no privacy implications in such packet inspections.

Finally, we are engaging with the broad Internet community through the Internet Engineering Task Force (IETF) to review how and why we implemented our current bandwidth management practices, and to consult with them on alternative approaches, including efforts to make P2P technologies more bandwidth-efficient.

Question 3. Don't certain networking protocols and standards, such as Transmission Control Protocol (TCP), already employ congestion control mechanisms, so why add an additional layer?

Answer. Different network operators have different reasons for employing their particular set of network management techniques and strategies. The merits, feasibility, and effectiveness of using particular congestion management techniques such as traditional TCP congestion controls versus using more innovative approaches are very complex technical issues that many of the greatest minds in the Internet community are currently debating. NCTA's member companies work hard to ensure that their customers receive a world-class service, and need the flexibility to use the network management practices that best address their particular circumstances to continue to deliver the type of service that their users expect and deserve.

Question 4. MIT Scientist David Clark recently voiced frustration about the lack of availability of data and information on network usage from the Internet service providers in order to conduct studies on some of the network problems that exist. Mr. Clark gave one example where he could not get one domestic ISP to provide any useful information for his study on residential high-usage broadband users—this in light of offering to keep the ISP's data completely anonymous. There also seemed to be similar reluctance from industry with crafting national broadband mapping policy—to improve the accuracy of the data so consumers and businesses know where broadband is offered and ISPs know where demand is. Why this constant reluctance, even when the data would remain anonymous?

Answer. We know and respect Dr. Clark's work. Various of our companies have spoken with Dr. Clark and others in the academic community about the challenges of sharing such data, and we are hopeful that this can be worked out with all ISPs. For ISPs, understanding customer usage patterns is an important part of devising

solutions for network management. Of course, network usage data is confidential and competitively sensitive, and there may be privacy issues raised by allowing third parties to have access to such data. Moreover, any network management solution needs to be designed to function with the specific technology each provider has implemented in its network.

We respectfully disagree with the suggestion that the cable industry has been reluctant to craft a national broadband mapping policy. The cable industry has consistently demonstrated its commitment to policies that ensure all Americans have access to affordable broadband. Cable supports Senator Inouye's Broadband Data Improvement Act because we believe that improving Federal data collection and dissemination regarding where broadband services have been deployed in the United States is necessary in order to achieve the goal of ubiquitous broadband availability for all Americans. And cable companies have cooperated with programs under the aegis of Connected Nation on state broadband mapping efforts.

Question 5. If we don't have this information then how can we properly address the problems we're facing, whether from standards development, regulatory, or a policy perspective?

Answer. As noted above, cable fully supports broadband mapping legislation, but we believe that network usage data is better evaluated by individual network providers.

Question 6. You've stated "various estimates are that as few as 5 percent of customers use from 50 to 90 percent of the total capacity of the network." But where is the industry data to support this claim?

Answer. The following from the FCC record:

AT&T Comments, WC Docket No. 07–52, at 14–15 (quoting David Vorhaus, Yankee Group, *Confronting the Albatross of P2P* 1–2 (May 31, 2007)):

- P2P traffic "constitutes approximately 60 percent of all traffic that traverses the public internet";
- "BitTorrent alone accounts for roughly 40 percent of all bandwidth";
- "[i]n times of peak usage, bandwidth-hogging users sharing large files over P2P can push networks to their absolute limit"; and
- "[t]his problem is poised to worsen in the coming years" because, "[a]s content owners migrate more video content to IP networks, bandwidth demand will inevitably skyrocket."

"In the absence of the broadband management practices, as few as 5 percent of users dictate the terms on which the remaining 95 percent of users get access to broadband." CTIA Reply Comments, WC Docket No. 07–52, at 3 (citing CTIA Comments at 12 (citing Steven Levy, "Pay Per Gig", *The Washington Post,* D1 (Jan. 30, 2008) *and* David Vorhaus, *Confronting the Albatross of P2P,* Yankee Group (May 31, 2007)).

"In a recent study of average data usage on its high speed wireless EvDO mobile broadband network, Sprint Nextel learned that a subset of end users, approximately 3 percent, accounted for more than 50 percent of the total data usage on the network. During busy hours, a mere 1 percent of end users generates 42 percent of data traffic and is affecting performance for all other users. While the demands of these users may not have a significant impact at 3 a.m., they do affect the other 99 percent of end users during the peak busy hours of 8 p.m. and midnight. If Sprint Nextel took no action to manage its network two or 3 percent of its total end users could exhaust the network, leaving little or no capacity for the remaining 98 percent." Sprint Reply Comments, WC Docket No. 07–52, at 6.

NBC Universal Reply Comments, WC Docket No. 07–52:

- Five percent of Internet users consume at least 60 to 70 percent of network capacity through P2P file sharing. 90 percent of this traffic consists of illegal, pirated content. Too many parties in this proceeding are ignoring the obvious reality that the scale of illegal conduct is enormous and the Commission must allow network operators to combat this. (1–2)
- Commission Deborah Taylor Tate referenced piracy in her opening statement on February 25, 2008, and her concerns are well-founded. There is overwhelming and undisputed evidence that massive copyright infringement takes place on P2P networks. (3)
- In 2005 CacheLogic presented figures to the Federal Trade Commission that P2P represented 60 percent of Internet traffic at the end of 2004 and is still growing. (5)

- A Sandvine report had similar conclusions. In Europe upstream P2P traffic represents up to 85 percent of all bandwidth consumed on broadband provider networks. Downstream P2P traffic represents about 60 percent of bandwidth consumed. In the U.S. and U.K. upstream traffic amounts to 76 percent and downstream 48 percent. (5)
- Time Warner Cable announced that fewer than 5 percent of its users account for 60–70 percent of their network capacity—all through P2P applications. Other commentators have noted that this can reach as high as 90–95 percent during peak times. (5–6)

"As the record makes clear, P2P traffic constitutes a clear majority of all Internet traffic. . . . Indeed, several observers suggest that P2P traffic now accounts for about 60 percent of all Internet traffic." USTA Reply Comments, WC Docket No. 07–52. at 6 (citing numerous sources including Christopher S. Yoo, *Network Neutrality and the Economics of Congestion,* 94 Geo. L. J. 1847, 1878 n.145 (2006) (citing six sources which attribute up to 73 percent of upstream traffic and 60 percent of overall traffic to peer-to-peer file sharing)).

"A study of Internet traffic between August and September 2007 confirmed that P2P applications produce more Internet traffic than all other applications combined and represent up to 89 percent of traffic in certain parts of the world. The restrictive ruling that certain parties in this proceeding request would, in effect, hinder the ability of content providers to offer their services to all subscribers just to satisfy the unreasonable network demand of a fraction of end users." Viacom Reply Comments. WC Docket No. 07–52, at 12.

"Numerous groups have highlighted the significant—negative—impact of P2P on America's broadband infrastructure. Estimates are that as much as 90 percent of traffic at a given time can be occupied by just a small percentage of users of P2P. Other analyses have shown that as few as 15 users within a geographic area using P2P can demonstrably degrade the Internet experience for the rest of the community. The Yankee Group estimates that P2P 'can push networks to their absolute limit' during times of peak usage. According to the network engineer Richard Bennett, '[t]he fundamental design goal of BitTorrent is to use up all available bandwidth.' Others contend that P2P 'will sop up the majority of available bandwidth.'" National Black Chamber of Commerce *et al.* Reply Comments, WC Docket 07–52, at 3–4.

George Ou 4/14/08 Written Testimony Generally

Question 7. Can you provide the raw data to support this or elaborate on the sources of the estimates you cite?

Answer. See above.

Question 8. Comcast has made the assertion that the FCC has no legal power to stop them from engaging in what it calls "reasonable network management" even if Comcast's behavior was deemed inconsistent with the Internet Policy Statement. Further more, Comcast states that given cable modem service is an information service not a telecommunications service, that any attempt to justify an injunction on Comcast based on a statutory provision that is explicitly limited to common carriers would violate the Communications Act and be arbitrary and capricious. If this is true, how can the FCC effectively prevent or enforce, in a swift manner, unreasonable or discriminatory practices related to broadband or network management?

Answer. There is no doubt that the FCC's Internet Policy Statement is not binding and enforceable today. Indeed, the Chairman of the FCC acknowledged that fact explicitly when the FCC issued it, expressly stating that the FCC was not adopting enforceable rules. Whether or not the FCC has the legal authority to adopt enforceable rules that regulate network management practices is currently an open question, and is being considered by the FCC in an ongoing proceeding. I would also note that the FTC has also claimed authority to address anticompetitive practices by network operators.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JIM DEMINT TO KYLE MCSLARROW

Question 1. Many people today have cited a time when "net neutrality" principles were enforced through common carrier regulations. Have cable modem services ever been treated under common carrier regulations?

Answer. No. There was a short period in which the underlying transmission component of cable modem service was considered a common carrier offering, but only in the 9th Circuit, as a result of that court's ruling in *AT&T* v. *City of Portland,* 216 F.3d 871 (2000). Notably, even this ruling did not apply common carrier regula-

tion to cable modem service itself. Less than 2 years after City of Portland, the FCC issued a declaratory ruling holding that neither cable modem service nor the underlying broadband transport was subject to common carrier regulation. In *NCTA* v. *Brand X Internet Services,* 545 U.S. 967 (2005), the Supreme Court not only upheld the FCC's ruling, but also held that the ruling superseded the 9th Circuit's decision.

Question 2. We hear a great deal about a lack of availability of broadband service in the United States, but your testimony indicates that cable broadband service is now available to 92 percent of Americans. How many years has it taken to reach this level?

Answer. Cable operators have invested $130 billion since 1996 to build fiber optic networks that have brought high-speed Internet access to more than 92 percent of the United States.

Question 3. How much public subsidy has been used to reach this level?

Answer. Other than a small amount of funding through the E-Rate program to wire schools and libraries, cable operators have relied on private risk capital to deploy their networks.

Question 4. How do you feel the efforts of the cable industry comport with Mr. Lessig's model of abundance?

Answer. Contrary to Mr. Lessig's suggestion, cable operators in fact have adopted a "business model of abundance and neutrality," in which providers offer "whatever legal applications and content users and innovators want." If cable operators pursued the model of "scarcity and control" he claims we do, they would soon lose customers to other providers of broadband service. It is clearly unnecessary to enact legislation imposing any particular business model, and doing so would deprive network operators of the flexibility they need to innovate and respond to customer demand.

Question 5. Many people belittle the competition that exists between cable companies and telephone companies in the broadband market today, as well as the competition provided by wireless and satellite providers. Could you provide your view on the state of competition, and what impact that competition has on consumers?

Answer. Broadband services arc intensely competitive, with cable operators, telephone companies, satellite providers, wireless network operators, mobile service providers and others investing, innovating and competing with one another. In this environment, cable operators are striving to give consumers the best Internet experience they can, at the best value.

Question 6. You've stated "various estimates are that as few as 5 percent of customers use from 50 to 90 percent of the total capacity of the network." But where is the industry data to support this claim?

Answer. There are no hard and fast rules with regard to estimates of bandwidth consumption, thus the reasoning behind referencing a range in the testimony. One reason for the wide range of estimates reported may be the difficulty in detecting certain types of protocols of Internet traffic. Some P2P clients now incorporate protocol obfuscation using encryption and similar methods to hide from detection. Therefore some of the studies or estimates may not actually be detecting all of the P2P and other bandwidth intensive activities that are actively taking measures to *fly under the radar.*

The core of the bandwidth consumption statement came from an Ellacoya Networks study.[1] It should be noted that this finding was not exclusively addressing P2P, but it did cite P2P as the primary high-bandwidth application. The testimony also cited recent experience in Japan, where 1 percent of broadband users, using P2P, account for roughly 47 percent of total consumption, and 10 percent of users, using P2P, account for 75 percent of total consumption.[2] Many other studies and knowledgeable entities have disclosed findings about inordinate bandwidth consumption, often as a result of P2P usage. Included among these are:

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[1] *No free lunches on the Net;* Research conducted by Ellacoya Networks shows that up to 5 percent of broadband subscribers can consume nearly 90 percent of network bandwidth, primarily by using high-bandwidth applications such as streaming media and, especially, file sharing. These demands are more than doubling network capacity requirements each year. *http://news.cnet.com/2010–1034__3–6068868.html?part=rss&tag=6068868&subj=news.*

[2] *Testimony of George Ou;* FCC Broadband Industry Practices Hearing; Stanford University; April 17, 2008; "Recently, the Japanese Ministry of Internal Affairs and Communications released a study showing that just 1 percent of Japan's broadband users using P2P account for roughly 47 percent of Japan's Internet usage. Furthermore, only 10 percent of Japan's broadband users using P2P account, on average, for 75 percent of all Internet usage." *http://www.lanarchitect.net/Files/Network__Management__n__Internet.doc*

- ipoque study [3]
  - P2P apps can account for an astonishing 95 percent of all nighttime traffic
  - P2P sucks up anywhere between 49 and 83 percent of all Internet traffic during the day, and can spike much higher at night
- Virgin Media [4]
  - 5 percent of customers accounting for 70 percent of data downloaded at peak times
- Yankee Group analyst David Vorhaus [5]
  - Cable operators report that 60 percent to 75 percent of their Internet traffic is being generated by P2P file-sharing.
  - Vorhaus estimates that 5 percent to 10 percent of Internet users are generating 80 percent to 90 percent of this P2P traffic.
- UC Irvine [6]
  - Prior to installing traffic management hardware, about 2 percent of the residents would use over 90 percent of the available bandwidth, causing slowdowns and poor performance for everyone.
- Cisco Systems [7]
  - P2P comprised 54 percent of global Internet traffic in 2007
- CacheLogic [8]
  - More than 60 percent of consumer Internet traffic is P2P

And finally, it should also be noted that SafeNet Inc. estimates that 90 percent of P2P downloads are still of illegally copied content.[9]

In addition, see the following from the FCC record:

AT&T Comments, WC Docket No. 07–52, at 14–15 (quoting David Vorhaus, Yankee Group, *Confronting the Albatross of P2P* 1–2 (May 31, 2007)):

- P2P traffic "constitutes approximately 60 percent of all traffic that traverses the public internet";
- "BitTorrent alone accounts for roughly 40 percent of all bandwidth";
- "[i]n times of peak usage, bandwidth-hogging users sharing large files over P2P can push networks to their absolute limit"; and
- "[t]his problem is poised to worsen in the coming years" because, "[a]s content owners migrate more video content to IP networks, bandwidth demand will inevitably skyrocket."

"In the absence of the broadband management practices, as few as 5 percent of users dictate the terms on which the remaining 95 percent of users get access to broadband." CTIA Reply Comments, WC Docket No. 07–52, at 3 (citing CT1A Comments at 12 (citing Steven Levy, "Pay Per Gig", *The Washington Post,* D1 (Jan. 30, 2008) *and* David Vorhaus. *Confronting the Albatross of P2P,* Yankee Group (May 31, 2007)).

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[3] *Nocturnal P2P transmissions account for 95 percent of Internet traffic; http://arstechnica.com/news.ars/post/20071128-nocturnal-p2p-transmissions-account-for-95-percent-of-internet-bandwidth.html link to ipoque study; http://www.ipoque.com/userfiles/file/Internet_study_2007_abstract_en.pdf*

[4] Virgin Media website—Traffic Management—how do we know this will work?

• During our busiest times in the evening, we have noticed that some applications (for example Peer to Peer file sharing applications) use significant amounts of bandwidth, often at the expense of critical Internet services like browsing the Web or using e-mail.

• We found that this small minority of customers were actually downloading enough information to significantly affect the service for other customers' broadband service. To put it another way, just 5 percent of customers were accounting for around 70 percent of data downloaded at peak times.

http://www.virgin.net/allyours/faqs/traffic_faqs.html#cut_costs

[5] *When Capacity is Never Enough; http://www.multichannel.com/article/CA6544099.html*

[6] *Bandwidth! How The Residential Network Is Handling It; http://resnet.uci.edu/bandwidthFAQ.asp*

[7] *Global IP Traffic Forecast and Methodology, 2006–2011-Cisco Systems; http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/net_implementation_white_paper0900aecd806a8laa.pdf*

[8] P2P File Sharing—The Evolving Distribution Chain-CacheLogic presentation; note chart on slide 3; *http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/net_implementation_white_paper0900aecd806a81aa.pdf*

[9] *Peer-to-peer networks go legit, but piracy is still rampant; http://www.siliconvalley.com/latestheadlines/ci_8575851?nclick_check=1&,forced=true*

"In a recent study of average data usage on its high speed wireless EvDO mobile broadband network, Sprint Nextel learned that a subset of end users, approximately 3 percent, accounted for more than 50 percent of the total data usage on the network. During busy hours, a mere 1 percent of end users generates 42 percent of data traffic and is affecting performance for all other users. While the demands of these users may not have a significant impact at 3 a.m., they do affect the other 99 percent of end users during the peak busy hours of 8 p.m. and midnight. If Sprint Nextel took no action to manage its network two or 3 percent of its total end users could exhaust the network, leaving little or no capacity for the remaining 98 percent." Sprint Reply Comments, WC Docket No. 07–52, at 6.

NBC Universal Reply Comments, WC Docket No. 07–52:

- Five percent of Internet users consume at least 60 to 70 percent of network capacity through P2P file sharing. 90 percent of this traffic consists of illegal, pirated content. Too many parties in this proceeding are ignoring the obvious reality that the scale of illegal conduct is enormous and the Commission must allow network operators to combat this. (1–2)
- Commission Deborah Taylor Tate referenced piracy in her opening statement on February 25, 2008, and her concerns are well-founded. There is overwhelming and undisputed evidence that massive copyright infringement takes place on P2P networks. (3)
- In 2005 CacheLogic presented figures to the Federal Trade Commission that P2P represented 60 percent of Internet traffic at the end of 2004 and is still growing. (5)
- A Sandvine report had similar conclusions. In Europe upstream P2P traffic represents up to 85 percent of all bandwidth consumed on broadband provider networks. Downstream P2P traffic represents about 60 percent of bandwidth consumed. In the U.S. and U.K. upstream traffic amounts to 76 percent and downstream 48 percent. (5)
- Time Warner Cable announced that fewer than 5 percent of its users account for 60–70 percent of their network capacity—all through P2P applications. Other commentators have noted that this can reach as high as 90–95 percent during peak times. (5–6)

"As the record makes clear, P2P traffic constitutes a clear majority of all Internet traffic. . . . Indeed, several observers suggest that P2P traffic now accounts for about 60 percent of all Internet traffic." USTA Reply Comments, WC Docket No. 07–52, at 6 (citing numerous sources including Christopher S. Yoo, *Network Neutrality and the Economics of Congestion,* 94 Geo. L. J. 1847, 1878 n.145 (2006) (citing six sources which attribute up to 73 percent of upstream traffic and 60 percent of overall traffic to peer-to-peer file sharing)).

"A study of Internet traffic between August and September 2007 confirmed that P2P applications produce more Internet traffic than all other applications combined and represent up to 89 percent of traffic in certain parts of the world. The restrictive ruling that certain parties in this proceeding request would, in effect, hinder the ability of content providers to offer their services to all subscribers just to satisfy the unreasonable network demand of a fraction of end users." Viacom Reply Comments, WC Docket No. 0752, at 12.

"Numerous groups have highlighted the significant—negative—impact of P2P on America's broadband infrastructure. Estimates are that as much as 90 percent of traffic at a given time can be occupied by just a small percentage of users of P2P. Other analyses have shown that as few as 15 users within a geographic area using P2P can demonstrably degrade the Internet experience for the rest of the community. The Yankee Group estimates that P2P 'can push networks to their absolute limit' during times of peak usage. According to the network engineer Richard Bennett, '[t]he fundamental design goal of BitTorrent is to use up all available bandwidth.' Others contend that P2P 'will sop up the majority of available bandwidth.'" National Black Chamber of Commerce *et al.,* Reply Comments, WC Docket 07–52, at 3–4.

George Ou 4/14/08 Written Testimony Generally

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DANIEL K. INOUYE TO PROFESSOR LAWRENCE LESSIG

Question 1. Since 2003, the FCC has been reclassifying broadband services as Title I services under the Communications Act. In 2005, the Supreme Court upheld this approach in its *Brand X* decision. In light of the FCC's reclassification of broadband services and the Supreme Court subsequently deciding that this approach passes legal muster, do you believe the FCC has adequate authority to stop broadband network providers from engaging in unfair discrimination?

Answer. I do believe that *Brand X* means the FCC has the authority to stop broadband network providers from engaging in unfair and innovation-harming discrimination. But I believe that network providers will challenge that authority, unnecessarily delaying the FCC's efforts to protect against discrimination. I therefore think clarifying legislation by Congress would be helpful.

Question 2. Broadband capacity plays an important role in the network neutrality and network management discussion. To this end, I would like to ask two questions: Can we worry less about discrimination or content favoritism if there is more broadband network capacity?

Answer. Yes, we can worry less, at least about discrimination or favoritism. The FCC must continue to be concerned about blocking certain applications.

Question 2a. Can broadband network providers add capacity fast enough to meet consumer demand?

Answer. There is no technical reason providers can't add capacity to meet consumer demand. My concern is that providers are withholding capacity until they are confident of a regulatory environment in which they can discriminate in ways that will ultimately harm innovation.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BYRON L. DORGAN TO PROFESSOR LAWRENCE LESSIG

Question 1. Are we in danger of seeing the old media cartel reappear in new media?

Answer. Yes. The pattern of new media captured by old is as old as media, and the pattern of that recapture is well settled. Current practices by network providers match that pattern, and without sufficient resistance by the FCC, the incentive will certainly be to reestablish that "cartel."

Question 2. Does current law or agency authority provide adequate protections to prevent the Internet from becoming a closed network similar to cable television, instead as opposed to the open platform the Internet was developed to be?

Answer. Authority alone won't prevent anything. Unless the FCC takes a clear policy stand, expressed in enforceable regulations, ideally backed up by a clear demand by Congress, network providers will continue to angel for a network over which they exercise a power to discriminate that can't help but weaken innovation in applications and content.

Question 3. Is the current regulatory structure sufficient to meet the needs of the Internet?

Answer. The FCC has the means, if it has the will. But I believe it is a mistake to trust the future of the Internet to the policy preferences of unelected FCC commissioners. It is Congress's job to set the policy of the FCC, and Congress has not adequately charged the FCC with the requirement that it assure network neutrality.

Question 4. Representatives of the phone and cable companies have consistently argued that if Congress were to impose a nondiscrimination rule, network operators would not deploy broadband networks. Isn't this a false choice? Why can't we have an open Internet and world class deployment?

Answer. Network providers in every major industrialized nation comparable to the United States face more restrictive regulatory obligations than are being discussed in network neutrality regulations, yet providers in those countries have deployed better—faster, cheaper—broadband networks. This does suggest these representatives have presented a false choice—unless there is some reason to believe American network providers are less capable than, for example, French network providers.

Question 5. Recently, Comcast announced that it is engaging in conversations with Bit Torrent, Inc. and Pando Networks, which distribute content through Bit Torrent applications. Does this demonstrate that the marketplace is addressing the concerns raised by consumers?

Answer. Not in a way that would *in any sense* address the competitive and innovation concerns raised by Comcast's behavior. If innovators have to strike a deal with network providers be-fore their innovation can be released on the network, innovation on the Internet would be radically constrained.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO PROFESSOR LAWRENCE LESSIG

Question 1. The last time you testified before the Committee, you expressed concerns about the potential 'cablelization' of the Internet. Two years later do you see signs that it is occurring?

Answer. Absolutely. By "cablelization," I meant the move to an Internet where providers: (1) face no legal obligation of neutrality or access, and (2) operate under a norm that expresses the idea that the network owner has an absolute right to control the content (or applications) on "their" network. Both aspects of that definition have only been reinforced in the past 2 years.

Question 2. In your testimony, you cite the electricity grid as a fundamentally neutral network. As you know, there are a handful of trials being conducted overseas where broadband providers are charging consumers on a per-packet basis similar to how utilities price electricity on a per-kilowatt hour basis. Do you believe such an Internet business model is viable? Would charging on a per-packet basis provide a financial disincentive for the small group of heavy bandwidth users that some broadband providers are concerned about?

Answer. I certainly do believe that business model is viable, and that it would not violate the appropriate norms of network neutrality, even while I very much hope that it does not become the dominant model for providing access to the Internet. My concern is that by failing to impose "open access" obligations on broadband providers, both cable and telecom, we don't have sufficient ISP competition to guarantee that alternatives to this per-packet model will have a chance to flourish.

Question 3. I have heard you argue that "fast lanes" on the Internet are only valuable if "slow lanes" are really slow. This approach can create a perverse incentive among network providers not to build the fastest network possible and an incentive to maintain bottlenecks. In light of the response Verizon has received from Wall Street for its FIOS rollout, do you believe that broadband providers have the incentive to upgrade their networks?

Answer. It is clear Wall Street will reward investment decisions that maximize the short term return to broadband providers—whether or not those decisions maximize long term broad-band growth for the Nation. For that reason, I think it is a fundamental mistake for Congress to look to Wall Street's ratings as a guide for good public policy. The innovators who would lose from a non-neutral network (the next Google's, or Facebooks), don't yet have Wall Street analysts focusing on them. Congress should insist on a broadband policy that benefits long term innovation and growth, and once that policy is set, adjust incentives in providers are not building networks sufficiently quickly.

Question 4. Dr. Hahn argues in his testimony that experimentation with new business models is the key to Internet innovation at both the "core" and the "edge" of the network, and the deployment of more intelligent networks needed to handle rapidly growing Internet traffic. In your opinion, would net neutrality rules prevent innovation at the core of the network or prevent the deployment of more intelligent networks?

Answer. I was confused by Dr. Hahn's testimony, as he was using the term "core" and "edge" in a way that is inconsistent with the standard terminology among network theorists and economists. As these terms are ordinarily used: It is clear that network neutrality regulations would have absolutely no effect on innovation in "edge" technologies. The only "core" technologies network neutrality legislation would affect would be those that harmed network neutrality. Thus, for example, some quality of service techniques would be inconsistent with network neutrality principles, but all would not.

Question 5. If U.S. network operators do end up charging content providers a second fee for delivering a differentiated quality of service to their customers, I am deeply concerned that net-work operators in other nations will follow suit. Given that, in many nations, the government owns a percentage, if not all, of the single, largest network provider, American companies exporting on-line content and services will find themselves paying an additional tax, and thus be placed at a competitive disadvantage with preferred content and service local champions. Do you know how other nations view net neutrality?

Answer. Most other nations have not had to confront network neutrality concerns because they have imposed a more onerous set of regulatory obligations, similar to the "open access" regulations that the FCC imposed on telecom providers in the late 1990s. Because those regulations tend to create significant ISP competition, the need to police neutrality on the network has proven to be less. If these other nations remove "open access" requirements, however, I would be concerned about the effect on American providers for precisely the reasons outlined.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. AMY KLOBUCHAR TO PROFESSOR LAWRENCE LESSIG

Question 1. You said in your prepared remarks that today's venture capitalists need certainty about the future of the internet. That is, they need to now *today* how the Internet will be *managed* tomorrow. Without that certainty, you claim these venture capitalists will be less likely to invest in new Internet technologies. What will give these venture capitalists certainty?

Answer. The only thing that would provide this certainty is if the policymaker charged with setting Internet and communications policy generally set this policy as a fundamental principle for communication regulators. In my view, it is Congress, and not the FCC, that is charged with setting that policy.

Question 2. Can you provide an example, or examples, of innovators holding back on inventions and/or advancements in Internet technology because of uncertainty surrounding the future of network neutrality?

Answer. As these are innovators whose ideas die on the venture capitalist's boardroom table, they are not public or common knowledge. My own research in this area has been informed by these venture capitalists, and their own account of the factors they use to evaluate funding proposals. The basic economics behind their calculation is not obscure, however: Increased strategic freedom for network providers increases the strategic risk for investments. Increased risks lowers the number of efficient investments.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. OLYMPIA J. SNOWE TO PROFESSOR LAWRENCE LESSIG

Question 1. It has been stated numerous times that there isn't sufficient broadband ISP competition. While some markets (more metropolitan and urban areas) do have robust competition, most markets have an effective duopoly that controls access to high speed Internet connections. How would you assess the current direction of broadband competition given the emergence of wireless broadband and broadband over power lines (BPL) services? Is competition growing?

Answer. Competition is growing, but I don't believe quickly enough, or with the right business model. The long term threat to the Internet comes from platform providers with a business model that depends upon leveraging value out of Internet applications and content. The long term solution is broadband providers who, like providers of electricity, have no interest in the content or applications running on the network.

Question 2. Why isn't there more competition in the Broadband space? What barriers to entry are hindering new entrants?

Answer. No doubt the most important barrier is the high cost of building infrastructure. But the government could take steps to encourage more competition. Securing more reliable access to local right of ways would be one. More unlicensed (or effectively so) spectrum would be another. A return to some of the "open access" policies of the late 1990s would be a third. I would strongly encourage the first two.

Question 3. What specific recommendations do you have for us to craft effective policy that would promote more competition in this market space?

You have mentioned that this innovation has come primarily from the "edge" or "end" of the network through application competition. And that the original Internet embraced an "end-to-end" design, meaning the network itself was to be as simple as possible, with intelligence for the network provided by applications that connected at the edge of the network. But given this "edge innovation" has created new Internet services and applications, and content has become more dynamic and larger as well as more time-sensitive with the increasing prevalence of voice and video traffic, doesn't the network itself have to become more intelligent to deal with the dizzying array of content and to ensure efficient delivery of the content and successful use of the applications and services?

Answer. No. The truth of the end-to-end design didn't depend upon the simplicity of the applications on the network. It reflects a technical judgment about where in the network it is most efficient to locate network-like services (the "ends"). But the consequence of that technical design was a platform that maximized the range of competition that was possible on that network.

Question 4. There has been an explosion of bandwidth intensive content—primarily with video. Broadband providers seem to constantly be playing catch-up in upgrading their infrastructure to meet the growing demand. While broadband providers can do more, what are content and application providers doing in developing new technologies to assist in dealing with the near-term bandwidth shortage that may exist in certain areas—such as utilizing compression technologies or using multicasting over P2P?

Answer. P2P itself is a technology to more efficiently use network resources, by sharing the performance requirements among a number of different uses. But more fundamentally, I don't think the government can do anything in particular to encourage one kind of technical development over another, and nor should it. The most (and least) the government should do is create the right competitive environment for the market in applications and content to flourish.

Question 5. Are content and applications providers designing their products around current network constraints that exist?

Answer. Yes, as they always will, as there will always, on the margin, be a constraint. The problem is the constraint now is so significant that the work-arounds are too severe, weakening competitive opportunity.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JIM DEMINT TO PROFESSOR LAWRENCE LESSIG

Question 1. When you testified before this Committee in 2006, you stated that network neutrality has been part of telecommunications law for 40 years. However, the Internet backbone has never been subject to network neutrality regulations or principles. And Mr. McSlarrow's member-companies have never been subject to network neutrality regulations or principles.

How could network neutrality principles be such an integral part of how the Internet has operated when neither backbone providers nor cable modem services, which still have more broadband customers than any other type of broadband service, have ever been subject to network neutrality requirements?

Answer. It is correct that backbone providers haven't been subject to legal regulation. But the competitive environment they have operated within has never given them the incentive to discriminate in ways that weaken the end-to-end character of the Internet's design. My point was that Title II Internet services—the core of early network growth—had been subject to a range of regulations that drove providers away from a discriminatory business model, which effected neutrality.

Question 2. I know you work with Tim Wu on these issues. Dr. Wu made the following comment in *The Economist* a year ago when talking about net neutrality:

Answer. "The public reaction has already been as powerful and effective as any law," says Timothy Wu, a professor at Columbia Law School who is credited with coining the term "net neutrality". The debate has put the telecoms companies on notice that they are being watched closely, he says, and has forced them to make public pledges not to block or degrade access. "Shame can have more power than litigation," says Mr Wu. "The market and consumers can control bad practices, but consumers actually have to be aware of what is going on for that to happen."

Question 3. Why can't the market (including Internet companies, application providers, consumers, and a vigilant FCC, monitoring activities) work in ensuring that bad actors are stopped?

Answer. Investment decisions will be based upon the expectation of the competitive environment at the time when the investment needs to earn a return. My view is that a clear Federal policy would more effectively signal the competitive environment in the future than the (often fickle) attitudes of public activism. Of course, there's no way to be certain. It may well be that the activists would be sufficient. But that work is complemented by clear Federal policy signaling the values this infrastructure will require.

Question 4. Why do we need more regulation today?

Answer. In my view, the government should adopt a minimal additional regulation to assure that business models that depend upon scarcity do not develop. That addition would complement the Internet Freedoms currently embraced by the FCC, by adding a requirement that any tiering done by an Internet provider be offered

on similar terms to any other provider. So if a provider charges a premium price for video content, it would have to offer that same price to anyone. That additional regulation focuses upon contracts; it doesn't require additional supervision of technology. And it puts significant pressure on a business model that envisions leveraging rents out of network scarcity.

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