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Legal Research Paper Series

The FCC Hearing at Stanford

A Compilation of Testimonies, Statements, Press Releases, News
Coverage and Other Materials from the Federal Communications
Commission (FCC) Public En Banc Hearing on Broadband Network
Management Practices - Held at Stanford University on April 17, 2008

Compiled by
Sarah F. Wilson, Reference Librarian & Archivist

Research Paper No. 21
April 2008

On April 17, 2008, the Federal Communications Commission (FCC) held a public en banc hearing on broadband network management practices. It was held at Stanford University in Dinkelspiel Auditorium. It was hosted by Stanford Law School's Center for Internet and Society.

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Photos taken on April 17, 2008 in Dinkelspiel Auditorium.

"CIS" is *Center for Internet and Society* (at Stanford Law School).

Photo credit: Judith Romero

Lawrence Lessig, CIS Founder; Lauren Gelman, CIS Executive Director

Photo credit: Judith Romero

Brandy Karl, CIS Residential Fellow; Amanda Smith, CIS Administrative Assistant; Elaine Adolfo, Assistant to Lawrence Lessig

Deborah Taylor Tate, FCC Commissioner; Larry Kramer, Stanford Law School Dean
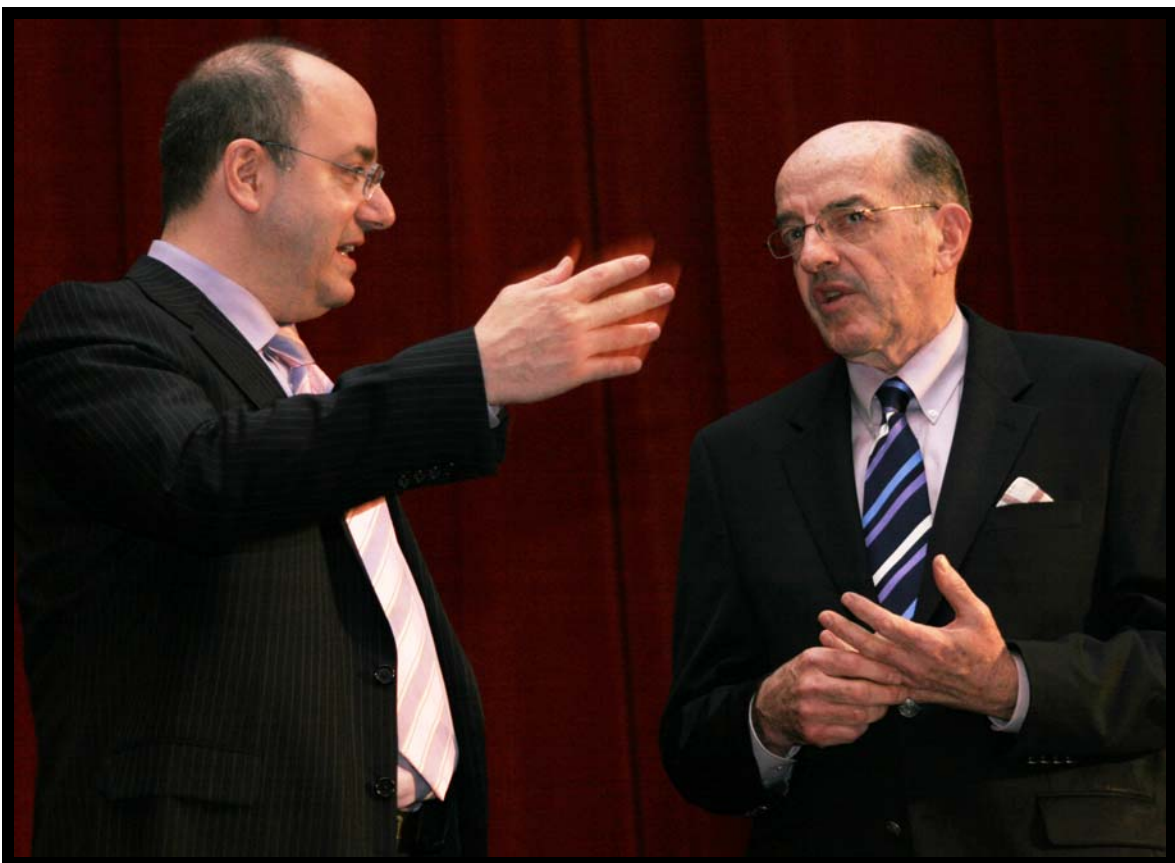
Larry Kramer, Stanford Law School Dean; Michael J. Copps, FCC Commissioner
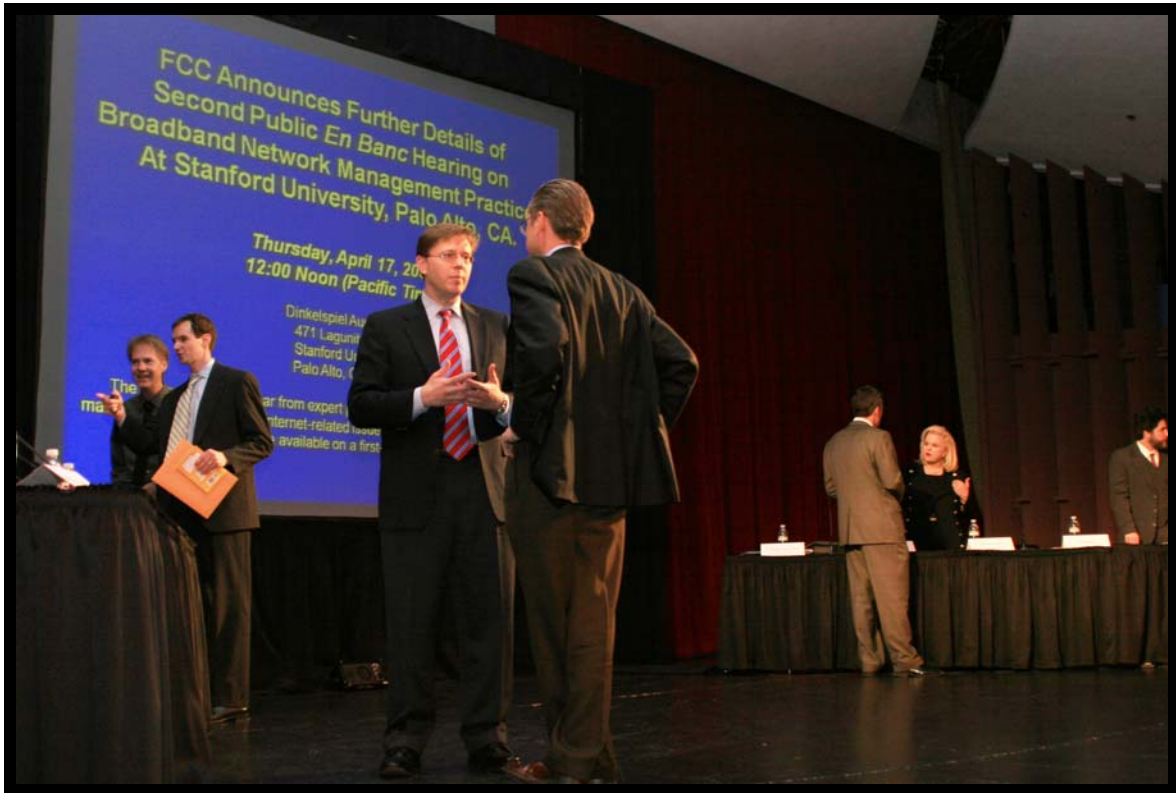
Photo credit: Judith Romero

Various panelists

Photo credit: Judith Romero

Dinkelspiel Auditorium

NEWS

Federal Communications Commission
445 12th Street, S.W.
Washington, D. C. 20554

This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action.
See MCI v. FCC. 515 F 2d 385 (D.C. Circ 1974).

FOR IMMEDIATE RELEASE:
March 19, 2008

NEWS MEDIA CONTACTS:
Robert Kenny at 202-418-2668
Clyde Ensslin at 202-418-0506

FCC ANNOUNCES SECOND PUBLIC *EN BANC* HEARING ON BROADBAND NETWORK MANAGEMENT PRACTICES AT STANFORD UNIVERSITY, PALO ALTO, CALIFORNIA

The Federal Communications Commission (FCC) today announced a public *En Banc* hearing to be held at Stanford University in Palo Alto, California on Thursday, April 17, 2008.

The hearing location is as follows:

Location:	Stanford University Campus Palo Alto, California
	Maps/Directions:
	http://www.stanford.edu/home/visitors/maps/index.html

The Commission will hear from expert panelists regarding broadband network management practices and Internet-related issues. The hearing scheduled at Stanford University is the second such hearing on broadband network management practices and Internet-related issues to be held by the FCC and follows a similar hearing held at Harvard Law School last month (for more information: http://www.fcc.gov/headlines.html - go to February 25, 2008 headline: 'FCC *En Banc* Hearing on Broadband Network Management Practices, Cambridge, Massachusetts'). The hearing at Stanford University is open to the public, and seating will be available on a first-come, first-served basis. Additional details on this hearing will be forthcoming.

The public may file comments or other documents with the Commission and should reference docket numbers 07-52 and 08-7 when filing by paper or submit your filing electronically by going to http://gullfoss2.fcc.gov/prod/ecfs/upload_v2.cgi and enter proceeding numbers 07-52 and 08-7. Filing instructions are provided at http://www.fcc.gov/cgb/ecfs/.

Sign language interpreters and open captioning will be provided for this event. Other reasonable accommodations for people with disabilities are available upon request. Include a

description of the accommodation needed, and include a way we can contact you if we need more information. Please make your request as early as possible. Last minute requests will be accepted, but may be impossible to fill. You may send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (Voice), 202-418-0432 (TTY).

For additional information about the hearing, please visit the FCC's website at http://www.fcc.gov. Press inquiries should be directed to Robert Kenny at 202-418-2668 or Clyde Ensslin at 202-418-0506.

-FCC-

News and other information about the Federal Communications Commission
is available at www.fcc.gov.

In the heart of the Silicon Valley, legal doctrine is emerging that will determine the course of civil rights and technological innovation for decades to come. The Center for Internet and Society (CIS), housed at Stanford Law School and a part of the Law, Science and Technology Program, is at the apex of this evolving area of law.

CIS
The Center for Internet and Society

Our Issues

cybercrime **Fair Use Project**
free speech infrastructure
intellectual property
privacy
anti-circumvention books
copyright
copyright copyright law
Creative Commons DMCA
economics Fair Use FOIA
Fourth Amendment
Future of Ideas Google
Hearsay Culture internet libel
IP reform law school libel
patent podcasting surveillance
tcblog Testimony
trademarks web 2.0

4/17: FCC Hearing on Broadband Network Management Practices

Start: Apr 17 2008 - 12:00pm
End: Apr 17 2008 - 7:00pm

Description:
UPDATE ABOUT FCC HEARING ON BROADBAND NETWORK MANAGEMENT PRACTICES TO BE HOSTED BY STANFORD LAW SCHOOL'S CENTER FOR INTERNET & SOCIETY

The Federal Communications Commission (FCC) has announced the names of panelists scheduled to testify at a public hearing hosted by Stanford Law School's Center for Internet & Society on broadband network management practices and Internet-related issues Thursday, April 17, 2008 starting at 12 noon (Pacific).

The Commission will hear testimony both from expert panelists, and members of the audience who will be permitted to speak directly to the commissioners during the public comment session.
Speakers from Stanford Law School include: Lawrence Lessig, founder of the Center for Internet and Society (CIS) and C. Wendell and Edith M. Carlsmith Professor of Law; and Barbara van Schewick, co-director of CIS and assistant professor of law.

The hearing will be held on the Stanford campus at Dinkelspiel Auditorium, 471 Lagunita Drive, Stanford University, Stanford, CA 94305. Seating is first-come, first-served, and open to the public. Doors will open at approximately 10 a.m. (Pacific). Free parking (Galvez Field), bus shuttles, and Wi-Fi will be available.

Hearing agenda and list of witnesses:
(All Pacific Time)

12:00 p.m. Welcome/Opening Remarks: Stanford Law School Dean Larry Kramer

12:45 p.m. Panel Discussion 1 - Network Management and Consumer Expectations

Introduction: Professor Lawrence Lessig, Stanford Law School

- Rick Carnes, president, Songwriters Guild of America;
- Michele Combs, Christian Coalition of America;
- George Ou, independent consultant and former network engineer;
- Jon Peha, associate director of the Center for Wireless and Broadband Networking; professor, Department of Electrical and Computer Engineering, and the Department of Engineering and Public Policy, Carnegie Mellon University;
- Jean Prewitt, president and chief executive officer, Independent Film & Television Alliance
- James P. Steyer, chief executive officer and founder, Common Sense Media
- Robb Topolski, Software Quality Engineer

2:15 p.m. Break

3:00 p.m. Panel Discussion 2 - Consumer Access to Emerging Internet Technologies and Applications

Introduction: Assistant Professor Barbara van Schewick, Stanford Law School

- Jason Devitt, chief executive officer, SkyDeck;
- Harold Feld, senior vice president, Media Access Project
- George S. Ford, chief economist Phoenix Center for Advanced Legal & Economic Public Policy Studies
- Brett Glass, chief executive officer, Lariat.net
- Blake Krikorian, chief executive officer, Sling Media
- Jon Peterson, co-director, Real-Time Applications and Infrastructure (RAI), Internet Engineering Task Force
- Gregory L. Rosston, deputy director, Stanford Institute for Economic Policy Research
- Ben Scott, policy director, Free Press

4:30 p.m. Public Comment Period

6:30 p.m. Closing Remarks

7:00 p.m. Adjournment

A live audio cast of the hearing will be available to the public on the FCC's website at: http://www.fcc.gov/realaudio/. You may also go to "FCC Meetings" from the homepage and then click on FCC Audio/Video events to access the audio cast.

Additional details about the hearing may be posted at the Center for Internet & Society: http://cyberlaw.stanford.edu.

This will be the FCC's second hearing on broadband network management and follows a February 25, 2008 hearing at Harvard University. For contextual information about the first hearing, please see: http://www.fcc.gov/headlines.html and go to headline: "FCC En Banc Hearing on Broadband Network Management Practices, Cambridge, Massachusetts."

The public may file comments or other documents with the Commission and should reference docket numbers 07-52 when filing by paper. To file electronically, go to http://gullfoss2.fcc.gov/prod/ecfs/upload_v2.cgi and enter proceeding number 07-52. Filing instructions are provided at http://www.fcc.gov/cgb/ecfs/

Sign language interpreters and open captioning will be provided for this event. Other reasonable accommodations for people with disabilities are available upon request to the FCC's Consumer & Governmental Affairs Bureau.

Free parking is available in the Galvez Field at Galvez & Campus Drive East. From there take a free Marguerite Shuttle to Dinkelspiel Auditorium. (Directional signs will be posted.)

See our announcement in the Stanford Law School news center (www.law.stanford.edu/news), which includes a PDF parking map for this event. Additional campus directions & maps: http://www.stanford.edu/home/visitors/maps/

Instructions for free, secure Wi-Fi access will be made available in the auditorium. Generators will supply electrical power for laptops.

Press should contact Judith Romero for entry /seating questions. TV crews should call about truck set up outside the event.

PRESS CONTACTS:

Stanford Law School:
Judith Romero, judith.romero@stanford.edu, 650.723.2232, www.law.stanford.edu/news

FCC:

For press: Robert Kenny at 202-418-2668 or Clyde Ensslin at 202-418-0506,
http://www.fcc.gov

For accessibility and similar accommodations: call 202.418.0432 (voice) or 202.418.0432 (TTY); or send email to fcc504@fcc.gov

Location

Stanford University - Dinkelspiel Auditorium
471 Lagunita Drive
Stanford, CA, 94305
United States

posted April 3, 2008 - 12:31pm

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FCC Hearing on Internet Practices
Thursday, April 17, 2008. 12:00 PM.
Dinkelspiel Auditorium

The Federal Communications Commission (FCC) will hold a public, en banc hearing hosted by Stanford Law School's Center for Internet & Society on broadband network management practices and Internet-related issues. The Commission will hear testimony both from expert panelists, and members of the audience who will be permitted to speak directly to the commissioners during the public comment session.

WEBCAST ARCHIVES

▶ Play

Welcome and Opening Remarks from the FCC Commissioners
Kevin J. Martin, FCC Chairman
Michael J. Copps, Commissioner
Jonathan S. Adelstein, Commissioner
Deborah Taylor Tate, Commissioner
Robert M. McDowell, Commissioner

▶ Play

Discussion 1 — Network Management and Consumer Expectations
Introduction: Lawrence Lessig, C. Wendell and Edith M. Carlsmith
Professor of Law, Stanford Law School
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Michele Combs, Christian Coalition of America
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▶ Play

Panel Discussion 2 — Consumer Access to Emerging Internet Technologies and Applications
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George S. Ford, Chief Economist Phoenix Center for Advanced Legal & Economic Public Policy Studies

FCC Hearing on Internet Practices
Thursday, April 17, 2008. 12:00 PM.
Dinkelspiel Auditorium

VON TV CHANNEL SPONSOR

Brett Glass, Chief Executive Officer, Lariat.net
Blake Krikorian, Chief Executive Officer, Sling Media
Jon Peterson, Co-Director, Real-Time Applications and Infrastructure (RAI), Internet Engineering Task Force
Gregory L. Rosston, Deputy Director, Stanford Institute for Economic Policy Research
Ben Scott, Policy Director, Free Press

Public Comment Period and Closing Remarks

▶ Play

About The Broadband Industry Practices Webcast Series

VON TV's Broadband Industry Practices Webcast Series is a series of live and archived webcasts aimed at creating awareness about issues and best practices important to the IP communications industry. This series provides an opportunity for industry professionals, analysts and press to see experts, government officials and leading industry figures discuss these issues, as well as participate in the discussion through interactive question and answer sessions.

SPEAK UP

Comcast, AT&T and Verizon want to control what you can see and do online.

On Thursday, April 17, the Federal Communications Commission is holding a public hearing at Stanford on the future of the Internet.

We have to act now to protect the Internet from corporate gatekeepers that want to block, filter and discriminate against the Web sites and services you use every day.

Tell the FCC to keep the Internet free and open.

SHOW UP. SPEAK UP. SAVE THE INTERNET.
Learn more at SavetheInternet.com/=stanford
or call toll-free 877.888.1533 ext. 204

Public Hearing on the Future of the Internet

Thursday, April 17, 2008
12pm-7pm*

Stanford University
Dinkelspiel Auditorium
471 Lagunita Drive
Palo Alto, CA

*There will be a public comment period for you to make your voice heard!

TO SAVE THE INTERNET

ON APRIL 17

Join us

The SavetheInternet.com Coalition is more than a million everyday people who have banded together with thousands of non-profit organizations, businesses and bloggers to protect Internet freedom.

The Coalition believes that the Internet is a crucial engine for economic growth and free speech. We are working together to urge Congress to preserve Network Neutrality, the First Amendment of the Internet, which ensures that the Internet remains open to new ideas, innovation and progress.

From its beginnings, the Internet has leveled the playing field for all. Everyday people can have their voices heard by thousands, even millions of people. The SavetheInternet.com Coalition -- representing millions of Americans from all walks of life -- is working together to ensure that Congress passes no telecommunications legislation without meaningful and enforceable Network Neutrality protections.

>> **Join the Coalition**
>> **Donate to the Coalition Ad Fund**

Charter Members:

Free Press -- Coalition Coordinator
Professor Lawrence Lessig -- Stanford
Professor Timothy Wu -- Columbia
Gun Owners of America
Craig Newmark -- craigslist.org Founder
Professor Glenn Reynolds -- aka Blogger Instapundit
MoveOn.org Civic Action
Consumers Union
American Library Association
National Coalition of Women's Organizations
Parents Television Council
Consumer Federation of America
Office of Communication of the United Church of Christ, Inc.
Public Knowledge
Common Cause
Christian Coalition of America
Democracy for America
Electronic Retailing Association
American Civil Liberties Union
National Association of State PIRGs (U.S. PIRG)
SEIU
Rethinking Schools
Parent-2-Parent
Center for Digital Democracy
Afro-Netizen
The Agonist
Alliance for Community Media
Amazing Kids
American Association of Law Libraries
AcornActive Media Foundation
Association of Research Libraries
Association for Community Networking
Scott Bradner -- Harvard Technology Security Officer
Brave New Films
California NOW
Californians Against Waste
CCTV Center for Media and Democracy
Center for Creative Voices in Media
Chicago Media Action
ColorofChange.org
Community HIV/AIDS Mobilization Project
Community Technology Centers
Computerguyslive.com
Computer Professionals for Social Responsibility
Consumer Action
Consumer Project on Technology
Professor Susan Crawford -- Online legal expert
CUWiN
Democracy in Action

Educause
Entertainment Consumers Association
Feminist Majority
FreeNetworks.org
Friends of the Earth
Future of Music Coalition
Game Overdrive
Grand Rapids Institute for Information Democracy
Internet2
David Isenberg -- Harvard Berkman Center
Independent Press Association
Kansas City Anti-Violence Project
Media Access Project
Media Alliance
MediaChannel.org
Sascha Meinrath -- Community Internet Pioneer
Music for America
National Video Resources
New Organizing Institute
NYC Wireless
Ohio Community Computing Network
OpenPrivacy
Open Security Foundation
People for the Ethical Treatment of Animals (PETA)
Personal Democracy Forum
Prometheus Radio Project
P2Pnet
grand Rapids Hip Hop Coalition
Quicksilver Communications
Reclaim the Media
Scott Kurtz -- Cartoonist
SoccerTimes
Teaching Matters
Teamsters
The International Webcasting Association
The Service Roundtable -- Small Business Network
David Weinberger -- Harvard Berkman Center (Joho the Blog)
Women's Institute for Freedom of the Press
Working Assets

See the full list

FCC HEARING ON BROADBAND NETWORK MANAGEMENT PRACTICES
April 17, 2008
Hosted by the Center for Internet and Society, Stanford Law School
Dinkelspiel Auditorium, Stanford University

Agenda

12:00 p.m.   Welcome/Opening Remarks: Stanford Law School Dean Larry Kramer

12:45 p.m.   Panel Discussion 1 - Network Management and Consumer Expectations

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4:30 p.m.   Public Comment Period

6:30 p.m.   Closing Remarks

7:00 p.m.   Adjournment

WIFI LOGIN:
login: fcchearing
password: 12345678

STATEMENT OF FCC COMMISSIONER JONATHAN S. ADELSTEIN
EN BANC HEARING ON
BROADBAND NETWORK MANAGEMENT PRACTICES
Palo Alto, CA – April 17, 2008

It's entirely appropriate that we convene this hearing on the future of the Internet here at Stanford, which has fueled so much of the innovation that has made the Internet the powerful tool it has become today. Mr. Chairman, I commend you for holding this hearing, especially here as we had discussed, and developing such an informative agenda.

The outstanding panelists we invited, as well as the people from this area who will have the opportunity to testify, will improve our understanding of the dynamic environment of broadband Internet access. There is nowhere better than Silicon Valley to shine a spotlight on how we reach the full promise of the Internet.

I would also like to thank Stanford University, the Law School, and the Center for Internet and Society for hosting us. Stanford is not only my alma mater, but is, in my unbiased opinion, the finest institution of higher learning the world. Bias aside, it does feel appropriate that I'm returning to Stanford to continue my studies about this topic. I am especially glad no to be paying tuition this time around.

You are fortunate to be represented by a delegation in Congress – Senators Boxer and Feinstein, and Rep. Eshoo – who truly understand the importance of maintaining America's leading technological edge.

Today we will hear from legal scholars, technology experts, entrepreneurs, and industry representatives. We will also add important new voices including representatives of families and children, as well as the creative arts community. They each bring a needed perspective, and I would like to thank all of them for joining us today.

The vast range of broadband users means that we cannot hear at one time from all of the affected communities. We could fill many more panels with countless numbers of innovators located here in Silicon Valley, alone. Broadband touches so many communities that I am particularly glad that we will have two full hours of public testimony. This will allow us to hear directly from consumers about their expectations. There are over 35 thousand comments filed in the FCC's docket on these issues – the vast majority from public citizen commenters. So, there clearly is deep public concern about these issues.

Consumers have come to expect and will continue to demand the open and neutral character that has always been the hallmark of the Internet. The movement for Internet freedom is tapping the same American spirit that fueled the movement against media consolidation. In an age when traditional media markets are dominated by a handful of giant conglomerates, there is optimism about the rise of broadband. There is a sense it can restore decentralized, locally-rooted and entrepreneurial voices to the media landscape that are reflective of the best aspects of the American media before the rise of consolidation. Consumers are saying, "don't tread on me." Any network provider that treads on freedom does so at their peril, and the government

that looks the other way does so at its peril.

That is why it's so welcome that we are looking at this squarely today. Basic decisions are being made about the development of Internet that will shape it for years to come. The beauty of the Internet is that nobody is in charge and everybody is in charge. Its open nature has enabled those with unique interests and needs to meet and form virtual communities like no tool before it. It has also empowered consumers as citizens and as entrepreneurs. Consumers are increasingly creative in the way that they use these new technologies – nowhere more so than here in Silicon Valley.

As a result, high speed access to the Internet is revolutionizing the way we work, learn, seek medical advice, gather our news, engage in public discourse, interface with government, socialize, and almost every aspect of the way we live.

At the same time, we are all making our way through a sea of changes -- in technology, to the communications marketplace, and to our legal framework -- that are literally reshaping consumers' on-line experiences. There are many positive developments. Over the past decade, we have seen considerable investment by providers in new broadband facilities, growth in the number of broadband users, and an explosion of new applications available to consumers.

But there are also warning signs that should not go unheeded. Over the past few years, there has been dramatic consolidation among the nation's leading broadband providers. We have seen the formation of the largest broadband provider in the nation, last mile providers have purchased backbone providers, providers are clustering their service territories, and we've seen new combinations of content and services.

We desperately need greater competition in the broadband marketplace. Effective competition will provide real incentives for broadband providers to maintain neutral and open networks. We all have high hopes for the development of alternative technologies like wireless. But the FCC's own statistics show that telephone and cable operators control over 90 percent of the residential market. Our recent 700 MHz auction largely dashed hopes of a nationwide third channel into the home and solidified the hold of the largest incumbents. For many consumers, there is no meaningful choice of providers.

With a limited number of broadband options, our attention is all the more important. Independent observers, like the Congressional Research Service, have determined that leading broadband providers -- which control the last mile connections to the home -- may have the ability and incentive to discriminate, and to limit the choices available over the Internet. Others have observed that the large broadband providers also face conflicting incentives, as Internet access increasingly competes with their historical lines of business.

Against this backdrop, we have allegations that broadband providers are exercising increasingly greater control over the applications and content accessed by their customers. The Commission has pending before it several proceedings – petitions for declaratory ruling and for rulemaking, and formal complaints – which argue that broadband providers have intentionally and secretly degraded applications in a way that undermines the open and interconnected character of the Internet. We also will hear concerns about the provisioning of wireless text messaging short codes, where we have seen providers refuse service to groups that were deemed "controversial."

We now face difficult questions about our role in preserving the unique characteristics of the Internet. Those questions are made harder by the Commission's recent efforts to reshape the legal framework that we have operated under since the dawn of the Internet. The effect of those decisions is that we have cast doubt about the rules of the road and left open questions about what protections apply.

To our credit, the Commission has taken the important step of adopting a statement of Internet policy principles, designed to preserve and promote the open and interconnected nature of the Internet. Yet, as we saw at our hearing at Harvard Law School, not all broadband providers believe we have the ability to enforce our own Policy Statement. These issues are simply too important to leave this question unanswered.

I also believe that it is time for the Commission to strengthen and enhance the Policy Statement. We need to add a "fifth principle" to our Policy Statement to address incentives for anti-competitive discrimination. Consumers want to be able to choose an independent VoIP provider, or to be able to access video clips, and not just video programming from the largest media companies. Consumers do not want the Internet to become another version of old media, dominated by a handful of corporate giants. We also need a strong commitment to monitoring and enforcing compliance on a case-by-case basis. These would be significant steps toward reaching the full promise of the Internet.

As the Commission has eliminated its traditional safeguards, new questions are also emerging about consumers' rights in this broadband world. The recent allegations have raised concerns about level of transparency and disclosure between broadband providers and their consumers. I come to this issue with a strong presumption that broadband providers should provide clear and accurate information – in plain English – about their policies and how they affect consumers' use.

As consumers shift from a narrowband to broadband world, we also must confront new questions about how to protect consumer privacy. A recent article documented a growing practice by which broadband providers – using deep packet inspection -- can track almost every keystroke of their on-line users. Providers hope to capitalize on a treasure trove of information about their customers' interests and habits. But it is far from clear what consumers are told about these monitoring practices and what protections are in place to safeguard their interests. Given the highly personal uses of the Internet – from managing bills and investments, seeking medical information, exploring religious beliefs, or conducting a job search -- this trend should give all consumers pause.

As we contemplate these uses of the Internet, I also look forward to hearing from my friend Jim Steyer, founder of Common Sense Media. Common Sense Media has worked to improve our understanding of the impact of our media and the Internet on the social, emotional, and physical development of our nation's children. More than ever, we must teach our children to be media savvy and that includes on-line media. We need to empower parents with the tools to manage their children's Internet experiences. These efforts are critical and they are also fully consistent with efforts to maintain an open and neutral Internet. In the on-line world, we need to put the consumer – and the parent -- in control.

Before we turn to today's panel, we must also take note of developments since our first hearing. At the top of the headlines, Comcast and BitTorrent announced an agreement to work together to address network management problems. I am encouraged that broadband providers are listening to the chorus of consumer calls for open and neutral broadband Internet access, and I look forward to learning more about this today. The FCC (through its oversight on these issues), consumer groups (through their vigilance and advocacy), and industry (through a renewed effort at collaboration) can all take credit for these developments.

I am also interested in the status of broader industry discussions and learning more about whether the agreements we have heard about are company-specific solutions or ones that will benefit the broader community of on-line innovators. We have also heard recent reports about progress in the collaborative P4P discussions and I would like to hear greater discussion of the role of industry bodies.

Recognizing the complexity of the task before us, I am reminded of Judge Learned Hands' observation that, "The spirit of liberty is the spirit which is not too sure that it is right." That is why we are here to learn, because it is so important to get rules that govern these networks right. Decisions being made today about the architecture of the Internet will affect its character for years to come. So, it is important that we make our expectations clear. Internet freedom, like liberty itself, is a cherished right that deserves our vigilance and protection. With that, I look forward to hearing directly from our panelists and the public. Thank you, all, for engaging with us today.

STATEMENT OF COMMISSIONER MICHAEL J. COPPS
***EN BANC* HEARING ON BROADBAND**
NETWORK MANAGEMENT PRACTICES
STANFORD UNIVERSITY, PALO ALTO, CALIFORNIA
APRIL 17, 2008

Thank you, Chairman Martin, for convening this second hearing on the importance of broadband and Internet Freedom. I hope there will be more such hearings around the country because so much, in terms of economic growth and individual opportunity, hinges on protecting the integrity and the openness of the Internet. Before delving a little into that, I would be remiss not to first thank this area's Congressional delegation for the work it does in this regard and, indeed, across the whole telecommunications landscape. The Speaker and your Senators—and we work frequently with Senator Boxer because of her important position on the Commerce Committee—provide thoughtful and truly effective leadership on these issues. And I can't say enough about your own Congresswoman, and my very good friend, Anna Eshoo. She's just an inspiration. She is a visionary leader who understands the transformative power of the Internet and the impact that technology, innovation and competition has on the economy, on creativity in this country, and on the daily lives of American consumers.

Out here in Silicon Valley, and at this great university, we have the perfect opportunity to talk about innovators, inventors, and entrepreneurs. This is the place, really, where so many of the things we take for granted every day actually got their start. Semi-conductors, personal computers, graphical user interfaces, search engines, devices like the iPhone—these are all innovations that have revolutionized communications and that got their start or went through an important stage in their evolution right here, in a place that once was just a sleepy farming community before Stanford came to the area and, later, companies and institutions such as Hewlett-Packard, Xerox PARC, Fairchild Semiconductors, Intel, Apple—the list goes on—and all the venture capitalists on Sand Hill Road who helped turn the area into the world's leading center of innovation and wealth creation. What a story!

But, you know, that innovation, that productivity, that entrepreneurship shouldn't be seen as a luxury, something that's really nice to have. Keeping it going is, rather, an urgent necessity, vital not only to the fulfillment of our individual lives but to our economic well-being and to our nation's competitive posture in the world. We've come a long way, thanks to many people in this room, but there are no guarantees for the future. And that wonderful, open and dynamic Internet—perhaps the most liberating technology since the printing press, if not even greater than that—is, in fact, under threat. We will keep it open and free only by acting to make it happen. Its future is not on autopilot and, indeed, powerful interests would bring it under their control for their own purposes— which may not be your purposes. I'm not presenting a novel theory here, I'm only learning from history. History shows that when somebody has the ability to control technology, and also has a business incentive to do so, they're going to try. And that, my friends, is what this issue of Internet Freedom or net neutrality, or whatever you want to

call it, is all about. When I say this, I'm not talking about bad people—but I am talking about some really bad results!

Let's look at it from an inventor's perspective. His or her job is to come up with the idea, go out and attract venture capital funding for it, and hopefully bring that innovation to consumers. Before they devote years of their lives, and ask investors to devote huge sums of money to their dream, they need confidence that if they invent a better mousetrap they will indeed be able to bring it to consumers. They need to know that their innovation won't be prevented from getting to market by a handful of network operators who have consolidated their control over broadband pipes all across this country. Inventors and creators need to know, up-front, that they have the right to innovate without going on bended knee to seek permission from a few who have amassed too much control in their own hands. And if they have that right, that is really good news for innovation and for consumers.

The future of that right is by no means guaranteed. Important decisions that could codify such a right have been postponed or avoided. And this is why it's time to insist upon action now. Now is the time for the FCC to add an enforceable principle of non-discrimination to our Internet Policy Statement—a clear, strong declaration that we will not tolerate unreasonable discrimination by network operators and that we have in place enforcement policies to make sure that anyone with other ideas isn't going to get away with them. And, by the way, this policy should apply to wireless as well as wireline operators.

Now I grant this won't be simple to do. These are evolving technologies and sometimes the line between reasonable network management and outright discrimination can be less than crystal clear. But that's why we need a for-sure enforcement process, to sift through complaints, to make the judgment calls, and, over time, to compile some case law and precedent so things become clearer. But I can tell you this: if everyone knew the FCC was on the job, that we had forthrightly staked out our principles, that everyone knew we would deal with any and all complaints that came in, and that those who do discriminate will be punished, word would get out pretty fast that no one should be messing around with the openness of the Net. We've done this before under Title II of the Telecommunications Act with policies and procedures that supported innovation at the edges of the networks, like the answering machine, fax machines, personal computer modems, and dial-up home Internet services like AOL and others (which provided most Americans with their first exposure to the Internet).

And while such an approach provides important safeguards for entrepreneurs just starting to get their innovative juices flowing, it does something else, too. It gives clarity to investors, not just investors here, but on Wall Street, too. An approach wherein the Commission had an enforceable rule of non-discrimination and then determines whether complex network practices abide by such a principle on a case-by-case basis would give investors in these networks more certainty, not less. Network operators and some on Wall Street might have to reconfigure the lens through which they view the Commission's principles, but I believe they would quickly come to appreciate having a clear understanding of what the rules are, and that we have a system that can account for

changes in technology and reasonable business practices. That kind of certainty breeds more, not less, investment.

We have two excellent panels with us today. I hope they will address whether net neutrality principles can be consistent with other important policy objectives as well as the ones I have mentioned—objectives like the protection of intellectual property and the protection of our children from obscene and dangerous Internet content. These are all in my estimation critical outcomes, but they raise a number of important questions which are central to our Internet dialogue.

Media historian Paul Starr points out that our country has made, at various critical points in its national passage, what he calls "constitutive choices"—important government decisions that have substantially guided the course of the nation's media and its impact on American culture and politics. For example, by subsidizing the postal service (especially into rural areas), the nation encouraged vibrant newspaper circulation and a deeply engaged electorate in the early days of the nation. Later, in setting the rules for licensing commercial broadcasting stations (often affiliated with nationwide networks), the Federal Radio Commission and later the FCC adopted a model to ensure that for-profit programming would not ride roughshod over the notion that the people's airwaves must serve the people's interest. Unfortunately, we've too often lost our compass on that one.

Now we face a constitutive choice with the Internet—a choice between closed networks where the network operators control the user experience and open networks that are controlled by end users. This is an issue in which you must engage, not just because you are innovators and business people, but because you are citizens. If I see what's happening accurately, I believe we will have an opportunity, before very long, to decide this issue of Internet Freedom. It will be a major fight, with powerful forces on the other side. We'll all have to work—and much as I know folks out here like to keep their focus on all the good entrepreneurial things they are doing, they—you—are going to have to focus on this issue, focus on Washington, and put your commitment and your resources into making sure the decision comes out right. Without that kind of participation, we will likely lose. With it, we have a real shot to win. I hope you'll join up!

Thank you very much.

OPENING STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL

Second Public *En Banc* Hearing
On Broadband Network Management Practices
Stanford University, Palo Alto, California
April 17, 2008

Thank you Mr. Chairman. Also, many thanks to Stanford for hosting us today. And I also thank our distinguished panelists for speaking with us. But I am disappointed that, apparently, AT&T, Comcast, Verizon and Time-Warner did not accept our invitation to appear today. So it appears that we have only one network operator witness for our hearing on network management. Nonetheless, it's good to be back here in the Bay Area. It's also fitting that we come from Washington, D.C., the birth place of the Internet's ancestor, ARPANET, to a part of the country that has played such an important role in the Internet's development and success.

We are here today not only to examine more closely the question of what is appropriate network management, but also to reassure American consumers that the FCC takes allegations of anticompetitive conduct seriously.

At the heart of this discussion is an allegation that Comcast inappropriately manipulated the upstream bits of certain peer-to-peer (P2P) video applications, namely those of BitTorrent. This allegation is especially serious because many P2P applications carry video content that competes directly with Comcast's video content. Additionally, most residential consumers only have a choice of two broadband pipes into their homes: a cable modem pipe or a DSL pipe from the incumbent local phone company. Additionally, for several years now, roughly two-thirds of residential broadband subscribers have been cable modem customers, in part because the cable industry was

first-to-market with such broadband technology. In short, the allegations boil down to a

suspicion that Comcast was motivated not by a need to manage its network, but by a

desire to discriminate against BitTorrent for anticompetitive reasons. However, the

conversation we are having about this matter is a healthy one and is yielding positive and

constructive results.

In the meantime, America's online video market is exploding in a wonderfully

energetic and chaotic way. comScore reported that Americans downloaded an

unbelievable ten billion online videos last December alone! According to the New York

Times last month, a Nielsen Media Research study revealed that thirty-nine percent of

Internet users ages 18 to 34 have downloaded full-length television episodes over a three

month period.[1]   When NBC's comedy, "The Office," premiered last September, one in

five of its viewings was seen online. "The Office's" premiere attracted 9.7 million

broadcast viewers, while it was streamed from the Web 2.7 million times in one week.

But the world's apparent overwhelming thirst for online video content is posing

an engineering challenge to network providers. Several analyses estimate that P2P

applications comprise over 75 percent of the Internet's traffic. And, while I'm here in

California, the intellectual property capital of the world, I would be remiss if I did not

observe that pirated content is a significant part of all P2P traffic.

P2P works by "seeding" millions of consumers' computers all over the world with

pieces of videos. When a consumer wants to download a video from a P2P provider, the

application calls on these millions of seeded computers to send their pieces of the show

upstream. At times, only five percent of broadband users are consuming as much as 90

percent of network capacity. P2P usage is causing congestion, especially on the upstream

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[1]   Brian Stelter, *Serving Up Television Without the TV Set*, N.Y. TIMES, Mar. 10, 2008, at C1.

portion of networks that were designed and built years ago, before these P2P applications were invented.

In the future, Internet usage is likely to be largely wireless. As we discuss and debate these issues, we must consider how what we do, or don't do, will affect today's build out of tomorrow's wireless networks. Like cable networks, wireless networks are shared. They also suffer from uploading challenges. Most emerging wireless broadband providers are not also Comcast providers in the same way as cable companies. Accordingly, if wireless broadband providers are required to manage the demands placed on the upstream portions of their networks, unlike the situation with cable, allegations of anticompetitive conduct against online video content may ring hollow. But we may not know for a long time. As a result, we should examine this complicated issue carefully before rushing headlong to codify a "solution" that may create more engineering problems than it solves.

In the meantime, the weight of the evidence in the record thus far tells us that Comcast was manipulating upstream, not downstream bits. If its actions were intended to be anticompetitive, would Comcast not have been interfering with video downloads instead? If the evidence shows that consumers could not perceive any slowing of downloaded videos due to the manipulation of uploads, is such evidence exculpatory of the charge of anticompetitive conduct? Are answers to these questions clearer after the March 26 BitTorrent/Comcast agreement? These, and many other questions, abound.

Nonetheless, contrary to rumor, the P2P congestion challenge is not unique to the United States. Japan, which offers fatter and faster pipes on average, is also experiencing vexing congestion problems when it comes to P2P applications. According to the

Japanese Embassy, a mere one percent of Japanese users consume more than half of the broadband capacity in that nation. With widespread 100 mbps service across Japan, the lesson here is that substantially more bandwidth alone in the last mile does not solve the P2P congestion problem. Something more must be done.

And something more is being done. Through a number of initiatives, the FCC has been creating opportunities for more competition in the last mile. While those efforts take root, however, the private sector is not standing still. In fact, last summer, long before the BitTorrent complaint was filed, the private sector created the P4P Working Group. The mission of this coalition of cable companies like Comcast, application providers like BitTorrent, content producers, engineers, universities and others is to:

> work jointly and cooperatively with leading Internet service providers (ISPs), peer-to-peer (P2P) software distributors, and technology researchers to ascertain appropriate and voluntary best practices for the use of P4P mechanisms to accelerate distribution of content and optimize utilization of ISP network resources in order to provide the best-possible performance to end-user customers ….[2]

In fact, just last week, on April 9, the P4P Working Group announced the completion of successful field tests of new P2P protocols that increase delivery speeds for consumers while removing network delivery obstacles for ISPs. The results show increased delivery speeds of up to 235 percent for P2P content carried on U.S. cable networks and up to 898 percent speed increases for other networks.

And just this past Tuesday, April 15, Comcast and P4P Working Group co-chair Pando Networks, announced that they will lead an industry-wide effort to create a "P2P Bill of Rights and Responsibilities" (BRR) for P2P users and ISPs.[3]

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[2] Haiyong Xie, The P4P Working Group, http://cs-www.cs.yale.edu/homes/yong/p4p/p4pwg.html.

[3] Press Release, Comcast Corporation, *Comcast and Pando Networks to Lead Creation of "P2P Bill of Rights and Responsibilities" for Peer-to-Peer Users and Internet Service Providers* (Apr. 15, 2008).

These announcements come on top of the Comcast/BitTorrent agreement of March 26. Comcast agreed to migrate to a capacity management technique that is protocol-agnostic while BitTorrent acknowledged the need of ISPs to manage their networks, especially given that the Internet has matured into the rich media environment it has become. In their joint press announcement, Comcast and BitTorrent expressed the view that "these technical issues can be worked out through private business discussions without the need for government intervention."[4]

As I have said for a long time, it is precisely this kind of private sector solution that has been the bedrock of Internet governance since its inception. America's Internet economy is the strongest in the world. It got that way not by government fiat, but by all interested parties working together toward a common goal. By definition, the Internet, a network of networks, is a "Wiki" environment which we all share, shape, build and, ultimately, pay for. Since it was opened up for public use, as a society we have worked hard to ensure that the Internet remains open and free. We have also worked hard to ensure that the Internet works, period. We call this: Internet governance. But since the days of ARPANET, Internet governance has migrated further away from government regulation, not closer to it.

By flattening out the governance structure into a bottom-up rather than government-mandated top-down environment, it has long been believed that the Internet is better able to flourish as a more dynamic and democratic entity. In contrast, an illustration of more government control of the Internet is China's Internet model. While

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[4] PR Newswire, *Comcast and BitTorrent Form Collaboration to Address Network Management, Network Architecture and Content Distribution* (Mar. 27, 2008), *available at* http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/03-27-2008/0004781055&EDATE=.

this may be an extreme example, some argue that societies that regulate the Internet less are more democratic, while societies that regulate it more are less democratic.

Early efforts to keep the Internet open and free sparked the creation of non-state-controlled Internet governance entities. For example, the Internet Society (ISOC), an umbrella organization founded in 1992, develops technical standards for the Internet. It is a non-profit corporation with a board of trustees and is funded by individuals and organizations in the Internet community virtually free from any government influence. Several organizations work with ISOC on a variety of Internet governance issues. Among them are: the Internet Engineering Task Force (IETF); the Internet Engineering Steering Group (IESG); the Internet Research Task Force (IRTF), the Internet Research Steering Group (IRSG); and the Internet Architecture Board (IAB), among others.[5] These organizations are largely self-governing and self-funded, with individuals and representatives of private organizations and companies serving on their boards. Similarly, the Internet Corporation for Assigned Names and Numbers (ICANN) is a private non-profit entity that works to govern the Internet's domain name system. ICANN manages the domain name system through a joint project agreement with the Department of Commerce. Furthermore, ICANN is a non-profit corporation funded and governed by private entities. The P4P Working Group is essentially no different.

The point is that the Internet has flourished by operating under the principle that: engineers should solve engineering problems, not politicians and bureaucrats. But don't take my word for it. Let me close with a quote from someone we all know and who had a great deal of influence over how the Internet became privatized.

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[5] Association for Computing Machinery, *A Concise Guide to the Major Internet Bodies*, http://www.acm.org/ubiquity/views/v6i5_simoneli.html.

Though government played a role in financing the initial development of the Internet, its expansion has been driven primarily by the private sector. For electronic commerce to flourish, the private sector must continue to lead. Innovation, expanded services, broader participation, and lower prices will arise in a market-driven arena, not in an environment that operates as a regulated industry.

Accordingly, governments should encourage industry self-regulation wherever appropriate and support the efforts of private sector organizations to develop mechanisms to facilitate the successful operation of the Internet. Even where collective agreements or standards are necessary, private entities should, where possible, take the lead in organizing them.[6]

Any guesses as to who said this? It comes from the Presidential Directive announcing the "Framework for Global Electronic Commerce" signed by President Bill Clinton in 1997.

We should heed President Clinton's advice. The government should encourage collaborative private sector solutions, such as those created by the P4P Working Group and the BitTorrent/Comcast agreement. But state intrusion into these partnerships will only inhibit future constructive endeavors. So to those who argue for more government control, I say be careful what you wish for.

Is now the time to discard that model which has served us so well after so many years of tremendous success? Would those who favor even seemingly innocuous consumer disclosure requirements on network owners regarding how they manage P2P traffic mind if a similar requirement were imposed on applications providers to reveal to consumers that their computers must be "seeded" and work 24 hours a day at the expense of your computer's processing power to allow the P2P system to work? Such disclosure

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[6] Memorandum from the White House Office of the Press Secretary to the Heads of Executive Departments and Agencies (July 1, 1997), *available at* http://www.landfield.com/govnews/mail-archives/root-hcc/0779.html.

might be beneficial to the public interest. But isn't the private sector the best forum to initially try to resolve these conflicts?

Having said that, I want to thank BitTorrent, Free Press and Vuze for filing their petitions at the FCC. You have stimulated the debate and spotlighted these important issues. In the end, I am optimistic that if we encourage all Internet stakeholders to continue their dialogue -- and collaboration -- we will see more win-win agreements that ultimately benefit consumers.

Thank you again to Stanford for hosting this hearing and I look forward to hearing from our distinguished panelists.

Statement of Commissioner Deborah Taylor Tate
At *En Banc* Hearing on
Broadband Network Management Practices
Dinkelspiel Auditorium
471 Lagunita Drive
Stanford University
Palo Alto, CA
April 17, 2008
(As prepared for delivery)

Thank you, Chairman Martin, for your leadership in holding this hearing on this very important issue, and thank you to Stanford Law School for hosting this event.

Today we gather in Silicon Valley, a place whose name evokes an entire geographical locale of technological innovation, newly discovered chemical compounds and uses for magnetic-radio waves, reminiscent of the Industrial Revolution, the dawn of the automobile, and airplane flight. Brilliant scientists, bold entrepreneurs and college students with unrivaled curiosity flocked here to create not merely a valley, but an entirely new, vibrant technological ecosystem -- a place that continues to maintain its status as one of the top research and development centers in the world, and that includes 10 of the 20 most inventive towns in America.[1] Stanford University, professors and graduates have played a pivotal role not only in the scientific, but also in the business, investment, and financial underpinnings of our society as well. None more revered than Vint Cerf, the Father of the Internet.

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[1] http://online.wsj.com/article/SB115352188346314087.html.

It is appropriate that here in this area so steeped in technology and innovation we hold a national hearing to examine the intersection of the extraordinarily connected, digital world in which we live and the role and appropriate level of governmental intervention, oversight and public policy.

As I have said many times, broadband is revolutionizing how we communicate, how, where and when we work, how we educate our children, the delivery of healthcare and public safety, as well as how we entertain ourselves. So this discussion is not about companies and not about regulators. This discussion is about patients, students, public safety officials and ultimately all Americans.

We must remain vigilant against intrusive governmental action that could disrupt the progress of broadband deployment. We must choose a path that is carefully balanced, providing the appropriate regulatory relief which resolves a specific "harm," allowing networks and carriers to respond to marketplace demands efficiently and effectively, ensuring that consumers are informed and protected and competition is encouraged through the least intrusive and least costly regulatory action.

Our decisions should fuel-inject the broadband turbines of the information economy. Freedom to innovate, not the shackles of regulation, drives productive solutions.

I have consistently favored competition and market forces rather than government regulation across all platforms-- especially in this dynamic, highly technical marketplace. I am pleased that since we last gathered in

Boston, BitTorrent and Comcast have announced several industry-based solutions for acceptable network capacity management and lawful content distribution. Comcast and P2P company Pando just announced an industry-wide effort to create a "P2P Bill of Rights and Responsibilities" for peer-to-peer users and Internet service providers. Both Comcast and Time Warner announced speed upgrades and tiered pricing for consumers in certain areas. Again, technology and the competitive marketplace seem to be responding to the appropriate oversight mechanism

As both a state regulator and now at the federal level, I have worked to remove legacy regulations to increase incentives for investment in new infrastructure, allowing services, applications and business plans to develop and proliferate in a less regulatory environment. And they have.

Notably, Internet providers continue to invest billions of dollars to upgrade and expand their networks. Spending on broadband networks was $15 billion in 2007 and is expected to dramatically rise to $23 billion by 2010. The Commission's most recent report on broadband deployment shows that the U.S. remains the largest broadband market in the world, and finds continued dramatic growth in broadband deployment to over 100 million lines as of June 2007, an increase of 55%.

These network upgrades allow Internet service providers to offer broadband service at ever-increasing speeds. We have come a long way since the 56 kilobytes-a-second dial-up speeds- with companies offering consumers download speeds of 50 megabits per second, and plans to offer speeds as much as hundreds of megabits per second. This multi-billion dollar

investment by private enterprise in complex networks is critical to ensure that consumers continue to reap the benefits of innovation. Some call for government regulation that, rather than continue, would actually greatly diminish future and essential investment.

Another byproduct of government regulation, especially in such nascent arenas, while both technology and business plans are still under development, is the "unintended" and often negative consequences of government intervention. As we review our own policies and learn more about especially P2P applications, I am particularly concerned about the growing problems of illegal content distribution, from pirated movies and music, to online child pornography, as well as the issue of child online safety and privacy in general. I look forward to even more collaborative, industry-based solutions, which are often the most effective and efficient means of resolving complex, technical network disputes.

To that end, I am glad that we are hearing from my friend and fellow Nashvillian Rick Carnes, President, Songwriters Guild of America, and also Jim Steyer and Common Sense Media today. Jim and Common Sense Media have been engaged in advocacy for children and families in the offline world and are now engaged in efforts to keep children safe in the online world. I also would like to recognize and mention that the National Center for Missing and Exploited Children very much wanted to participate but literally cannot be here with us today due to two other hearings in which they were already involved – one in Ireland signifying the growing global nature of this issue. However, I wanted to share some of what Mr. Allen would probably have described as one of the most successful public-private

partnerships that this digital age has fostered and why we should tread very lightly into any type of government regulatory action.

Many of us probably do not realize that the child pornography industry is a multi-billion dollar industry with most of the financial benefit accruing to organized crime in other countries while most of the demand is right here in the U.S. Through incredible technology, and unique public-private partnerships between sometimes unlikely partners, great strides are being made to crackdown on illegal content and money laundering problems. Internet service providers are able to differentiate these illegal images and through voluntary agreements with financial institutions—95% of them to date—are able to shut down the financial enterprise that allows payments over the Internet. While this has not stopped the criminal behavior, it certainly makes it more and more difficult to utilize the Internet for these illegal purposes. Mr. Allen cannot be here today as he is actually in Ireland, meeting with officials from law enforcement and financial institutions and technology companies with international presence to expand these voluntary efforts internationally. Countries around the world are interested in duplicating what we have done here in just two short years. The statistics are staggering and the technology such as peer-to-peer has unfortunately provided even more ease of access by people across the globe. Just to give you an example and this is a graphic one so I apologize to those of you who find this discomforting: through British law enforcement, a child pornographer was located and shut down; the Internet site allows viewers to watch the abuse of a child under 1 year of age. This is shocking. This is illegal. This is harmful to our children and their families and our society. Thus, I want to make sure that we weigh the unintended consequences of

any regulatory action we may take regarding more openness with these successful voluntary steps to use not just reasonable but extraordinary network management and technologies to fight crime rather than harbor and encourage it. We must be vigilant regarding our children so I think it is important not only to encourage and utilize the Internet in new, innovative and exciting ways; but also fully appreciate all the illegal, unlawful and predatory uses technology allows or exacerbates as well -- whether our financial information, our privacy, our most personal information, and most of all our young children.

Thank you, esteemed panelists for joining us here at Stanford. We look forward to hearing from you and learning from you regarding these important policy issues as we attempt to find the right balance in order to provide all our citizens the vast opportunities of the broadband world of today to compete in the global economy of tomorrow.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of   )
)
Broadband Industry Practices   )   WC Docket No. 07-52
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)

TESTIMONY OF GEORGE OU

FCC Broadband Industry Practices Hearing
Stanford University
April 17, 2008

George Ou
[george_ou@LANArchitect.net]

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Opening statement

Good afternoon Mr. Chairman and Commissioners, my name is George Ou and I am a former Network Engineer who designed and built network and server infrastructure for Fortune 100 companies. Thank you for inviting me here to speak to you about this critical matter of Network Management. I'm here to explain why network management has and always will be an essential part of the Internet.

Past Internet crises

The Internet is an evolving standard that had its share of growing pains and it continues to face them today. The rise of FTP (File Transfer Protocol) caused "congestion collapse" in 1986 because the Internet at the time lacked a functional congestion avoidance mechanism. This was patched in 1987 by Van Jacobson's congestion avoidance algorithm which fairly allocated network resources to the applications of its time. Despite newer and more efficient congestion control standards, Jacobson's algorithm has remained dominant for over 20 years.

By the mid 1990s, the rise of the web browser turned the "World Wide Web" in to the "World Wide Wait". Because the first web browsers weren't optimized for resource utilization, they were tuned to be more resource friendly in the re-write of HTTP between version 1.0 and 1.1.

Today's crisis on the Internet

Today we face a whole new problem. P2P (Peer-to-Peer) applications are causing a new congestion collapse because broadcast video is migrating to VOD (Video on Demand) over the Internet. Because of loopholes in the TCP standard, a small percentage of users utilizing P2P are appropriating the vast majority of network capacity at the expense of every other consumer. Interactive applications like web browsing or real-time applications like Voice over IP are being unnecessarily degraded not by carriers, but by P2P users.

Even Japan, with one of the world's fastest Internet broadband infrastructure, where many homes have access to 100 Mbps or even 1000 Mbps fiber service are facing the same P2P induced congestion collapse. This has caused their government to spend the last two years studying the issue. Recently, the Japanese Ministry of Internal Affairs and Communications released a study showing that just 1% of Japan's broadband users using P2P account for roughly 47% of Japan's Internet usage. Furthermore, only 10% of Japan's broadband users using P2P account, on average, for 75% of all Internet usage.

Source:
Ministry of Internal Affairs and Communications
Haruka Saito
Counselor for Telecom Policy
Embassy of Japan
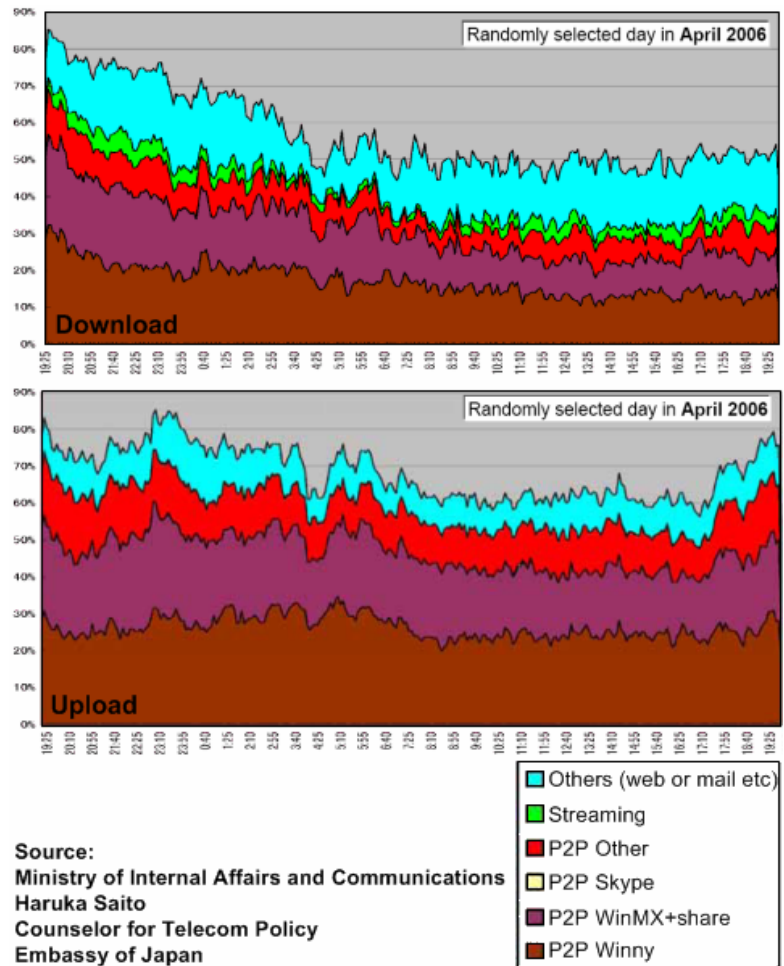
This would be like 10 passengers on a 100-seat airplane taking up 75 seats and forcing the other 90 passengers to share the remaining 25 seats. One of those 10 passengers would take up 47 seats while the other 9 take up 28 seats. While it's perfectly acceptable for 10 people to take 75 seats when there are only 25 other people on the plane who don't mind using a single seat, it is outrageous when 90 passengers who paid just as much for their ticket as the 10 seat hogs get "de-prioritized" in to 25 seats.

On the airplane, the obvious thing to do is to tell those people to take their feet and bags off the other seats so that other passengers may sit down. Yet on the Internet because it isn't easy for everyone to see what is really going on, the P2P bandwidth hogs yell "discrimination" and persuade activists to portray them as the victims of evil corporations who are being deprived of their civil rights. If anyone dares to throttle their overconsumption in any way, activist groups demand trillion-dollar FCC fines and immediate enjoinments[1] before the facts are even in. But there's nothing neutral or fair about what these groups are asking for and they're not the protectors of consumer rights they portray themselves to be.

1) http://www.freepress.net/files/fp_pk_comcast_complaint.pdf

The unfairness of TCP congestion control

So how could such an extreme state of unfairness be possible when TCP congestion control was supposedly fair? It's because Jacobson's TCP algorithm was only designed for the FTP problem of the 1980s, not the problems of the 1990s and beyond. It had a major loophole because it only sought to balance the flow rate of each TCP stream with no regard to how many TCP streams a person's application could open. While Jacobson's TCP algorithm worked for early Internet applications that only used one active TCP stream at a time, it's completely ineffective for the applications of today.

By 1999, the first P2P application called "Swarmcast" appeared on the Internet and began fully exploiting that loophole. When a P2P application opens up multiple TCP streams, each TCP stream flows at the same rate of TCP stream. That means a person using 4 TCP streams gets 4 times more bandwidth on a congested network than a person using the normal single TCP stream. The person using 11 TCP streams will get 11 times more bandwidth. Coupled with the fact that P2P applications operate non-stop throughout the day while normal applications only transmit and receive data a small percentage of the time, in short bursts, it is easy to see how only 1% of users, using P2P, have the ability to consume nearly half of all resources.
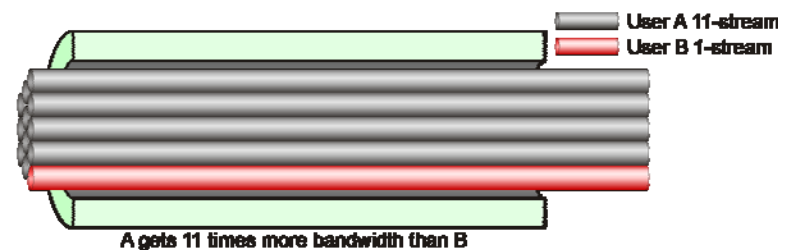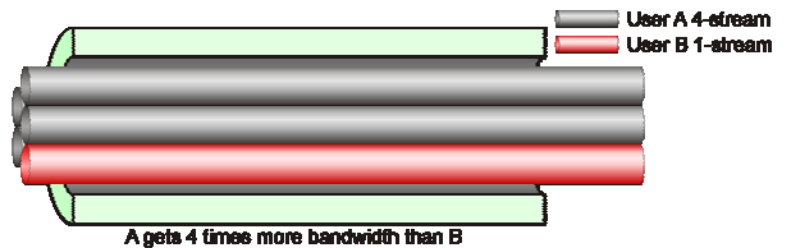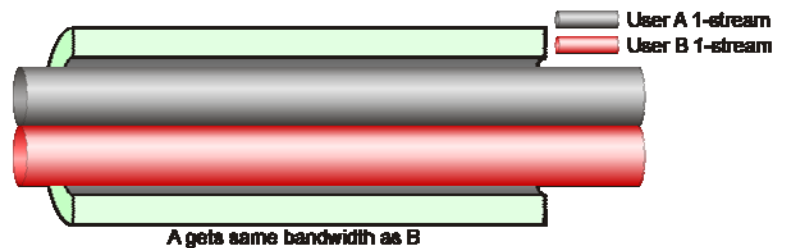
Fixing the unfairness of TCP

Thanks to the work of Frank Kelly and BT chief researcher Bob Briscoe, the matter of TCP unfairness is now before the IETF (Internet Engineering Task Force). Briscoe has issued an official IETF problem statement and he wants close the loopholes in TCP.

Unfortunately, making fundamental changes at the TCP standards level is extremely difficult and time consuming. Even when superior TCP congestion control mechanisms like ECN (Explicit Congestion Notification) were standardized in 2001, we have yet to see any real-world deployments because we can't force the billion-device installed base to upgrade. We're no longer in a time when a few thousand system administrators could patch all 30,000 computers on the entire Internet with Jacobson's algorithm in 1987.
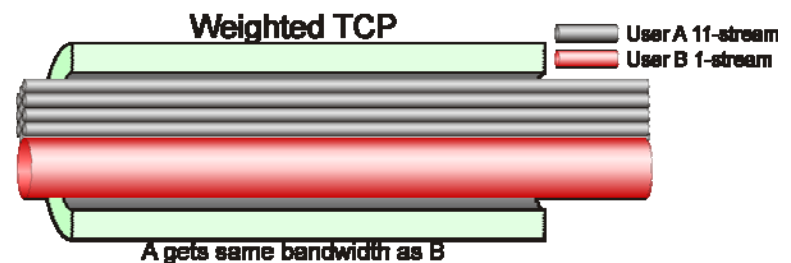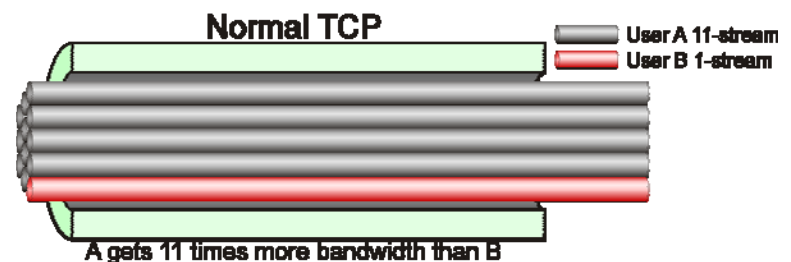
The effect of non-stop application usage on base loads

	Hours used per day	In-use upstream kbps	Average upstream kbps	Kilobytes sent per day	Sessions in use
Fulltime BitTorrent seeder	24	384	384.0	4,147,200	~20
Parttime BitTorrent seeder	12	384	192.0	2,073,600	~20
High-quality Skype video call	2	384	32.0	345,600	1
Wideband VoIP over VPN*	5	98.8	20.6	222,300	1
Heavy online gamer	10	35	14.6	157,500	1
VoIP**	6	50.8	12.7	137,160	1
Skype voice call	6	34.8	8.7	93,960	1
Sending email ***	0.0031	384	0.05	535	1
Heavy web surfer	12	0.1	0.05	<500	1
Heavy YouTube watcher	12	0.1	0.05	<500	1
Heavy Apple iTunes video user	12	0.1	0.05	<500	1
Heavy Xbox live HD video user	12	0.1	0.05	<500	1
Heavy Netflix	12	0.1	0.05	<500	1

Internet application usage
average upstream kilobits per second
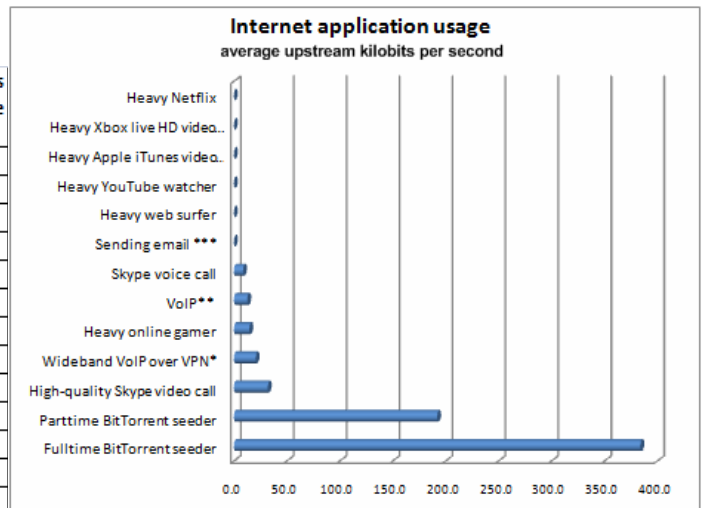
*   Corporate VPN telecommuter worker using G.722 codec @ 64 kbps payload and 33.8 kbps packetization overhead
**   Vonage or Lingo SIP-based VoIP service with G.726 codec @ 32 kbps payload and 18.8 kbps packetization overhead
***   I calculated that I sent 29976 kilobytes of mail over the last 56 days averaging 0.04956 kbps

In the real world, it's extremely unlikely that there would be a BitTorrent or P2P seeder who isn't a bandwidth hog. Anyone saturating the upstream nonstop and using multiple TCP streams is by definition hogging a much larger share of bandwidth than anyone else. Even if a P2P user manually sets his/her bandwidth consumption down to a fraction of the peak upload and only seeds for 12 hours a day, the amount of upstream resources used still dwarfs every other application. As I show in the chart above, just the persistence advantage alone allows a BitTorrent client to take an order of magnitude more upstream bandwidth than even the next heaviest upstream application.

Just as it is possible to "game " the TCP algorithm using P2P applications, it is also possible to construct a contrived example in which someone uses a P2P application to upload a 4.23 MB copy of the King James Version of the Holy Bible in order, they posit, to distribute the Bible to a single person. Then, when the downloading party tries to obtain the content with enough trials, they eventually trigger Comcast's network management response (which is not accustomed to seeing the anomalous situation in which a P2P application is used to exchange information between only two users). The "testing" party can then claim that even a minimal use of upstream bandwidth by a P2P application was targeted unfairly by Comcast's TCP resets. On the face of it, this claim sounds plausible and might suggest that something is wrong. But the minute you realize that Comcast gives you a gigabyte of web hosting space which allows you to distribute to many times more people at more than 20 times the speed of using a BitTorrent seed without the need to tie up your personal computer and broadband connection, you realize the implausibility of this scenario as a practical matter.

To illustrate this point, Richard Bennett used his Comcast-allocated web space to host that copy of the King James Bible at http://home.comcast.net/~richard_bennett/site/ which is far more accessible to anyone with a web browser at blazing fast speeds. This not only benefits the users because it's easy and fast, it also alleviates congestion on the scarce upstream path on a cable broadband provider's last-mile DOCSIS network.

Limitations of shared-medium broadband networks

	Upstream	Downstream	# of BitTorrent 24×7 seeders to kill unmanaged network
Cable DOCSIS 1.1	10 Mbps	40 Mbps	Less than 26 [1]
Cable DOCSIS 3.0 [4]	30 Mbps	80 Mbps	Less than 30 [2]
Wireless 802.11b ISP	4 to 6 Mbps shared		One [3]

1. Fewer than 26 fulltime P2P seeders saturating their upstream at 384 kbps 24×7 kills an unmanaged DOCSIS 1.1 network.

2. Fewer than 30 fulltime P2P seeders saturating their upstream at 1 Mbps 24×7 kills an unmanaged DOCSIS 3.0 network.

3. One fulltime P2P seeders OR P2P uploaders/downloaders can kill an unmanaged Wireless 802.11g network.

4. First implementations of Comcast's DOCSIS 3.0 use 2 bonded-channels downstream and a single upstream channel.

How do we deal with the immediate crisis?

The reality is that we cannot expect any meaningful fixes on TCP for the foreseeable future, let alone world-wide deployment of such a remedy. The solution must be found in the network itself because we cannot expect ordinary users to patch their computers to behave more politely even if a patch was approved and standardized. The network must implement and enforce fairness or else we have a state of anarchy where the "wants" of the few constrain the majority of the capacity that was intended for all paying users.

But as with any technology, there are growing pains in network-managed fairness. The first generation solutions would typically use protocol throttling techniques to neutralize the disproportionately large amounts of bandwidth that P2P applications consume. Throttling is not always the most accurate method and it can't work in all network topologies but it is cheap to deploy and used where it is effective. Other first-generation solutions like the Sandvine appliance used by cable broadband companies had occasional false positives like the accidental blockage of IBM Lotus Notes, but those bugs were quickly fixed as soon as they were identified.

The bigger problem with these first generation solutions is that they may not identify all of the bandwidth hogs and they can be fooled by protocol obfuscation techniques. It is also less than ideal to force a complete stoppage of a P2P BitTorrent seed even if it's only for a few minutes at a time during congested periods of the day rather than just slowing them down. But slowing down a specific bandwidth hog requires more drastic in-line changes to the network infrastructure, as opposed to the out-of-band Sandvine boxes that merely issued TCP resets to occasionally stop P2P seeding.

> **Note:** TCP resets are a commonly implemented feature in Internet firewalls and routers. TCP resets operate on the "control bits" in the transport layer and they do not constitute any modification or forgery of user data.

Critics like the Free Press and EFF claim that it would be better if users controlled their own throttling through economic incentives in the form of metered Internet access. But that would be far more draconian since users have to manually shut down P2P completely for 12 hours a day compared to having the ISP automatically shut down P2P seeds a few minutes at a time while not affecting normal P2P uploading and downloading. Any parent would appreciate the risk of their teenage child racking up thousand-dollar broadband bills because they thought it would be cool to try a new application that happens to conscript their computer as a P2P file distribution seed.

The immediate crisis is even more problematic for the wireless industry where spectrum and bandwidth is even scarcer and the capacity shared between more people than a cable DOCSIS network. One option in use today is to tell customers upfront that P2P applications aren't supported. Small wireless operators like LARIAT operating in the unlicensed 2.4 GHz spectrum space have so little shared capacity and their backhaul connections to the Internet are so expensive that they can't afford to have uploading bandwidth costs of other content corporations shifted on to them. Not only are the bandwidth costs shifted to them under the P2P distribution model, the costs are amplified by an order of magnitude because bandwidth out in the rural areas cost far more than the concentrated bandwidth in the data centers. These small wireless ISPs are often times the only Internet Service Providers in their space because larger corporations don't want to serve these less lucrative areas. As Dr. Robert D. Atkinson and Philip J. Weiser of ITIF argued[2], "Even port blocking, for example, might be defensible under certain circumstances." In this case, having a small ISP that blocks P2P serve an area is better than none at all or better than one that charges by the bit.

2) A "Third Way" on Network Neutrality http://www.itif.org/files/netneutrality.pdf

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Next generation network management technologies

As technology matures and network management becomes more sophisticated, companies that are most susceptible to P2P congestion (those using cable or wireless shared media transmission) are committing to newer in-line technologies that are protocol-agnostic and enforce real-time, per-user bandwidth fairness. These newer technologies will avoid false positives or false negatives and more importantly, they can't be fooled by protocol obfuscation techniques because they only look at bandwidth usage patterns. They also respond to bandwidth hogs by slowing them down rather than occasionally stopping them with TCP resets.

Comcast's CTO Tony Werner explained that any congested link on their network will have 2% of the users taking approximately half of all capacity at the expense of everyone else and this is consistent with the data from Japan's government. The new in-line technology Comcast is experimenting with now will de-prioritize and throttle that 2% of bandwidth hogs down to roughly 25% of all resources and that will be enough to alleviate congestion for everyone else. When the network isn't congested, those few P2P users can resume taking as much as they please.

BitTorrent Corporation knows that the metered Internet service plans promoted by Free Press will severely harm use of their application and their business model, which is why they know it's in their best interest to work with ISPs. BitTorrent will begin to clearly label their own traffic as P2P instead of obscuring their protocol headers like most P2P clients so that network operators can properly manage them. BitTorrent is also working closely with the P4P working group to make P2P clients more efficient by selecting nearby peers instead of random peers to minimize load on the network. Finally, BitTorrent K.K., BitTorrent's Japanese subsidiary, was part of a recent working group of ISPs and applications developers in Japan that has developed "best practices" guidelines for traffic shaping—recognizing that the mere addition of network capacity will not correct a problem created by an application designed to consume all available capacity.

How do we define what is "reasonable network management"?

It should be reasonable to conclude that "fairness" to each paying consumer should be a key criterion in determining how reasonable a solution is. Based on that criterion, I worked out the chart below with the solutions that are either in use or being proposed.

Future | **Reasonable** | **Unreasonable** | **Past**

Protocol-agnostic per-user fairness

Pros	Cons
Equal sharing of resources between users of same tier. Can't be fooled by protocol obfuscation.	Requires more drastic in-line changes to network. Requires real-time tracking of per-user bandwidth consumption and enforcement of per-user fairness.

ISP throttles BW hogging protocols

Pros	Cons
Out-of-band deployment with TCP resets or use of common de-prioritization techniques. Results in fairer distribution of bandwidth.	Can be fooled by protocol obfuscation. Possibility of affecting non bandwidth hogs.

Metered Internet

Pros	Cons
Solves congestion because users self-throttle for fear of massive ISP bill.	Danger of massive ISP bills for consumer. Makes P2P usage cost-prohibitive. By definition a "Toll road".

No network management

Pros	Cons
Cost free deployment	10% of users throttles 90% of users down to 25% of resources

Intelligent | **Dumb** | **Fair** | **Unfair**

I've defined **"No network management"** as the <u>most</u> unreasonable form of network management because it allows 10% of the users to throttle 90% of the users by leaving them with 25% of the resources. What does it matter that it's a small minority of users doing the "throttling" here rather than some corporation? Isn't the greatest amount of harm being perpetrated on the largest number of paying consumers under a non-managed network?

The Free Press argues that protocol-agnostic per-user fairness, Metered Internet, or No network management (random packet drops) would all be superior to the protocol throttling methods that employ de-prioritization or TCP reset and that protocol throttling should be banned. While we can all agree that we should move to the protocol-agnostic per-user fairness model of network management, it would be harmful to the vast majority of consumers if we insisted on immediate perfection today and banned something that was mostly fair and mostly reasonable. The market is already moving to the newer more advanced network management techniques and we should give that a chance to mature rather than forcing a change for the worst in the meantime.

Network management ensures a harmonious coexistence

As Japan's broadband experience has shown, we will never grow our way out of congestion and we will never have enough bandwidth. But managing a network can ensure a harmonious coexistence where P2P background applications and traditional interactive or real-time applications all get what they want. All too often, non-technical Network Neutrality proponents confuse network priority with network throughput when they in fact have nothing to do with each other.

P2P will always consume the lion's share in traffic volume but they can have all the volume in the world even when they have the least priority. Interactive and real-time applications fundamentally have low volume requirements and there's no reason they shouldn't get maximum priority. It makes no difference to a P2P application if you send the interactive or real-time packets in a quick priority burst since that would only get them out of the way sooner. The interactive or real-time applications only have a small and fixed amount of data to transport so the amount they can displace the larger P2P file transfers remains constant regardless of priority given to the smaller payloads. The P2P file transfer will still be completed in the same amount of time whether that's an hour or a day. But receiving priority makes all the difference in the world to the interactive and real-time application because a human is waiting for an immediate response and voice or gaming applications can't tolerate delays that are more than a tenth of a second.

So with network management, background applications like P2P can get all the traffic volume they want in the same timely fashion with no need for draconian metered pricing. Interactive or real-time applications get the priority they need so they don't get drowned out P2P applications. But without network management regardless of how much capacity you throw at the problem, P2P applications won't run much faster but they will drown out the interactive and real-time applications on the Internet.

Conclusion

The purpose of my testimony is for the Commission to recognize the efforts the networking industry is making to improve network traffic management and consumer disclosure. The industry faces a hard up-hill climb to educate consumers about the services they offer, their limitations, and their terms of use because we aren't a nation of network engineers. Perhaps the worst side-effect of the current controversy over P2P management is the large number of false and misleading statements about network engineering that have become part of the public debate. The Commission should be particularly mindful of its role in educating the public toward a genuine understanding of the Internet and its unique properties compared to the traditional telephone network. Networking is a difficult and complicated subject and I hope the Commission will consider the pragmatic, engineering concerns when crafting its policy solutions. Chairman Martin, and the other members of the Commission, thank you for taking the time to listen.

Sincerely,
George Ou
Former Network Engineer

Acknowledgements
I'd like to thank Network Architect Richard Bennett, who testified at the FCC hearings at Harvard, for contributing some of the ideas and edits to this paper. I'd also like to thank BT chief researcher Bob Briscoe for his influence on this paper as well and anyone else who helped edit this paper.

Jim Steyer, Founder and CEO, Common Sense Media
Testimony to Federal Communications Commission
En Banc Hearing, Stanford University, April 17, 2008

As a graduate of Stanford Law School and a member of the faculty here, I'm pleased to welcome you to Stanford.

These discussions about broadband network management have focused almost entirely about business issues that concern adults and media companies. While those issues are important, Common Sense Media is here to urge you to focus your deliberations on the most important group of consumers of the Internet and digital media: our kids.

I think it is especially appropriate for this Commission to focus on kids. Because whether it has been leading new efforts on childhood obesity, or requiring media companies to clean up their act when kids comprise a large part of their audience, this Commission's work on behalf of kids will be a hallmark of your legacy. Each of you deserves great credit for the bipartisan manner in which you have consistently tried to promote the best interests of children and families.

You've heard testimony about ensuring that consumers and businesses can effectively access the content they want. But we also need to talk about empowering families and educators as consumers, so they can protect children from content they *don't* want, and help them find top quality content quickly and easily.

I want to focus my remarks on ways that everyone involved can keep the interests of kids and families front and center. The most important of these is harnessing the educational power of the Internet, so that it continues to improve children's opportunities for learning.

First, some basic facts about kids and media:
- A recent Pew survey found that 93% of teens use the Internet today. Pre-teens are there in the tens of millions, and whether we like it or not, we have 3- and 4-year olds using the Internet today.
- Just as importantly, kids and teens are no longer just consumers – many are becoming content providers. The Pew survey found that 39% of online teens share their own artistic creations online – including artwork, photos and videos.
- In Common Sense Media's recent national survey, 85 percent of parents said that the Internet is the medium that poses the greatest risk to kids. Yet 74 percent said the Internet is the medium that offers kids the greatest opportunities for learning and growth.

The seemingly contradictory feelings actually make complete sense. The Internet and the growing world of digital media are full of *both* perils and possibilities. They can and do pose potential dangers for children, but they also create extraordinary, unparalleled opportunities for their education and development.

One thing is already clear. This isn't about how the Internet and this 24/7 digital reality *will* change children's lives – it already *has*, and is constantly changing them. We adults are just

visitors and immigrants to the world of the Internet – our children are the true natives. They are leading digital lives, with huge implications for our discussions here today and in the future.

- For example, you cannot define literacy in the 21st century without understanding the ever expanding presence of the internet and other digital media. Many of us lament that the average American high school kid cannot find Japan on a map. But those same kids can use the Internet and find the name of the third largest city in Japan in about 20 seconds, and probably learn more about that city than kids ever knew a generation ago.
- Whatever decisions the Commission makes about network management, your decisions must continue unleashing the incredible educational potential of the Internet.

We want to be very clear – Common Sense Media believes in sanity, not censorship. We believe that an informed consumer is the best consumer. We want all of the media companies with stakes in today's discussion to do more to help parents, families and educators. By providing better tools and information, service providers and content providers can empower families to make smart choices for kids – and help them to make sure their kids find the good stuff, and avoid the bad stuff, in this changing media world.

Several of the commissioners have talked about how the Internet has fostered innovation. On behalf of children and families, we want the FCC to call on service providers and content providers to use that innovation to greatly expand the quality and quantity of tools and resources they provide to families, so that parents can choose media they feel is helpful and appropriate. This spirit of innovation can foster a 'public Internet' that truly serves the public interest by meeting the 21st century education needs of children and families.

I'd like to close by reiterating that an important aspect of this Commission's legacy will be the bipartisan work that you have done – and can still do – on behalf of children and families. With that in mind, I have one final recommendation for you:

We would urge that this fall, you hold one more En Banc hearing, focusing exclusively on kids, and on the ways that the Internet and digital media can best serve the interests of kids in the 21st century.

Network Management and Consumer Expectations

Robert M. "Robb" Topolski
robb@funchords.com

Hello, I'm Robb Topolski…

- 25 years, **Amateur Radio Operator**
  - Public Service: Disaster recovery, Navy MARS, USAF MARS
  - Digital modes, RTTY and packet, PBBS, NET/ROM, Digipeaters
  - Southern California Digital Communications Council member

- 15 years, **Software Quality Assurance and Testing**
  - Networking products and platforms

- **Internet "Settler" (early 1990s)**
  - Both for work and personal research
  - Known by my own name; signed the Nat'l Science Foundation AUP
  - The WWW just starting and it was a fun "Information Dirt Road"

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Thank you for inviting me to speak on this panel.

I owe my interest in technology and networking to Amateur Radio, where as a teen I was supervised by mentors "Elmers" who introduced me to digital modes over radio. Indeed, my interest in communications, protocols, and networking "physics" is deeply rooted in the concepts that I learned in those first days as a "Ham."

For the last 15 years, I've been working on Networking products and platforms, ranging from "Video Phone" software to scalable data-center servers.

(Note: My professional bio is on file with the original *Free Press, et. al.* filings in this case.

Not surprisingly, then, I took those basics with me when I became interested in an emerging medium known as the "Internet." I didn't invent it, nor were any of my innovations one of the Internet's core protocols. But when I arrived, it wasn't yet the "World-Wide-Web" or an "Information Superhighway," either. We all used our real names, many of us signed a National Science Foundation agreement promising to keep to certain standards. One of my favorite pages sat on a server called akebono.stanford.edu – known either as Jerry's List or Yet Another Hierarchical Officious Oracle – later to change its name to, simply, YAHOO. So perhaps you might think of me as an stagecoach Settler.

One of my first projects on the Internet was the commercial development of the NCSA Mosaic browser. Most recently, I was responsible for oversight of multiple development and testing projects concerning datacenter servers. Over the years, I have been responsible for ensuring that my company's numerous networking products behaved according to established Standards.

…and I am a Comcast Customer.

- **I could not upload** certain legal and historical Tin-Pan Alley and Barbershop Quartet era content – 24 hours a day, for months

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My work is also one of my hobbies. I have been a presenter at several software quality and testing conferences, I've worked on anti-spam and anti-phishing projects. I have helped numerous end-user consumers put together their wireless networking projects.

Another hobby of mine is music. Since coming to Oregon. Nine months out of the year, people in my part of the Pacific NorthWET look for ways to stay dry. I became interested in four-part barbershop harmony.

Over the years, I had collected some nice samples of printed and recorded musical history, in the old-time Barbershop Quartet style. While trying to use the Peer-to-peer networks to share this with others, I found that I was completely unable to upload any of it on the Gnutella network. This confused me, because, months earlier, an earlier attempt to share other files like these worked fine.

…and I am a Comcast Customer.

- **I could not upload** certain legal Tin-Pan Alley and Barbershop Quartet era content – 24 hours a day, for months

- **I posted a technical report** about it on "DSL Reports," a long-standing bulletin-board service shared by Broadband enthusiasts

- **My reports were independently confirmed** and widely reported in the blogs and print media: Comcast injects forged packets to tear down established connections

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At first, I suspected that something new about my own configuration was at fault (I'm always changing things). After applying a packet-sniffer to the line, I found that there were several incoming Gnutella requests to download my files, but that these requests were immediately being Reset. After repeating my tests over a secure tunnel to another ISP, I found that Comcast was the common denominator. I also found that their method was one known to be associated with severe policy management – such as that used by "The Great Firewall of China" – and that a policy-management company known as Sandvine recently broke news by signing a big customer, analysts whispering the name Comcast.

As technologists are apt to do, I publically posted about my findings (http://preview.tinyurl.com/yqyow2) and the story was later picked up by blogs and news media. My findings have since been independently verified, have been covered in thousands of news articles, and are the heart of these hearings.

The Simple Problem

- Consumers, developers, content creators and service providers all **expect and depend** upon **network operators** using the **same standardized set of protocols and principles common to the Internet.**

As I told the Free Press when I agreed to sign on to their FCC filing, the implications of an ISP behaving this way strikes at the heart of the freedom to innovate on the Internet.

On February's technical panel, Dr. David P. Reed said it very well: "Providing Internet Access implies adherence to a set of standard technical protocols and technical practices that are essential for the world-wide Internet to work for all its users."

I have to know, as a developer, that the Web Browser that I am developing in a lab in Santa Monica, California will work on an ISP anywhere in Africa. As a consumer, I expect that Slingbox, which was developed in Israel, will work on my Cable ISP in Hillsboro, Oregon. Each of these may have certain minimum System Requirements about the connection speed, but world-wide, developers assume that the word "Internet" means that same set of protocols and operating principles.

When you pull into a station, and fill your tank with Unleaded Gasoline, you need only concern yourself with the volume and the price. You need not concern yourself with the fundamental formula. Otherwise, the job of owning, manufacturing, repairing, or making products for cars would be much more complicated. The "Internet" has a similar quality. Since the consumers, developers, content providers, and network service providers all share a common understanding of the "Internet," there is no need to define it any further. Network requirements for currently-shipping products need not mention the various protocols presumed to be allowed across the 'net.

The Simple Problem

- Consumers, developers, content and service providers **expect and depend** upon **network operators** using the **same standardized set of protocols and principles common to the Internet.**

- **Consumers** and the **Internet community** were **harmed** when **Comcast offered "High Speed Internet"** yet **secretly** delivered **something** much **less and different.**

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But, one day we did have a problem with gasoline. Dealers and suppliers toyed with their fuel sources, the formula, and their pumps. In such cases, the dealer secretly evaded gasoline taxes or the consumer received less volume, and/or a lower-quality product than expected. The ripped-off public, however, was usually none-the-wiser as all of the clues of such a scam are quite hidden from them. When the damage is done, it is too late.

Likewise, this has happened with Broadband. When Comcast offered High Speed Internet at certain "tiers" or levels of service, it secretly deployed technology to stop delivery of the upload portion of that service to some. Most non-technical customers did not notice, which was by design – Sandvine even goes as far as to warn ISPs not to go too far with its product lest it be noticed by the consumers.*

Consumers and the Internet community were harmed when Comcast offered "High Speed Internet" yet secretly delivered something much less and different.

Consumers obviously got less product than their subscription called for. Developers were also harmed, who were chasing their tails as the issues reported by their users could not be reproduced.

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*http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519855453 (see quoted text in point 8)

RFC 1087 (dated 1989, but historically relevant – an Internet "Federalist Paper" if you will):

The […Internet Architecture Board of The Internet Society, (and the oversight board of the IETF), views…] as unethical and unacceptable any activity which purposely: (a) seeks to gain unauthorized access to the resources of the Internet, **(b) disrupts the intended use of the Internet**, (c) wastes resources (people, capacity, computer) through such actions, **(d) destroys the integrity of computer-based information**, and/or (e) compromises the privacy of users.

The Simple Problem

- Consumers, developers, content and service providers **expect and depend** upon **network operators** using the **same standardized set of protocols and principles common to the Internet.**

- **Consumers** and the **Internet community** were **harmed** when **Comcast offered "High Speed Internet"** yet **furtively** delivered **something** much **less and different.**

- The interference remains **unreasonable**, undisclosed, arbitrary, and unauthorized. It **constantly** attacks **both ends** of TCP links established by **P2P applications** in a way that **hides the source** of those attacks and **prevents customers** from uploading.

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That denial of service, man-in-the-middle attack continues today. Using a very detailed scheme* of packet forgery that both hides the source of the attacks and rewriting certain counters to ensure that the forged packet is accepted by the end-users' networks, Comcast tears down its customers' uploading connections. This attack is presumably without regard to network congestion, as it happens regardless of the time of day or day of the week. The only common factor in these attacks is that it was a TCP connection transporting an openly-defined P2P application protocol and the application was in an uploading mode on that connection.**

One thing that was made crystal clear at the last FCC hearing on this matter, nobody sees using RST flags to tear down established and working TCP connections is an extreme act, having no place in Reasonable Network Management.

**Sandvine US Patent App 20040006643-"TCP proxy providing application layer modifications"* :

•[0097] State machine 100 will on occasion need to generate segments, for example when:

•[0098] a) sending ACK segments to the sender to force the sender's rapid re-transmit algorithm to activate;

•[0099] b) sending ACK segments to the sender when entire segments are deleted by application layer analysis module 104; and

•[0100] c) **sending RST segments in both directions** *when the flow is forcibly terminated by application layer analysis module 104.*

•[0101] This generation of segments is handled by segment generation module 106.

**http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519870563 explains about how most of Comcast's assertions are technically inaccurate.

The Simple Solution

- **Immediately stop the interference**
  - It is no different than any other malicious interference (jamming) case affecting authorized communications; the FCC takes quick action to stop jamming.

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As a ham radio operator, I see this simply as – without regard to the Network Neutrality implications – a jamming complaint.

The FCC usually does a fantastic job of putting active jamming activity on the top of their list, however this period of jamming has continued from sometime in 2006 until present day – and the "Jammer" assures us that he'll stop when he's damned good and ready to change his ways – hopefully by the end of the year. This is both unprecedented and unacceptable.

The FCC probably should have acted already. Nevertheless, the FCC should take immediate action, today if possible, to enjoin Comcast from employing this technology any longer.

Just as there is no reasonable excuse for intentionally jamming authorized communications, forging RSTs to tear down authorized, working communication links between peers is likewise without excuse.

The Simple Solution

- **Immediately stop the interference**
  - It is no different than any other malicious interference (jamming) case affecting authorized communications; the FCC takes quick action to stop jamming.
- Begin the process of granting relief
  - ISPs who under-deliver should pay fair restitution
  - ISPs who conspire to secretly deliver less service than was sold, should also be punished with greater severity
  - ISPs who compound the problem by unethically diffusing, denying, or deflecting the truthful examination of their acts should face compounded punishment as a result.

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Aside from stopping the interference, the various complainants in this case have asked for certain relief. Considering those requests seems to be the appropriate and logical next steps in this case.

In such that we have a case of under-delivery of services – regardless if malicious or not – capture and restitution of customers' subscription fees is in order.

The government should duly investigate and determine if there are further findings of a violation of certain assurances Comcast provided to the government, or criminal acts committed, or securities-related ethical lapses, and upon such finding deliver appropriate consequences.

The Simple Solution

- **Immediately stop the interference**
  - It is no different than any other malicious interference (jamming) case affecting authorized communications; the FCC takes quick action to stop jamming.
- Begin the process of granting relief
  - ISPs who under-deliver should pay fair restitution
  - ISPs who conspire to secretly deliver less service than was sold, should also be punished with greater severity
  - ISPs who compound the problem by unethically diffusing, denying, or deflecting the truthful examination of their acts should face compounded punishment as a result.
- Establish proactive oversight: *today, DPI … Tomorrow?*
  - Create improved processes, rules, or procedures for the future
  - Obtain appropriate access to technical and complaint data

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Finally, the FCC needs to understand that the advent of high-speed Deep Packet Inspection hardware opens up a whole new set of capabilities –

Some are good. Deep Packet Inspection might be employed by a lab or a business to prevent employee theft of Intellectual Property by looking for key words in incoming or outgoing communications. It might be specifically requested by customers who want additional parental controls to monitor participation in chat rooms and to avoid dangerous content.

It's when these new abilities challenge the bedrock principles of the Internet that require the FCC to prepare. These devices are still very new, but are currently being tested and marketed for:

a. Intercepting a subscribers' incoming web pages and changing their content, such as an ISP inserting their own ads or messages so that they appear within the web pages fetched by the consumer.
b. Passively monitoring the activity of users, without their explicit consent, and selling that information and/or delivering customized marketing campaigns based on the results.

Situations like these are extremely difficult for an end user to detect, and they're appearing in the marketplace now. A grass-roots concern known as the Network Neutrality Squad (www.nnsquad.org) is collecting such reports.

For the integrity of the Internet "product," the FCC needs to have sufficient access to the appropriate business and complaint records as well as access to "the product" to determine the validity of those complaints.

Network Management and Consumer Expectations

by Robert M. "Robb" Topolski - robb@funchords.com

for the **Federal Communications Commission**

April 2008 En Banc Hearing on Broadband Practices

Thank you for inviting me to speak on this panel.

For the past 25 years, I've been working on Networking protocols, products and platforms, starting as a hobby and eventually, as a profession. I've worked on projects ranging from Amateur Radio packet BBS systems, to one of the first commercial ports of the NCSA Mosaic browser to scalable datacenter servers. Over the years, I have been responsible for ensuring that numerous networking products behaved according to established Standards.

Another hobby of mine is barbershop harmony.

Over the years, I had collected samples of printed and recorded musical history, in the old-time Barbershop Quartet style. While trying to use the Peer-to-peer networks to share this with others, I found that I was completely unable to upload any of it on the Gnutella network.

Using packet traces and end-to-end comparisons between Comcast and non-Comcast connections, I concluded that TCP Reset flags were being used to tear down P2P connections when the uploading peer was on the Comcast network.

Investigating this technology further, I found that it was nearly universally despised – it's the same method used by "The Great Firewall of China." Dr. Sally Floyd, wrote a paper which the IETF later adopted as a "Best Current Practice," demonstrated that TCP resets used for network management are both rare and harmful (BCP 60, "Inappropriate TCP Resets Considered Harmful").

As technologists are apt to do, I publically posted about my findings and described my tests and results. My findings have since been independently verified, have been covered in thousands of press articles, and are at the heart of these hearings on these practices.

The impacts of an ISP behaving this way strike at the heart of the ability to innovate on the Internet. At the February hearing, David Reed told you that, "Providing Internet Access implies adherence to a set of standard technical protocols and technical practices that are essential for the world-wide Internet to work for all its users." The entire Internet community counts on that fact, every day.

I have to know, as a developer, that the Web Browser that I am developing in a lab in Santa Monica, California will work on an ISP anywhere in Africa. As a consumer, I expect that Slingbox, which was developed in Israel, will work on my Cable ISP in Hillsboro, Oregon.

Consumers and the Internet community were harmed when Comcast offered "High Speed Internet" yet secretly delivered something much less and different.

Consumers obviously got significantly less product than they purchased; and they applications they tried to use did not work correctly. The developers were also harmed, as they down user issues that they could not reproduce to debug.

This situation continues today. It has not stopped.

Using RST flags to tear down established and working TCP connections is an extreme act, having no place in Reasonable Network Management.

Comcast's interference occurs during all hours of every day, a fact which does not jive with the idea that it is somehow responding to rare moments of congestion.

As a ham radio operator, I see this simply as – without regard to the Network Neutrality implications – a jamming complaint.

The FCC usually does a fantastic job of putting active jamming activity on the top of their list, however this period of jamming has continued from sometime in 2006 until present day – and this "Jammer" assures us that he'll stop when he's damned good and ready to change his ways to something else yet to be determined – hopefully by the end of the year.

This is both unprecedented and unacceptable. The FCC should take immediate action, today if possible, to stop Comcast from using this technology any longer.

The various complainants in this case have asked for certain relief. Considering those requests seems to be the appropriate and logical next steps in this case.

In such that we have a case of under-delivery of services, restitution is in order.

Most importantly, the FCC needs to prepare. The advent of high-speed Deep-Packet-Inspection hardware such as that used by Comcast opens up a whole new set of capabilities – many involving changing the behavior or even the content of Internet messages.

These products are in the field, now.

Technology like this is nearly impossible to detect. For the integrity of the Internet "product," there needs to be a way to monitor and protect it.

Barbara van Schewick
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Stanford Law School

**Oral Testimony at the
Federal Communications Commission's Second Public En Banc Hearing
on Broadband Network Management Practices
at Stanford University, Stanford, CA on April 17, 2008**

Mr. Chairman, Commissioners,

Thank you for inviting me to testify today. My name is Barbara van Schewick. I'm an Assistant Professor at Stanford Law School; I also have a courtesy appointment at Stanford's Electrical Engineering Department. Together with Larry Lessig, I co-direct the Center for Internet and Society at the Law School. I have a PhD in computer science and a law degree. For the past eight years, my research has focused on the relationship between Internet architecture, innovation and regulation.

In my opening statement, I would like to make three points:

1. Allowing network providers to single out specific applications and block or degrade them to manage bandwidth on their networks would harm user choice and application-level innovation – the two things that the Internet Policy Statement is designed to protect.

2. Even with disclosure, the market will not solve this problem.

3. To protect application-level innovation and user choice, the FCC needs to clarify that singling out specific applications and blocking or degrading them to manage bandwidth on a network is not reasonable network management and violates the Internet Policy Statement.

Users choose the applications that best meet their needs and that provide the most value to them. If I'm working on an open source project that uses BitTorrent to distribute its source code, and the network provider chooses to single out BitTorrent to manage bandwidth on its network, I am unable to use the application that best meets my needs and use the Internet in the way that is most valuable to me. This is pretty obvious.

But what is the impact on application-level innovation? I recently met a graduate of Stanford's computer science program. Together with other graduates, he started a company that will develop a video application with a peer-to-peer component. Because he had a great concept, he was able to present his idea to six private equity firms. He entered into formal discussion with three. In these talks, the investors discussed the risk factors associated with his product. That network providers would block or degrade his application was one of the top risk factors for all investors.

If there was no market demand for his product, it would fail. And, worse, if there was market demand, it would be blocked. The more likely it was to succeed, the more likely it was to be blocked. Each of the three firms passed on funding his innovation.

This is a real problem. This story is not unique. And this story will become the norm unless the FCC adopts some baseline protections ensuring that network providers cannot target and degrade particular applications to manage bandwidth on their networks.

In my submitted testimony, I discuss three points.

First, I explain the need for more in-depth and standardized disclosure for consumers.

Second, I explain that the current level of disclosure in the US marketplace is inadequate.

Third, I explain why disclosure is not enough and why the FCC must enforce clear non-discrimination principles beyond mere disclosure.

There is a market failure here, in fact several. First, we do not have effective competition in the broadband market. The market for broadband internet services is an effective duopoly. In addition, this market is afflicted with significant switching costs.

Second, because of the prevailing flat-rate pricing structure, network providers have the perverse incentive to block or degrade applications that consume more bandwidth or consume it in unexpected ways. If the use of the network increases, the network provider's costs increase as well, but due to flat-rate pricing, its revenue stays the same.

Third, the history of the Internet (as well as theoretical analysis) shows that network providers prefer solutions that constitute a "quick fix" without considering the impact on the long-term evolvability of the Internet. The deployment of asymmetric cable and DSL, network address translators and Comcast's tactics to manage congestion are all examples of this problem.

All this suggests that network providers will find it more attractive to choose a specific application and block or degrade it than to try to find a non-discriminatory way of managing their network. A large literature describes the problems for application-level innovation that result when network providers, not users, pick winners and losers among applications. This is worse. When network providers choose applications to degrade in order to manage bandwidth, they will use all sorts of criteria (is the application easy to recognize; does the application constitute a significant chunk of bandwidth; what are the applications blocked by a particular vendor's product), but these criteria are very different from the criteria users employ when deciding which application to use. It is impossible to predict which applications a network providers would want to block; today it's p2p, next year it may be YouTube, the year after that it may be this exciting new application that we haven't even thought of yet. The only thing we know is that the mechanism that is most attractive to network providers is most harmful for application-level innovation and user choice.

Telling Comcast that its particular practice constitutes unreasonable network management is not enough. Network providers will still have an incentive to single out specific applications, and the risk of being blocked if they are successful will still be the number one risk factor for applications developers and investors who consider potentially bandwidth intensive applications. By declaring

that "reasonable network management does not include practices that single out specific applications and block or degrade them to manage bandwidth on their networks", the FCC can restore application developers' and investors' confidence that they will be able to use the network. This ability to use the network is not unlimited. Network providers will still need to manage congestion on their network, but the tools they use will affect all applications, and won't just make one application the odd man out.

In the Internet Policy Statement, network management is the exception, not the rule. The rule protects application innovation and user choice. Allowing network providers to target specific applications to manage bandwidth on their networks would make the rule meaningless. It is on the FCC to prevent this from happening.

Thank you for your attention, and I'm looking forward to your questions.

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**Official Testimony at the
Federal Communications Commission's Second Public En Banc Hearing
on Broadband Network Management Practices
at Stanford University, Stanford, CA on April 17, 2008,
Docket No. 07-52**

Mr. Chairman, Commissioners,

Thank you for giving me the opportunity to testify today. I would like to make four points:

1. The FCC should require broadband providers to disclose their broadband management practices.
2. The current level of disclosure is not sufficient.
3. Disclosure alone is not enough.
4. The FCC needs to establish some ground rules for reasonable network management. In particular, it should ban network management practices that single out specific applications or classes of applications in order to manage bandwidth consumption on broadband networks.

1. The FCC should require broadband providers to disclose their broadband management practices.

Full disclosure is a necessary condition to enable competition to work. Disclosure improves competition by enabling customers to make informed decisions when choosing providers. Disclosure also enables competitors to differentiate themselves along these dimensions.

Today, network providers in the US compete based on maximum upload and download speed and price. If, however, customers are unable to note the differences between the offerings along other dimensions (e.g. how oversubscribed is the network, how often is traffic management used, how is traffic prioritized), they cannot take these factors into account when making a decision, and network providers do not have an incentive to compete on these factors.

Compare this with the situation in Europe: A quick look at network provider offerings shows that ISPs compete on much more than just price and maximum upload or download bandwidth. For example, BT offers customers three different options with differing monthly bandwidth allowances that indicate the maximum amount of bandwidth you are allowed to use in a month. To protect customers from unexpected increases in their broadband bills, BT does not charge customers if they exceed their monthly usage allowance in one month.[1] Laribu, a provider in Belgium, offers three service packets which offer different combinations of upload/download speed and monthly bandwidth allowances. Usage that occurs during 2 am and 8 am only counts with half of the actual bandwidth used, an offering that clearly targets customers interested in peer-to-peer file sharing.[2] PlusNet, an ISP in the UK that is an independent subsidiary of BT, offers different combinations of maximum upload/download speed, monthly volume caps and traffic prioritizations; traffic between midnight and 8 am is not counted towards the monthly volume cap.[3] This type of differentiation enables someone who knows she wants to do a lot of file-sharing or who is an avid gamer to choose the Internet service offering that best supports her needs.

The UK providers have clearer descriptions of their acceptable use policies, and of the type of network management they use in their network.[4] For example, BT's policy usage allowance and fair use policy informs customers that "[…] we restrict P2P speeds if it's having a negative impact on the online experience of the majority of our customers. We normally place restrictions in the evenings at peak time, but we do apply them during the day if a lot of customers are using P2P at the same time."[5] BT's broadband management practices are very different from Comcast, and their disclosure is clearer. PlusNet explicitly states how different traffic is prioritized on their network, and what bandwidth rates customers can expect for different applications at different times of day.[6] As a side effect, such disclosure may help alleviate congestion by enabling customers to adjust their behavior.

Disclosure provides visibility to regulators, competitors and industry observers. It avoids the waste of resources spend when users or application or content providers try to figure out what is going on on a particular network, as when the Associated Press, EFF or private parties like Robert Topolski and David Reed were running tests on Comcast's network to understand what Comcast was doing. Additionally, testing by end users may be unable to detect the "next generation" of network management tools, which may be completely hidden from end users.

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[1] BT (2008).
[2] LaTribu (2008).
[3] PlusNet (2008a); PlusNet (2008c).
[4] Not all these practices would be considered reasonable network management under the standard advanced below. The point here is that the disclosure is clearer than the disclosure of practices in the US.
[5] BT (2008).
[6] PlusNet (2008b); PlusNet (2008c).

Finally, under effective competition, disclosure can discipline provider's behavior.[7] Customers who do not like how a provider manages its traffic can switch to another provider.

2. The current level of disclosure is not sufficient.

To realize these goals, disclosed information must provide enough detail to enable customers to make an informed decision and to enable them to adjust their behavior. Comcast's current acceptable use policy falls short of these goals. Customers shopping for Internet service on Comcast's website are not directed to the acceptable use policy (if you click on terms and conditions, the pop-up window states: "Service is subject to terms and conditions of Comcast High-Speed Internet Subscriber Agreement and Home Networking Amendment if applicable. For restrictions, minimum requirements and details about service and prices, call 1-800-Comcast.")[8] While Comcast new acceptable use policy mentions that Comcast employs traffic management during periods of heavy usage, it does not give any indication when that may be, or how often it occurs. There also is an unresolved tension between the prohibition on running servers, and the allowing of peer-to-peer file-sharing applications. Compare "Examples of prohibited equipment and servers include, but are not limited to, e-mail, Web hosting, file sharing, and proxy services and servers"[9] with "Common activities that may cause excessive bandwidth consumption in violation of this Policy include, but are not limited to, numerous or continuous bulk transfers of files and other high capacity traffic using (i) file transfer protocol ("FTP"), (ii) peer-to-peer applications, and (iii) newsgroups, whether provided by Comcast or a third party."[10] and "Does Comcast block peer-to-peer ("P2P") traffic or applications like BitTorrent, Gnutella, or others? No. Comcast does not block P2P traffic or applications."[11] The "Frequently Asked Questions on Network Management and Excessive Use" are buried on the website under "Customers -> FAQs / Product Information / Comcast High-Speed Internet" under the heading "hot".[12] Comcast also reserves the right to change this policy at any time without giving notice to the consumer, forcing their customers to constantly monitor the acceptable use site, if they want to understand what is going on.

To support the effectiveness of disclosure, the FCC could set up a website where network providers would have to post their network management practices in a standardized format that would enable customers to compare providers' network management practices easily.

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[7] van Schewick (2007), p. 376-377 (explaining how network providers' ability to secretly degrade the performance of applications limits the effectiveness of competition in the market for broadband Internet services); van Schewick (forthcoming 2009), chapter 5 (noting how disclosure requirements may alleviate the market power provided resulting from secret degradation).

[8] Comcast (2008a).

[9] Comcast (2008b), under "Technical restrictions".

[10] Ibid., under "Are there restrictions on bandwidth consumption that apply to the Service?".

[11] Comcast (2008d).

[12] Comcast (2008c).

3. Disclosure alone is not enough.

Disclosure can only facilitate competition and discipline providers if there is effective competition. In order for disclosure to have a disciplining effect, customers need to be able to switch to another provider that does not impose a similar restriction, and they need to be able to do so at low costs. In the US, none of these conditions is currently satisfied:

First, according to the GAO, the median number of broadband providers accessible to broadband Internet service customers in the US is two.[13] This market structure is often characterized as "duopoly +/-".[14] In some parts of the country, customers are facing a monopoly. According to the FCC's own data, 34 % of ZIP codes have one or less cable or ADSL provider who serves at least one subscriber living within the ZIP code.[15] As the GAO has pointed out, this measure (i.e. the number of providers reporting at least one subscriber in a certain ZIP code) overstates the level of competition to individual households.[16] While a duopoly is often better than a monopoly, duopolists enjoy a degree of market power that enables them to impose restrictions on their customers that they would not be able to impose in a competitive market.[17]

Second, as I have described in detail in my written work, the market for Internet services is characterized by significant switching costs that limit the effectiveness of competition. Although rules that require network providers to disclose whether and how they interfere with applications and content on their networks may reduce the problem of incomplete customer information, they cannot reduce the switching costs in the market for Internet services, and still leave the network provider with a substantial degree of market power over its customers that enables it to restrict some applications and content on its network without loosing too many Internet service customers.[18]

3. The FCC needs to establish some ground rules for reasonable network management. In particular, it should ban network management practices that single out specific applications or classes of applications in order to manage bandwidth consumption on broadband networks.

Without such a rule, "reasonable network management" becomes the back door that enables network providers to undermine the non-discriminatory nature of the Internet that the FCC's Internet Policy Statement is designed to protect. The Internet Policy Statement promotes user choice and fosters application-level innovation by providing application developers with the certainty that they will not be discriminated against. If network providers can single out specific applications in order to manage bandwidth on their network, application developers face a fundamental uncertainty. The network may turn against them at any time. This risk of being cut off from access to end users at any time

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[13] United States Government Accountability Office (2006), p. 18.
[14] See, e.g., Farrell (2006), p. 202.
[15] Federal Communications Commission (2008), Table 16.
[16] United States Government Accountability Office (2006).
[17] See, e.g., Farrell (2006), pp. 202-205.
[18] van Schewick (2007), pp. 374-377; van Schewick (forthcoming 2009), chapter 5.

and at the sole discretion of the network provider constitutes a substantial risk that will make it much more difficult to get funding. For application developers, the impact of the threat of being discriminated against on their incentives to innovate[19] is the same, regardless of the motivation of the network provider, e.g. whether it is technically anticompetitive or not. Given the nature of the Internet as a general purpose technology, this reduction in application-level innovation is bad for society as a whole.[20]

Given that there is no real competition and significant switching costs, disclosure alone will not be sufficient to constrain network providers' incentives to impose restrictions that are not in the public interest.

As long as the current pricing structure continues to be based on flat-rate pricing, network providers have the perverse incentive to block or degrade applications on their network that use more bandwidth or deviate from the usage patterns for which the network was designed:[21] Applications that use more bandwidth than expected or exhibit usage patterns that deviate from the expected ones may put strain on the existing access network or the links to other providers, threatening congestion if the network provider does not upgrade the capacity of the network, or increase network providers' operating costs by raising their interconnection fees. From the network provider's point of view, blocking or degrading selected applications is a quick fix that requires less investment than upgrading the network or coming up with a non-discriminatory solution. As Brett Frischmann and I have shown in a recent paper, singling out specific applications to control bandwidth on a network has significant social costs that are not internalized by network providers. It harms application-level innovation by distorting the playing field between applications, and reduces consumer welfare by preventing users from using the applications of their choice.[22]

The original architecture of the Internet was based on a design principle called the end-to-end arguments.[23] As a result of this design, the network is general and can support a large variety of applications with different requirements. The network is not optimized in favor of specific applications. While this may increase the performance of particular applications, it also constitutes an unnecessary and therefore inefficient feature for applications that do not need this function and may even rule out the implementation of

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[19] van Schewick (2007), pp. 378-380 (describing the impact of a threat of discrimination on application developers' incentives to innovate).

[20] Ibid., pp. 382-386; Frischmann and van Schewick (2007), pp. 423-425 (describing the benefits for social welfare associated with application-level innovation).

[21] MIT Communications Futures Program and Cambridge University Communications Research Network Broadband Working Group (2005); van Schewick (forthcoming 2009), chapter 5.

[22] Frischmann and van Schewick (2007).

[23] There are two versions of the end-to-end arguments: a narrow version, which was first identified, named and described in a seminal paper by Saltzer, Clark and Reed in 1981 (Saltzer, Reed and Clark (1981)), and a broad version which was the focus of later papers by the authors (e.g., Reed, Saltzer and Clark (1998); Blumenthal and Clark (2001)). While both versions have shaped the original architecture of the Internet, only the broad version is responsible for the application-blindness of the network.). For a detailed analysis of the two versions and their relationship to the architecture of the Internet, see van Schewick (2004), pp. 87-129.

applications that are not foreseen at the time of the design. Instead, all application-specific functionality is implemented at the end hosts, i.e. the computers at the edge of the network. As I show in my forthcoming book, this design results in an economic environment for innovation that is much more conducive to application-level innovation than network architectures that deviate from the broad version of the end-to-end arguments.[24]

However, while maintaining the openness for new applications, general solutions are sometimes more complicated to design and more costly to implement. As my forthcoming book shows, there is a market failure regarding the evolution of the core of the Internet.[25] While society as a whole has an interest in keeping the architecture non-discriminatory and general in order to preserve its openness for new applications, network providers' incentives are not necessarily aligned with this goal. Recent years have seen a myriad of technical solutions driven by the short-term interests of particular actors which do not take account of the impact on the long-term evolvability of the Internet.[26] The deployment of asymmetric DSL and cable, network address translators and now the Comcast tactics for managing bandwidth on their portion of the Internet are examples of such solutions. They solve the problem at hand, but at the same time reduce the generality of the Internet, with significant costs for application-level innovation. Network providers' preference for short-term solutions is not surprising:[27] While the benefits of deviating from the broad version such as the reduction in cost or the improvement in performance of certain applications are immediately apparent, the associated costs for the evolvability of the system are almost impossible to determine: The applications that may suffer from the deviation are yet unknown. This makes it impossible to determine whether and to what extent some of these future applications would be harmed. As the application is not known yet, the value of the application to society cannot be known either; this makes it impossible to determine what the ultimate costs to society will be. As research in behavioral economics has shown, humans tend to assign disproportionately more weight to present benefits than to future costs that are yet uncertain, making it more likely that network designers would deviate from the broad version of the end-to-end arguments. The fact that network providers are unable to capture all of the gains associated with a non-discriminatory Internet,[28] further exacerbates the problem.

By prudently defining limits to what constitutes reasonable network management, the FCC can provide network providers with incentives to work towards general solutions that preserve the openness of the Internet for new applications and consumer choice.

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[24] van Schewick (forthcoming 2009).

[25] Ibid..

[26] See, e.g., Braden, Clark, Shenker and Wroclawski (2000), pp. 5-9.

[27] The following paragraph is based on van Schewick (forthcoming 2009), chapter 2.

[28] For example, they will not be able to capture all the productivity gains that users get from introducing new applications, or the positive spillovers associated with users' productive uses of the Internet (such as the improvement in democratic discourse resulting from widespread blogging on the Internet). For a long version of the argument, see Frischmann (2005); For a short summary, see Frischmann and van Schewick (2007), pp. 424-425.

If the openness of the Internet for new applications is to be preserved, the network providers need to manage their networks in a non-discriminatory way – without singling out specific applications or classes of applications. Of course, there needs to be an exemption for malicious applications that are engaged in an attack on the network.

Network providers would be able to enforce fairness among users, but how a user decides to use its "share" of bandwidth, both in general and at a particular point in time should be decided by the user. Network management solutions that enable network providers to police the amount of bandwidth used by a particular user are available today.

Some may claim that forcing network providers to treat a user's traffic in a non-discriminatory way may ultimately harm the user, as some of the user's applications may be more sensitive to the delay than others. They would suggest that enabling network providers to differentiate between classes of applications according to their needs (i.e. prioritize real-time VoIP traffic over file-sharing) would be in the interest of the user and should therefore be allowed.

While intuitively appealing, this view overviews that the value a user attaches to a particular application is not necessarily fixed:[29] my priorities may differ considerably depending on the circumstances: if I'm using BitTorrent to download a movie that I want to watch tomorrow, I do not care if the download is delayed a bit. If, however, I'm using BitTorrent to download a critical security patch that I need to get quickly or if I'm a programmer and want to download the source code for the project that I want to work on now, this may have priority over all the other applications I'm currently using.

Similarly, if I'm doing a VoIP call to my friend and just want to chat, I may not care as much about the quality of the call as when I'm doing a job interview or a project phone conference using VoIP and want to hear or be heard in a crystal clear way.

This implies that having users signal their priority instead of having network providers determine prioritization within the network based on classes of applications may be preferable.[30] For users who do not want to set their own priorities, network providers could offer different sets of potential prioritizations, among which users could choose. Thus, network providers could offer and users could opt-in to prioritization based on application class, but without enforcing this prioritization on users whose needs differ. (To maintain the non-discriminatory nature of the Internet, prioritization choices offered by the network provider would have to treat applications belonging to the same class in the same way).

Why the emphasis on user choice? First, user choice is fundamental if the Internet is to create the maximum value to society. The Internet is a general purpose technology. It does not create value through its existence alone.[31] It creates value by enabling users to

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[29] Briscoe, Moncaster and Burness (2007), section 3.3.

[30] David Clark made the same point when he testified at the first FCC En Banc Hearing on Broadband Network Management Practices in Harvard.

[31] See, e.g., van Schewick (2007), pp. 385-386; van Schewick (forthcoming 2009).

do the things they want or need to do. Users know best what this is. As a result, users, not network providers should be able to decide how they would like to use the network, and what is important to them. Of course, in order for users to behave efficiently, they also need to bear (at least some of) the costs of their actions, something which the current system does not sufficiently provide.

User choice is also a fundamental component of the mechanism that enables application-level innovation to function effectively.[32] In the current Internet, it is impossible to predict what future successful applications will be. Enabling widespread experimentation at the application-level and enabling users to choose the applications they prefer is at the heart of the mechanism that enables innovation under uncertainty to be successful.

By singling out specific applications, network providers start picking winners and losers on the Internet. As we have seen, whom they pick may be driven by a number of motivations that are not necessarily identical with what users would prefer, leading to applications that users would not have chosen and forcing users to engage in an Internet usage that does not create the value it could. Consumers, not network providers, should continue to choose winners and losers on the Internet.

While there are mechanisms available that enable network providers to manage their networks in non-discriminatory ways now, the ways in which the Internet bandwidth on the Internet will be allocated between users and applications and in which it will deal with congestion is still evolving. Constraining the range of possible solutions in a way that provides network providers with incentives to evolve the Internet in a way that is good for society, not just good for network providers, while maintaining enough freedom to come up with good technical solutions, is the challenge in front of the FCC.

Thank you again for the opportunity to testify. I look forward to your questions.

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STATEMENT OF JASON DEVITT
CEO, Skydeck
FCC Hearing, Stanford University, April 17, 2008

My name is Jason Devitt, and I am the CEO of a new company called Skydeck. Skydeck's mission is to help consumers to take back control of their cell phones and their cell phone bills, by providing them with the tools and the information that they need to do so.

How can we measure the effects of regulation? Every so often the economy presents us with a natural experiment: two almost identical markets that differ only with respect to the regulatory environment.

I have two computers in front of me today, both very powerful, both offering multiple applications, both able to connect to broadband wireless networks.

I like a lot of the software that came with this computer *[my laptop]*, but I always have other choices. I did not like their browser, so I chose another. Since that browser is itself an open platform, I added several features that made it more powerful. They offer a service for backing up my hard drive, but I found a much better one online. There's no GPS chip in this computer, but an independent company has worked out how to estimate my location based on the WiFi hotspots around me, and I chose to install their software.

I use this computer *[my laptop]* on multiple networks on a regular basis: Comcast, Covad, Verizon Wireless, many WiFi networks. That's not evidence of broadband choice by the way. Covad does not serve my home, Comcast does not serve my office, neither serves this table, and last time I traveled I found that Verizon did not serve my hotel room. I did, however, have a choice when two of those carriers pestered me to install their software on my computer and to use some of their branded services. I said no.

This computer *[my cell phone]* on the other hand works on only one network. I cannot change the default browser, or upgrade it, or extend its functionality so that I can visit obscure web sites like YouTube. The manufacturer offers only one way to back up all the contents of this computer, and their software is not compatible with my other computer. It should be easy for me to copy my address book across using Bluetooth, but my carrier blocks that. This computer does have a GPS chip – but only applications sold by my carrier can use it.

What is the difference between these two computers? Is it price? No, because my carrier won't sell me a more open device at any price. Is it because one network requires careful management? No, because right now they are both connected to the same wireless network. Is the cellular market less competitive? No, the reverse is true, I have at least 5 wireless carriers to choose from in the Bay Area, while practically speaking I have no choice in wireline Internet service and the market for PC software has at times been distorted by a monopoly.

Here is the difference; here is our natural experiment. The people who designed this computer *[my laptop]* had to presume a neutral network: common carriage and Carterfone rules. The people who designed this computer *[my cell phone]* did not.

For better or for worse, I have built my career on the wireless Internet. But if this were a Dickens novel, then I would be the Ghost of Internet Future.

Within a year or two, modems like these *[my laptop's external wireless modem]* will be built in. When you start up a new laptop computer you will be asked - repeatedly - to sign a contract with a broadband wireless network. Why? Because the commission which carriers will pay to the manufacturer will be double the profit that they make on selling the computer. Just as with cell phone manufacturers today, their primary customer will become the carrier, not you. If they have no duty to you under the law, if you are no longer their primary customer, then what power will you have? Even if your carrier

nominally allows you to connect any device to their network, who is going to make and sell a device that your carrier doesn't like?

On this computer *[my cell phone]*, I cannot tell you what 'network management' technologies my carrier is using, because I cannot install an application to detect them. I do not know whether they are blocking any legitimate text messages to me because I have no way of knowing what messages they block.   I cannot even check if they are billing me correctly each month, because I cannot get a complete record of my activity – my calls, messages, and data usage – off this computer to compare to my bill.

But that does allow me to end on an optimistic note. Quit worrying about whether the network is neutral; because soon you might not be able to tell.

John Sundman, Gary Gray, Harold Feld, Howard Stearns & Friends

Wetmachine
Hardware. Software. Wetware. I fear these things

Archives

My Testimony From Today

Well, that was fun. I reprint my testimony as prepared, not as delivered. I also cut a very insider joke. I'd planned to start:

"Mr. Chairman, I understand that this is the open Commission meeting, so it is perhaps no surprise that we are running an hour late. Also, as I have not had time to complete this testimony, I ask for editorial privileges."

But no one off the podium was likely to get it.

[Editorial note from John (to help search engines and any random Wetmachine readers who stumble upon this): This post concerns Harold Feld's testimony at today's FCC hearing at Stanford University.]

Stay tuned . . . .

Mr. Chairman, Commissioners, thank you very much for inviting me to testify today, and hank you very much for holding this hearing. For one thing, it appears that these hearings have a salutary effect on resolving the issues raised by the complaint filed by myself and Marvin Ammori of Free Press with regard to Comcast's choice of network management techniques and lack of disclosure (I might even say denial) of same to its customers and the public at large. Just before the February hearing in Boston, Comcast amended its customer service agreement to make clear it reserved the right to interfere with user traffic at any time without warning. Just before this hearing, Comcast announced its agreement with Pando Networks to create a P2P "Bill of Rights" for internet users and developers. I calculate that at this rate, the Commission will only need to have another thirty or so hearings on this topic before Comcast takes real action.

I have personally been involved in this debate about the FCC's proper role in broadband policy since 1999. At that time, of course, the only one of you at the commission was Chairman Martin in his capacity as an advisor to Commissioner Furchgott-Roth. So you may not recall how back then the FCC was considering whether to require cable operators to allow resale of their broadband capacity at wholesale rates - what we used to call "open access" and what the FCC at that time required of telephone. But I still remember when AT&T Broadband (later acquired by Comcast) announced a deal with Earthlink to allow Earthlink to resell their broadband service. Over our protests, the FCC breathed a sigh of relief that the "market was working" and the need for FCC action averted.

Well, we all know what happened. As soon as the Commission made clear it had switched direction and no longer cared about open access, the deals stopped. Worse, we have moved from debating whether to allow competitors to have access bottleneck facilities, to whether subscribers will enjoy the freedom that the cable and DSL duopoly actively advertise but reserve the right not to provide. When this debate started almost ten years ago, the arguments that ISPs would block or degrade applications were dismissed as technologically impossible and we were accused of paranoia and fear mongering. Now, the worst case scenarios we predicted are proudly defended as "reasonable network management." Worse, whereas in 1999 companies actually had to take action to appease the watchful eye of the Commission, it is enough now for Comcast to enter agreements to talk about doing something someday to begin a chorus of "Mission Accomplished. These Aren't the Droids We're Looking For. Move Along."

But enough nostalgia. Let me talk about the pending legal pleadings before the Commission, on which it must legally act, and how they impact user access to applications and content. As Dr. Ford observed when we both testified over a year ago at the FCC, I am not an economist. He took me to task for bringing my First Amendment arguments into a forum on competition. Fair enough. But here I stand on unimpeachable ground.

As the Supreme Court observed, the public interest standard under which you operate "of necessity" requires consideration of the First Amendment, particularly of the public's "paramount" right to access diverse sources of news and other content. The Supreme Court has also said that the internet is a medium "as diverse as human thought," and that when the government acts to protect diversity of voices it fulfills "a government interest, of the highest order." Those who recognize that quote from the *Turner* decision will recognize that it applied to the cable industry for regulations far more intrusive and far less effective in promoting diversity than the modest action requested by MAP, Free Press, Vuze, and millions of others. I should add that as a blogger who occasionally says some rather blunt things about Comcast, AT&T, and the other carriers, this is no theoretical issue for me. I am extremely uncomfortable with the idea that my ability to speak my mind to whoever wants to hear is a matter of corporate grace rather than constitutional right, and I suspect other Americans will feel equally uncomfortable if the FCC abandons its responsibilities and fails to act.

Your authority - indeed, your responsibility - under the First Amendment is therefore clear. The practices defended by Comcast and others as "reasonable network management" will result in the homogenization of both content and services in exactly the same way it did on the phone network, radio networks, television, cable, and now the wireless broadband platform. If Comcast and other carriers may pick and choose which applications it will favor and which it will degrade, then the age of rapid innovation without permission and vibrant user generated content that has triggered a rebirth of civic engagement on a level not seen since the "idiot box" replaced the social hall as the place where people discussed the critical issues of the day. If you are to fulfill you obligations under the First Amendment and under the Communications Act, you must not allow this to happen.

Comcast's actions after the complaint, to the extent they have actually done anything other than agree to talk, can neither deprive the Commission of jurisdiction nor relieve the Commission of its responsibility to address the complaint. For example, after the Janet Jackson "wardrobe malfunction," the networks at once engaged in all manner of damage control far more comprehensive than that undertaken by Comcast. But Clear Channel's firing "Bubba the Love Sponge" or the promise of the networks to broadcast live events with a delay to "bleep" future fleeting expletives did not in any way effect the Commission's jurisdiction over the indecency complaints that flowed from those actions.

Although we have provided detailed analysis of the Commission's legal authority in our filings at the Commission, and while I and other lawyers here could go on about this for hours, I will touch on this matter only briefly. First, with regard to statutory authority, the Supreme Court has announced that Congress granted the FCC "broad" ancillary power over any communication by wire and wireless. The D.C. Circuit affirmed the FCC's ancillary jurisdiction over information services as early as 1981. The Supreme Court in Brand X similarly affirmed this authority. With regard to the notice issues, the Commission included questions on what user protection regulations it should adopt under Title I in every one of the proceedings that culminated in the Commission's final declaratory ruling on the appropriate regulatory treatment of wireline services in 2005. All parties had more than adequate notice the Commission could adopt rules and regulations - up to and including adjudication on a case by case basis. If Comcast or other parties find that adjudication provides too much uncertainty, let them join us in establishing explicit rules which, as we argued in this and every other proceeding, would benefit all stakeholders. So if the Commission feels it is better to act by rulemaking, it has both the Petition for Declaratory Ruling or - if you really want to do a thorough job - the Petition for formal rulemaking. And, as Professor Lessig observed, you can use your statutory and regulatory authority to punish companies that act with lack of candor —including incomplete disclosures or failure to disclose relevant information during an ongoing investigation.

But whether you prefer the clarity of bright line rules or the precision of adjudication, you have both the authority to act and the responsibility to act on three separate pleadings before you. Comcast cannot evade the consequences of its action by a regulatory version of the old shell game - where it is somehow always the wrong proceeding and always either too soon or too late to address Comcast's behavior. But there is something more important here, as my opening trip down memory

lane will perhaps illustrate - that failure to take action can have unanticipated consequences as devastating or worse than taking action too soon, or inappropriately. Opponents of net neutrality are fond of quoting the phrase of the Hypocratic Oath "do no harm." But this injunction does not prevent physicians from administering vaccinations rather than waiting for a "tetnus problem" or prevents them from removing a tumor before it becomes malignant and spreads to vital organs. The evidence of harm is before you in our filings, with new examples constantly emerging - sometimes retreating in the glare of the spotlight, but other times festering to the detriment of us all.. In 1999, we could have saved competition. Now, we are struggling to save free speech and innovation at the edge. As we are fond of saying at the Passover seder, daiynu - it is enough.

Before I conclude, allow me to briefly address the questions raised by Commissioners Tate and McDowell in their opening statement. As a father of a nine year old, I also worry about access to inappropriate material. But we must distinguish between this very important social concern and what Comcast actually did and is doing with regard to Bittorent. MAP recently hired a consultant to test whether Comcast's practices of network management had any impact on access to adult oriented material. Our tester found that free porn and pay porn remained plentiful and abundant, from websites whose names I cannot read in this public forum. Ironically, Comcast would address its bandwidth problem and do more to reduce access to inappropriate conduct by taking the 2% of its channel capacity devoted to pay-per-view adult programming and dedicating those channels to broadband capacity.

I want to stress that I absolutely support Comcast's right to offer this content, and I do not want for one minute to suggest that Comcast should try to police this content. But the suggestions by some that the Commission deciding against Comcast in our complaint would somehow increase the adult-oriented content available to Comcast subscribers is false to fact. Comcast's network management in this case has nothing to do with indecent content, and we must not allow our legitimate concern about children accessing inappropriate material to be manipulated.

On the other hand, and also addressing Commissioner McDowell's questions regarding whether this impacts downloads, our tester made over 300 hundred attempts over the course of two weeks at randomized times to download the King James Bible via bittorrent from torrentbox.com. Of 300 attempts, two-hundred and twenty-six attempts failed, a failure rate of 75.33% — consistent, I note, with Robert Topolski's recent experimental data.

I also have to say that, having been involved in the "internet governance" debate since its beginning, having served on the ICANN Names Council, and various other advisory boards and so forth, I find Commissioner McDowell's rosy description . . . incomplete. For example, will there be a government advisory council for this private P2P organization? How about a non-commericial users constituency? I was able to actually participate in ICANN, even sit on one of its governing bodies. How will Comcast and the other cable operators foster such end user participation? A business constituency for folks like Jason? I can subscribe to the IETF mailing list. I can show up at any meeting, and anyone can initiate an RFC. How do I initiate an RFC with the p2p working group? How do I make my comments known for this bill of rights? I know I would like to know, and I imagine that everyone with an interest in the evolution of the internet — meaning, of course, everyone — would like to know as well.

To conclude, Ecclesiatses says: There is a time to speak, and a time to keep silent. With respect, the time has come for the FCC to speak. The American people, whose right to free speech you are obligated to protect, deserve no less.

Thank you.

Comments

barry payne_economist wrote:

A SERIOUS ERROR OF DEFINING NETWORK CONGESTION AS AN ECONOMIC EXTERNALITY IN THE FCC STANFORD HEARING

George S. Ford of the Phoenix Center asserted in effect, that as an externality, network congestion is caused between crowded customers and their overuse of underpriced bandwidth. From this he concludes that the alleviation of congestion by a broadband provider generates economic benefit via the elimination of the externality, a cost on all customers, and further that the provider has no particular strategic incentive to exploit conditions of congestion since externality reduction by definition benefits customers rather than the company.

He has it backwards. In this case, congestion is exactly a strategic phenomena between the company and its customers, and does not reflect typical conditions of congestion among only customers like traffic jams or overcrowded free public parks.

Is bandwidth underpriced and if so, how would it create such an externality?

When Comcast markets bandwidth, it does intentionally underprice it by virture of overstating its availability with an "up to" maximum but no "at least" minimum. In theory, as long as customers don't experience chronic congestion or blocking, they could still get what they pay for, no matter how large the difference between potential and actual bandwidth use. For Comcast, it's an economic incentive to minimize cost and maximize revenue and profit by loading up the system with these customers as close to the point of congestion as it can get without going past it.

Here's where Ford's "externality" backfires. Once congestion occurs, bandwidth is effectively overpriced in the sense that the service is degraded at a lower quality level for the same price paid. But Ford and others insist the opposite, that from a falsely characterized "all you can eat" pricing model, bandwidth is underpriced at zero for the marginal GB consumed in peak, which therefore is posed to drive aggregate consumption past the point of congestion.

This is the Catch-22 pricing model described elsewhere here by Harold Feld. Service X is sold for price Y available for Z use between zero and a maxmum, for which the provider can restrict use down to zero if necessary to control congestion. There's no externality here. Service X has a price for any range of Z use between zero and a maximum. That's the TOS.

The use of service X may or may not contribute to congestion in the aggregate. If it doesn't, it's not called an "externality", and if it does, it is. How much use of X above zero Z use causes congestion? … It's a mystery … Comcast will let you know, and when it does, opponents of net neutrality like Ford will chime in and call it an externality.

As long as the provider maintains enough network bandwidth capacity to avoid congestion, it can claim the bandwidth was not "oversold" or "underpriced" from the perspective of an individual customer who is never blocked or experiences congestion. But once congestion occurs, it is characterized mistakenly as an "externality" by Ford and others when in fact, it's a forced degradation of service by virtue of an intentional undersupply of bandwidth maintained by a combination of underinvestment coupled with discriminatory restrictions on its use.

How would net neutrality solve this problem? At one level it would require transparency and at another level, it would require all sources of congestion to be treated equally via pricing, non-price rationing and TOS, like it is in genuinely competitive markets without externalities.

04/18/08 09:38:14

bj wrote:

barrypayne_economist, I'm not an economist, I'm a simple blogger, so I'd like to know-- how does the concept of "economic externality" fit when, like in the case of AT&T and Verizon, they've already received the dough to build the network, in the form of hundreds of billions of dollars in tax incentives, and then chose not to do so? (Silly me, I call

that theft.)

Oh, and Harold, didn't know if you'd seen this:
http://www.technologyreview...

Of course, the powers that be will probably snarf this tech up ASAP to keep it from getting into a potential competitor's hands.

barry payne_economist wrote:

bj
Theft and externality are not the same thing. When clean air and water is polluted due to its overuse and misuse at a zero price, it can still be legal and impose costs on third parties who use clean air and water.

If clean air and water were priced correctly to avoid externalities, it could still be "stolen" in various ways, including politically, effectively bypassing the prices.

Some economists of the libertarian variety would indeed lump both instances under the "externality" umbrella by insisting that anything that can be privatized should be to eliminate externalities among other things, i.e. there's no such thing as "market failure", only "government failure".

The same school may agree that what AT&T and Verizon did was "theft", but only as a consequence of manipulation of government regulation by the governed, i.e., any regulation that can be avoided through privatization is a failure by definition.

As for the terrahertz radiation off-the-charts bandwidth, this is one more example of market failure that will be denied by the same school of thought. With that kind of dramatic efficiency, only "one pipe" makes sense, like the electric grid described by Lawrence Lessig in the hearing.

The flip side of negative externalities is positive externalities, where when more users come on line, everyone benefits, so if terrahertz radiation ends up displacing everything else, net neutrality becomes all the more critical to enable positive externalities through the enforcement of open and equal access among producers and consumers of content and free speech.

Brett Glass wrote:

My prepared comments before the FCC (of which I got to deliver only about half — while Harold got to deliver all of his, even though they were longer) is at http://www.brettglass.com/F...

Brett Glass wrote:

My prepared comments before the FCC (of which I got to deliver only about half — while Harold got to deliver all of his, even though they were longer) are at http://www.brettglass.com/F...

Harold wrote:

Brett:

I trimmed mine too, although I suspect they seemed interminable while waiting for your turn.

I just checked the record and I ran five minutes over, which is on par with Barbara and George Ford. You only got to run about 3 minutes over. Alas, you suffered from being further down the line when Martin started to really feel the time pressure. I've been there myself, so you have my sympathy, but so it goes. This time, I was fortunate enough to be placed far enough ahead by alphabetical order.

Brett Glass wrote:

Alas, Harold, even if I had gotten the same 10 minutes as you, it still would not have been fair because many other people were saying the same things you did. I was the ONLY service provider speaking; it was 20 to 1. And even Larry Lessig, who made no substantive points but rather preached a sermon, was allocated 25 minutes and used more than that. I had 8 minutes to represent my entire industry and to cover some facts that had NEVER BEEN PRESENTED before the Commissioners.

As you were looking forward to being a "free man," I was looking forward to being enslaved and held captive by regulation. This business is hard enough; I'm already competing against giants and constantly being sabotaged by them. Your group is lobbying to turn the government against me — and, ironically, by destroying businesses like mine to DECREASE consumer choice and install a duopoly. I cannot help but think that my existence seems to be, in some ways, inconvenient for you and that your life would be so much easier if there were just a nice, big, comfortable duopoly to pick on. Is that what you want? Because based on the comments I heard at the Stanford hearing and at today's Senate hearing, that's what you're lobbying for.

Brett Glass wrote:

By the way, to continue the Passover theme: Some of my friends have joked with me that they loved the picture at http://www.indybay.org/uplo... except for a few minor details. Firstly, it doesn't show me with any matzoh (though I do have a bottle of water which I suppose I could have turned into wine). Secondly, there are too few disciples. But, they noted, Larry Lessig did deny me — both at the FCC hearing and at at the hearing before Congress today — by claiming that there was a duopoly and therefore I did not exist. Still, I am nonetheless about to be crucified if regulations or legislation get passed that put me out of business.

Robb Topolski wrote:

I loved your talk, Harold! I just caught the video part today!

Brett — it took me 3 days to get my presentation down to 5 minutes (and I think I took 7 or 8). I think you said that you had 1 day's notice to prepare and get out there.

Although we disagree on a lot, good job never the less.

Robb

04/24/08 00:04:34

Brett Glass wrote:

The job I did was not good enough. I have a lot more work to do.

I expect to spend many thousand dollars of my personal savings (I don't have big money backing me, as you do) talking to legislators and regulators. I will be renting an apartment in Washington DC at great expense and leaving my business in the capable hands of an assistant several times as I fly back and forth.

You can be as cordial as you like, Robb, but you are NOT going to kill my business and thereby deprive my customers of service. No matter how much you and your cohorts continue to spread lies.

04/24/08 21:11:41

[Harold](#) wrote:

Brett:

I recognize it's your business, your life, your passion, etc. But a word of friendly advice. Just because people disagree with you does not make them liars. Just because they don't care about you doesn't make them liars.

Bob Topolski did not go lookng for this. He was going about his normal business when he discovered something, investigated, and Comcast lied their asses off about it.

Feel free to make the case that the cure we want is worse than the disease, because it would kill you. That's how the process works. Everyone makes their case and policy makers weigh the costs and benefits and decide.

And, let me add, there are other answers to your problem. The Commission can regulate the access market directly. Arguing that we need to screw the rest of us sot ht you can live strikes me as less optimal than arguing for you to survive without screwing the rest of us. Fix the real problem, rather than try to live off the scraps the FCc has left you after 10 years of aggressive deregulation.

04/24/08 22:00:08

Brett Glass wrote:

Harold writes: "Just because people disagree with you does not make them liars. Just because they don't care about you doesn't make them liars."

You're correct. But lying does make them liars.

Comcast did lie. But Robb and Larry Lessig and Susan Crawford are lying as well.

You write: "Arguing that we need to screw the rest of us so that you can live strikes me as less optimal than arguing for you to survive without screwing the rest of us."

Not true. It's if I and others like me don't live that you're screwed. And you're lobbying to kill me, Harold. You can't expect me to react well to that.

04/25/08 00:07:39

Brett Glass wrote:

By the way, Harold, I must say that many parties — yes, including you — are not being truthful when you assert that Comcast's behavior was in any way blocking free speech. That simply isn't so. Comcast was stopping activity that was abusive to the network and in fact was harming free speech by degrading its quality of service and potentially forcing it to raise its prices (thus limiting the access of some members of the public to broadband). Yes, Comcast — a blundering corporation — ineptly and stupidly lied about what it was doing. It should have come right out and said, "We are blocking this abusive and non-neutral behavior for good reason."

If you really were a champion of free speech, you would welcome mitigation of P2P. But you've become an irrational corporation-basher, and because you're not thinking of what the consequences of your actions will actually be, you are in fact threatening to bring on some of the very harm about which you are being alarmist.

As someone who actually understands the broadband market (because I am in it), let me tell you what will happen if blocking or throttling of P2P behavior is prohibited.

* Small ISPs will be put out of business by rampant cost shifting and deteriorating quality of service, leaving duopoly in urban areas and no access in many rural ones.

* It will be impossible to control piracy of intellectual property or child pornography, because P2P obfuscates the sources of material and makes it hard to stop its distribution. Encrypted P2P will make it difficult if not impossible to detect which content is legal and which is not in many cases.

* The ISPs left standing — and there will be a cable/telco duopoly — will be forced to raise prices due to the crushing bandwidth load caused by P2P.

* The expensive spectrum recently bought by wireless carriers will be monopolized, and hence squandered, by P2P. Any benefits it might have brought the public will be wasted.

* There will be an actual threat to freedom of speech due to duopoly, increased cost of broadband service, and decreased availability of broadband.

This is what you're about to do, Harold, if you don't stop and rethink what you are doing and I don't succeed in stopping you and the irrational mob that you and yours have gathered behind you by creating an imaginary threat.

For more, see Andrew Orlowski's two brilliant articles at

http://www.theregister.co.u...

and

http://www.theregister.co.u...

04/25/08 07:22:20

Brett Glass wrote:

P.S. — Since your blog software apparently munged the two URLs above, I've put them through TinyURL:

http://preview.tinyurl.com/...

http://preview.tinyurl.com/...

04/25/08 07:53:25

Harold wrote:

Brett:

1) I of course expect that if you believe our advocacy will lead to your destruction, you will fight back. I would hope to persuade you that you are wrong that the end result of our advocacy is your destruction. But, failing that, I expect you to do what you think you need to do to survive.

2) WRT the First Amendment — I recognize you don't see the connection. But my work is based on the idea that permitting corporations to act as gatekeepers of speech over vital communications bottlenecks is repugnant to the First Amendment, and that the government has an obligation to protect the free flow of information. It's what MAP _does_. We do this in broadcast, in cable, and now for the internet.

I long ago recognized that many people do not share this view of the First Amendment. Fine. I am sorry I am unable to persuade you. But again, you mistake a fundamental difference in first principles as "lying" or being disingenuous. Believe what you wish, but your failure to appreciate this will both weaken your advocacy, needlessly increase your frutstation levels, and prompt you to fail time and again to recognize the strength and animating force of your opposition.

04/25/08 11:40:48

Brett Glass wrote:

You write:

"I of course expect that if you believe our advocacy will lead to your destruction, you will fight back. I would hope to persuade you that you are wrong that the end result of our advocacy is your destruction."

Of course it is. Look at what you are advocating: that we should allow infinite costs to be dumped on us without compensation. Have you ever owned or operated a business? How can you not understand that this would put anyone out of business?

"But, failing that, I expect you to do what you think you need to do to survive."

Gee, thanks. You draw a nice salary and have megabucks behind you. I'm living hand to mouth. Do you not think it's rather irresponsible both to try to destroy me and to destroy any last chance that consumers have to choose a broadband provider?

"WRT the First Amendment — I recognize you don't see the connection."

There is none. Firstly, the First Amendment says, "Congress shall make no law." It regulates the government, not private parties. Secondly, nothing Comcast did was in any way a restraint upon users' speech.

"But my work is based on the idea that permitting corporations to act as gatekeepers of speech over vital communications bottlenecks is repugnant to the First Amendment,"

You want gatekeepers? Just kill off all competition. Want bottlenecks? Let the Net get choked by P2P so that nothing else can get through.

"and that the government has an obligation to protect the free flow of information. It's what MAP _does_. We do this in broadcast, in cable, and now for the internet."

The Internet is not a broadcast medium. You are out of your field.

To use a literary reference I'm sure that you will get (though others may not): You're in a panic about Comcast leveraging market power to hurt someone's ability to speak (even though they are not doing that). And so, not satisfied with passing or enforcing laws that merely prohibit those things, you are advocating laws that prevent ISPs from even managing their networks. This is what is known as building a "fence around a fence." It is not only unwise but destructive.

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Testimony of

George S. Ford, Ph.D.

Chief Economist

Phoenix Center for Advanced Legal & Economic Public Policy Studies

Before the

Federal Communications Commission

Open Meeting on Network Neutrality and Broadband Network Management

Stanford University

April 17, 2008

Testimony of George S. Ford, PhD

**Chief Economist, Phoenix Center for Advanced Legal & Economic
Public Policy Studies**

**Federal Communications Commission
Open Meeting on Broadband Network Management**

Stanford University, April 17, 2008

Mr. Chairman and Commissioners, good afternoon and thank you for inviting me to testify today.

My name is Dr. George S. Ford, and I am the Chief Economist of the Phoenix Center for Advanced Legal and Economic Public Policy Studies, a non-profit 501(c)(3) organization that studies broad public policy issues related to governance, social and economic conditions, with a particular emphasis publishing scholarly research on the law and economics of telecommunications and high-tech industries. We have written nearly fifty papers on telecommunications policy in the last nine years, many of which have been published in scholarly journals. Moreover, we make all of our research—as well as rebuttals by those who do not agree with us—available for free at our website, www.phoenix-center.org.

Before beginning my testimony today, I wish to make it clear that the Phoenix Center makes it a policy not to endorse or support any particular proposed regulation or

regulatory outcome. Our mission is not to tell policymakers *what* to think about an issue, but to help them with *how to think* about it. We do so by constructing analytical frameworks for evaluating problems and policy proposals as well as empirics that attempt to quantify the relevant tradeoffs. We believe that in the absence of a suitable analytical framework, it is difficult if not impossible to make a decision that will do more good than harm. Further, unlike many participants in the policy debate, we refuse ignore the institutional realities and economic constraints of the communications business. Economic theories derived in an idealized environment are often not useful in industries like telecommunications that have scale economies, externalities, and regulation. There are simply no easy answers here.

The Phoenix Center has published a number of studies on the economics of network neutrality and broadband network management. Almost all of these papers include original theoretical or empirical work. Our efforts to model theoretically the consequences of particular and general proposals on network neutrality and network management reveal, almost universally, that the efforts to place more regulation on the Internet are problematic, and in many cases, decidedly anti-consumer. These results are consistent with other research.[1]

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[1]   B. E. Hermalin and M. L. Katz, *The Economics of Product-Line Restrictions: With An Application to the Network Neutrality Debate*, COMPETITION POLICY CENTER PAPER CPC06-059 (July 2006) (available at:http://repositories.cdlib.org/iber/cpc/CPC06-059; M. Jamison and J. Hauge, *Getting What You Pay For: Analyzing the Net Neutrality Debate*, Working Paper: http://ssrn.com/abstract=1081690; N. Economides and

The Importance of a Sound Analytical Framework when Considering Network Neutrality Regulation

The task of policymakers is to sort through the many and varied claims of interested parties and determine which policy prescription can be expected to advance the interests of consumers and overall economic welfare best. It is the responsibility of the parties and other participants, like me, to provide you with the tools and information you need to make prudent policy decisions. As such, every request to impose significant regulatory change should be accompanied by a serious attempt to determine the probable winners, losers, and other consequences of the proposed changes. If the parties fail to provide you such a framework and analysis, then regulation is little more than a religion.

Today, the arguments for network neutrality seem more like a Christmas list of "I wants" than a serious effort to improve on the status quo. You, the government, play the role of Santa Claus, checking twice to determine whether firm conduct is "naughty" or "nice." The idea of network neutrality is an important one and deserves much better. The undeveloped and unspecific state of network neutrality proposals opens the door for effective and often lethal criticism. Research by the Phoenix Center and others, for example, shows that the very entities intended to be helped by many of the proposed regulations would, in many cases, actually be harmed by those proposals. The

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J. Tag, *Net Neutrality on the Internet: A Two-Sided Market Analysis*, NYU CENTER FOR LAW AND ECONOMICS, Working Paper: http://ssrn.com/abstract=1019121.

inconsistencies between intent and consequence arise due to the lack of any analytical

foundation for existing network neutrality proposals.

So how can we improve the status of the network neutrality debate? My

recommendation to you is that you first insist that all proponents of network neutrality

or network management regulation show convincingly that the proposed rules will

indeed have their intended effect of increasing consumer and/or social welfare. Second,

the regulation must do so efficiently, in that the expected costs of the regulations are less

than the expected benefits. The burden of proof should rest on those proposing

regulation, since the 1996 Act explicitly calls for deregulation in communications.[2] Thus

far, such analyses are completely absent from the debate.

This additional discipline will greatly simplify your work, since most of what is

proposed and debated today could not satisfy either requirement. As I discuss below,

what little research we have seen supporting network neutrality regulation shows that

network neutrality regulation has, at best, ambiguous welfare effects and, at worst, is

decidedly anti-consumer and harmful to the content industry it aims to protect or

enrich. At the Phoenix Center, we have provided policymakers with some theoretical

and empirical analysis of network neutrality and network management proposals, with

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[2]   1996 TELECOMMUNICATIONS ACT, Preamble ("to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies.").

our focus being upon the welfare impacts of proposed regulation. We find generally that the welfare effects of the existing network neutrality proposals do not increase consumer or aggregate welfare. While we do not pretend to have all the answers, we do believe that our approach to these questions is important to your deliberations, and I welcome this opportunity to present our research to you.

Impact of Network Neutrality Regulation on Market Structure

The Phoenix Center takes a realistic—some would say pessimistic—view of the potential for competition and entry into the broadband network industry.

Our core approach to these issues rests upon the reality that building broadband networks—either wireline or wireless—is *difficult and costly.* As explained in PHOENIX CENTER POLICY PAPER NO. 21,[3] policymakers need to recognize and account for this fact. Phoenix Center and other academic research shows that because it is costly to build and operate communications networks, even in a "best case scenario," only a few firms will be able to provide advanced communications services over their own network.

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[3]   G. S. Ford, T. M. Koutsky and L. J. Spiwak, *Competition after Unbundling: Entry, Industry Structure and Convergence,* PHOENIX CENTER POLICY PAPER NO. 21 (July 2005)(available at http://www.phoenix-center.org/pcpp/PCPP21Final.pdf) *and reprinted in* 59 FEDERAL COMMUNICATIONS LAW JOURNAL 331 (2007)l *see also* J. B. Duvall and G. S. Ford, *Changing Industry Structure: The Economics of Entry and Price Competition,* PHOENIX CENTER POLICY PAPER NO. 10 (Apr. 2001) (available at http://www.phoenix-center.org/pcpp/PCPP10Final.pdf *and reprinted in* 7 TELECOM. AND SPACE JOURNAL 11 (2002)); T. R. Beard, G. S. Ford and L. J. Spiwak, *Why ADCo? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets,* 54 FED. COM. L. J. 421 (May 2002); J. Sutton, SUNK COST AND MARKET STRUCTURE (1995).

Policymakers need to begin with the assumption that there will, at best, be only a "few" facilities-based firms. As a result, policies should not impede sustainable competition among the few firms that the market can actually support and should not nudge the industry toward increased consolidation. At the most basic level, our research suggests that policies should be avoided that make the market smaller, promote the commoditization of network services, or raise the entry costs of firms. In an industry with large sunk costs, each of these actions will result in a more concentrated market that can cause harm to consumers. The softening of price competition through, say, consumer-friendly product differentiation may allow multiple firms to exist in a market that is otherwise a natural monopoly with homogeneous products.[4] Commoditization, then, should be avoided in communications markets with large fixed and sunk costs.

Now, what does that have to do with network neutrality and broadband network management?

Understanding the underlying market structure conditions are important because in my opinion, many, if not most, of the proposed network neutrality rules will promote industry concentration by shrinking markets, commoditizing services, and raising entry costs. Proposals that a network firm can deal with congestion only by

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[4] Commoditization results in the possibility of intense price competition that favors highly-concentrated markets. It may seem paradoxical to say that intense price competition in such a situation can harm consumers, but this condition is called the "Bertrand Paradox" and is well-established in economic theory. *See* J. Tirole, THE THEORY OF INDUSTRIAL ORGANIZATION (1995) at 209-212.

expanding capacity obviously will increase the capital outlays required for the network. This will raise the cost of building networks and necessarily reduce the number of firms sustainable in equilibrium.

In addition, network neutrality proposals that would limit network firms to the selling of raw bandwidth capacity would effectively commoditize broadband service. In my opinion, this is the unstated goal of many of those that would have the FCC prohibit broadband network management practices—broadband networks be operated on a "stupid" rather than "intelligent" basis.

Doing so would intensify the role of scale economies and possibly render monopoly outcomes in many markets. In PHOENIX CENTER POLICY PAPER NO. 24[5], we discuss this issue in relation to network neutrality using a standard, neoclassical economic framework.[6] Our analysis in that PAPER shows that such proposals to "commoditize" broadband access services is likely to deter facilities-based competition,

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[5] G. S. Ford, T. M. Koutsky and L. J. Spiwak, *Network Neutrality and Industry Structure*, PHOENIX CENTER POLICY PAPER NO. 24 (April 2006) (available at: http://www.phoenix-center.org/pcpp/PCPP24Final.pdf *and reprinted* as T. R. Beard, G. S. Ford, T. M. Koutsky, & L. J. Spiwak, *Network Neutrality and Industry Structure*, 29 HASTINGS COMMUNICATIONS AND ENTERTAINMENT LAW JOURNAL 149 (2007)).

[6] Rebuttal to this POLICY PAPER, and the responses thereto, are available on the Phoenix Center website. *See Network Neutrality and Scale Economies: A Response to Dr. Roycroft* (May 2006)(available at: http://www.phoenix-center.org/RoycroftResponseFinal.pdf); *A Response to Dr. Roycroft (Redux)* (July 2006)(available at: http://www.phoenix-center.org/RoycroftReduxFinal.pdf). Despite repeated correction, however, the Consumer Federation of America, Consumers Union and Free Press continue to mischaracterize our work before the FCC. Comments of the Consumer Federation of America, Consumers Union and Free Press in Docket No. WC Docket No. 07-52, In re Broadband Industry Practices, filed June 15, 2007 at *passim* (available at: http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519529581).

reduce the expansion and deployment of advanced communications networks, and increase prices.

The potential impact of network neutrality proposals upon market structure is important. Network neutrality proponents often indicate that their proposed regulations are needed because there is a "broadband duopoly" between cable and telephone firms. But in this situation, the prescription may be worse than the disease, as network neutrality rules can be expected to *encourage more* industry consolidation. The "market power monster" is not slain by network neutrality regulation; instead, it is fed by it. Similarly, in both POLICY PAPER NO. 12 and POLICY BULLETIN NO. 17, we show that it is *regulation* that induces firms to sabotage their rivals.[7] Oddly enough, network neutrality regulation provides the incentives for broadband providers to treat content firms badly; it does not eliminate such incentives.[8]

The impact on market structure is not just a theoretical possibility concocted by the Phoenix Center. Network neutrality advocate David Isenberg, who is known for the

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[7] T. R. Beard, G. S. Ford and L. J. Spiwak, *Why ADCo? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets,* PHOENIX CENTER POLICY PAPER NO. 12 (November 2001) *and reprinted in* 54 FED. COM. L. J. 421 (May 2002); see also G. S. Ford, T. M. Koutsky and L. J. Spiwak, *Wireless Net Neutrality: From Carterfone to Cable Boxes*, PHOENIX CENTER POLICY BULLETIN NO. 17 (April 2007) (available at: http://www.phoenix-center.org/PolicyBulletin/PCPB17Final.pdf).

[8] *See* J. Farrell and P. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 7 HARVARD JOURNAL OF LAW AND TECHNOLOGY 85-134 (2003). For a thorough analysis of sabotage, *see* T. R. Beard, D. Kaserman and J. Mayo, *Regulation, Vertical Integration and Sabotage*, 49 JOURNAL OF INDUSTRIAL ECONOMICS 319-333 (2001).

notion of the "Stupid Network," fully recognizes, to his credit, that it is privately unprofitable to build the ideal neutral network, and that rate-of-return regulation and subsidization of a monopoly is the likely outcome.[9]   It is not clear to me that this consequence advances the interests of consumers or society, but reasonable minds can disagree. What is important is to understand the consequences of regulatory actions; we can then debate the desirability of the consequences.

Welfare Implications of Broadband Network Management

With regard to broadband network management specifically, in POLICY PAPER NO. 32[10], we provided a formal economic analysis of the likely welfare consequences of network management that is designed to control network congestion.

The key point is to recognize that network congestion creates a negative externality, much like pollution. This is a type of market failure. These "congestion externalities" occur when the use of applications by some users harm other users of a broadband network, without compensation, by causing delays or other service quality problems. When one person's use of BitTorrent affects the quality of the connection to

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[9]   D. Isenberg, *The Rise of the Stupid Network*, COMPUTER TELEPHONY (Aug. 1997) at 16-26 ("the best network is the hardest to make money running. So who builds it? Who runs it? Who fixes it when it breaks? And who develops the next generations of faster, simpler infrastructure?"; "The transport companies would be have [sic] government incentives (e.g., assured return on investment), to make fiber, pole attachment, and right of way available to all service providers.").

[10]   G. S. Ford, T. M. Koutsky and L. J. Spiwak, *The Welfare Impacts of Broadband Network Management: Can Broadband Service Providers be Trusted?* PHOENIX CENTER POLICY PAPER NO. 32 (March 2008) (available at: http://www.phoenix-center.org/pcpp/PCPP32Final.pdf).

his neighbor, this is a classic negative externality that is not that much different than a farmer who drains a river for irrigation or a chemical factory that spews toxic fumes into the air. The model we present in our PAPER reveals that when a congestion externality is present, network management—including, but not limited to, the differential treatment of particular applications—is pro-consumer and welfare enhancing.

Our approach is useful for policymakers because it shows that from a social welfare perspective, private firms will *inadequately* respond to the congestion externality. For the same reason some argue that broadband firms under invest in network by responding only to profits and not the full social benefits of broadband service, broadband firms can be expected to fail to sufficiently curb congestion. This is because their focus is only on profits and not on the full consumer impact of quality degradation.[11]

What does that mean for the debate we are having today? In one sense, it indicates that perhaps we are looking at network management from the wrong perspective, at least as it applies to congestion. Broadband network providers like AT&T and Comcast are not going to go out willy-nilly and unduly blocking Internet applications and websites at the drop of a hat, even if those uses cause congestion.

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[11] This point is discussed in most general economics texts. *See, e.g.,* D. W. Carlton and J. M. Perloff, MODERN INDUSTRIAL ORGANIZATION (2005) at 82-3; P. R. G. Layard and A. A. Walters, MICROECONOMIC THEORY (1978) at 189-95; R. J. Carbaugh, CONTEMPORARY ECONOMICS: AN APPLICATIONS APPROACH (2006) at 188-91.

Economic theory tells us that these private firms—because they do not fully internalize the negative externality cost of congestion—will actually engage in *less* of this type of behavior than a social welfare-maximizing entity would do. The widespread blocking of P2P traffic on university networks is instructive.

Our approach also provides a framework for analyzing disputes like Comcast-BitTorrent. In particular, once it is shown that a congestion externality is present and that the traffic management technique alleviates that congestion, it appropriate to presume that this type of traffic management is legitimate and welfare enhancing.[12] This places the focus of the analysis upon two particular factual inquiries: (1) whether there a congestion externality that is caused by this particular application; and (2) whether the traffic management technique at issue sufficiently targeted and actually alleviate the congestion.

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[12]   This failure to recognize that congestion imposes an externality on users is consistently found in those proponents of network neutrality who argue that broadband providers are too aggressive in the management of congestion and call for *per se* prohibitions against all network management practices. For example, in their petition to the FCC regarding Comcast's treatment of BitTorrent traffic, Free Press and others assert that "no economic argument supports the notion that degrading applications is reasonable network management." In particular, Free Press asserts that "the transaction costs" of metered Internet usage "must not be prohibitively high" because bandwidth use is metered in Australia. As a result, Free Press states that blocking or degrading applications should be prohibited that that network providers simply rely on other options—such as setting "dynamic quotas" on bandwidth for end users, "charge by usage," "provide more bandwidth to all users," or "actually offer high symmetric bandwidth speeds." Free Press, Public Knowledge *et al.* Petition for Declaratory Ruling, CC Docket Nos. 02-33, 01-337, 95-20, 98-10, GN Docket No. 00-185, CS Docket No. 02-52, WC Docket No. 07-52 (filed Nov. 1, 2007) (hereinafter "Free Press Petition"), at 29-32. *See also,* R. Frieden, *Wireless Carterfone: A Long Overdue Policy Promoting Consumer Choice and Competition*, Working Paper, New America Foundation (2008) (available at: http://www.newamerica.net/files/Wireless_Carterfone_Frieden.pdf); C. Holohan, *Time Warner's Pricing Paradox: Proposed Changes in the Cable Provider's Fees for Web Use Could Crimp Demand for Download Services and Hurt Net Innovation*, BUSINESS WEEK (Jan. 28, 2008).

These inquiries are factual and indeed engineering questions. I would suggest that you speak to and rely upon the judgment of Internet engineers to answer these questions—not the lawyers and economists that are dominating these panels today. In my view, if the answer to the above two factual questions are "Yes," then it is appropriate to presume that the traffic management tool being employed by the broadband provider is welfare-enhancing.

Our approach also indicates that different networks are likely to have different network management practices. For example, wireless broadband networks today may face more severe capacity constraints than wireline networks, in part because all users share the common pool of spectrum capacity that is used to provide such services. As a result, we should expect that wireless carriers will likely be the most diligent in managing traffic—not because they violate a public trust but simply as a result of network architecture and spectrum limitations. Likewise, it seems that BitTorrent was particularly troublesome for certain cable network architectures and not DSL or fiber networks, so it not surprising that the congestion-relieving action was implemented by cable operators first. Capacity constraints and applications using that capacity are apt to change over time and vary by network. As a result, judging the appropriateness of traffic management techniques is best done on a case-by-case basis rather than through prescriptive, ex ante regulations and prohibitions of general applicability. Further, if we see a pattern of network management that follows these expectations, then we may sensibly start from the position that such actions are legitimate.

Incentive to Invest in Network Management Technology

We have also studied a firm's decision to invest in network management technology and demonstrated that a firm would never invest in network intelligence unless that investment increases consumer welfare.[13] Importantly, we modeled the "worst case" scenario for network neutrality proponents—we modeled a monopoly network provider and a situation in which consumers value a "stupid" broadband network over an "intelligent" one. Even in this extreme situation that is clearly biased against consumer welfare improvements due to investments in network intelligence, we found that the monopoly network provider's incentives to build intelligence into the network align with the interests of consumers.

This is an important point, since most of the network neutrality debate is couched in terms of a zero-sum game of buyers versus sellers. We show that this slant on the issue is inappropriate, and that policymakers should initially trust firms to do what is in the interest of consumers with regard to investments in network intelligence until someone proves otherwise.

Differential Impact in Rural, High-Cost Areas

The distribution of the costs and benefits of network neutrality regulation is also important. In PHOENIX CENTER POLICY PAPER NO. 25 we show that the cost of network

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[13] George S. Ford, Thomas M. Koutsky and Lawrence J. Spiwak, *The Efficiency Risk of Network Neutrality Rules*, PHOENIX CENTER POLICY BULLETIN NO. 16 (May 2006).

neutrality mandates will be felt disproportionately in rural and high-cost regions of the country.[14] Our empirical analysis shows that the distribution of costs across markets of different sizes and population densities causes the network neutrality mandates to more severely curtail of network deployment in rural areas. On average, rural, high-cost areas will bear the burden of network neutrality mandates at a magnitude of six times the impact relative to lower-cost urban areas.

As we described in POLICY BULLETIN NO. 16, if broadband traffic management is prohibited and broadband providers are only permitted to invest in more "bandwidth" to address capacity problems, the potential size of these increased costs, according to some estimates, is very high.[15] In rural, high-cost areas, these increased costs may be the difference between whether entire swaths of this country get left behind and do not see investment in broadband infrastructure.

Stated simply, if you drive up the costs of building and operating a broadband network by limiting traffic management options, then the impact of that decision will be felt far more in high-cost rural areas than Palo Alto, California or Cambridge, Massachusetts.

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[14]   G. S. Ford, T. M. Koutsky and L. J. Spiwak, Spiwak, *The Burden of Network Neutrality Mandates on Rural Broadband Deployment*, PHOENIX CENTER POLICY PAPER NO. 25 (July 2006)(available at: http://www.phoenix-center.org/pcpp/PCPP25Final.pdf).

[15]   G. Ford, T. Koutsky and L. Spiwak, *The Efficiency Risk of Network Neutrality Rules*, PHOENIX CENTER POLICY BULLETIN NO. 16 (May 2006) (available at: http://www.phoenix-center.org/PolicyBulletin/PCPB16Final.pdf).

Increases in Transaction Costs Can Harm Consumers

Network neutrality proponents seem ever-fearful of commercial transactions between broadband service providers and on-line content firms. Out of a concern over vertical leveraging, there have been legislative proposals to prohibit AT&T, Comcast, Verizon, or any of the other broadband service providers from contracting with Amazon, Google, the National Football League, or any other content firm to ensure timely delivery of purchased content. (Notably, such voluntary arrangements already exist.[16]) Any arrangement for a higher quality transaction, the argument goes, is best made between the consumer and broadband provider after the transaction is made between the consumer and the content provider. Arguably, the intent of the rule is to protect both consumers and content firms from the exercise of market power by the broadband provider.

In POLICY PAPER NO. 28, however, we showed that under plausible conditions, rules that prohibit efficient commercial transactions between content and broadband service providers could, in fact, be bad for everyone—consumers would pay higher

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[16]   S. Nassauer, *ESPN Charges Net Providers for Right to Offer Broadband Web Site*, WALL STREET JOURNAL (Aug. 1, 2006).

prices, broadband service providers earn lower profits, and even the Internet content, software and application firms see lower sales.[17]

Transaction cost economics teaches that over time, the market will tend to develop relationships that are efficient and minimize transaction costs, thereby expanding output. However, a network neutrality rule jumps the government in the middle into these transactions and alters decisions. The result would be that otherwise-efficient transactions are replaced with more expensive ones. This hardly seems like good policy. Despite the obvious shortcomings of prohibiting this entire category of voluntary exchange, calls for such a prohibition remain an important part of the network neutrality agenda.

Welfare Consequences of Network Neutrality

To date, network neutrality advocates have not adequately taken into account the welfare consequences of their proposals. Because the purpose of regulation is to improve welfare, the general absence of welfare analysis is a significant shortcoming.

Instead, what we see are statements that "upstream" providers—the Googles and Microsofts of the world—would benefit if network neutrality rules were applied across the board. But enriching one set of firms at the expense of another says little

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[17] G. S. Ford, T. M. Koutsky and L. J. Spiwak, *Network Neutrality and Foreclosing Market Exchange: A Transaction Cost Analysis*, PHOENIX CENTER POLICY PAPER No. 28 (March 2007)

about overall consumer or social welfare. Little or no research has been done to actually *prove* or *show* that this transfer of wealth from one industry sector to another will actually benefit consumers and society as a whole.

Nicolas Economides, an economist at New York University who has contributed much to network economics over his distinguished career, has presented a theoretical analysis of a two-sided market in which a broadband provider can levy a charge on either or both users and content firms. The problem modeled is clearly relevant to the debate, and Dr. Economides generally supports network neutrality regulation.

Dr. Economides shows that under certain conditions, the upstream charge can reduce welfare, thereby supporting portions of the network neutrality agenda. But it is not difficult to find equally plausible parameterizations of the model where the upstream charge increases welfare. The theoretical result, then, is ambiguous. As an economist, it is difficult to imagine how it could be any other way. Dr. Economides' model, as would any sensible model of this problem, shows that charges by network firms to service providers may enhance welfare—a result that makes untenable the presumption that such charges are always undesirable.

The paper by Dr. Economides is an important contribution, and others have tried to undertake a more technical analysis of network neutrality regulation. Last year,

much was made by network neutrality advocates about a study by University of Florida researchers from the Department of Decision and Information Sciences.[18]   Yet the paper is rarely cited today because on close analysis it shows that under no circumstances will consumer welfare be improved by network neutrality regulation. In fact, the Florida Study suggests that the only "winners" from network neutrality regulation are the Internet content providers—with broadband service providers and consumers being worse off (or, in some cases, unaffected).[19]

Moreover, a subsequent study on the same topic by Economics Professor Mark Jamison, also at the University of Florida and a recognized scholar on communications policy, has been entirely ignored by the network neutrality advocates. It tackles the same problem as the original Florida Study, using more reasonable assumptions and better modeling techniques. It comes out with the conclusion that network neutrality regulation would reduce, not increase, network investment. Jamison also finds that offering premium services to content firms stimulates innovation at the network edge and is beneficial to content firms, and more beneficial to smaller content providers than larger ones. Subscribership also increases. The analysis suggests that network

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[18]   *The Debate on Net Neutrality: A Policy Perspective*, Working Paper, Department of Decision and Information Sciences, Warrington College of Business Administration, University of Florida (Mar. 2007) ("Florida Study")(available at http://ssrn.com/abstract=959944).

[19]   George S. Ford, PHOENIX CENTER PERSPECTIVES NO. 07-01: *University of Florida Study Shows Only Winners from Network Neutrality Regulation to be Content Providers, Consumers Lose* (March 14, 2007)(available at: http://www.phoenix-center.org/perspectives/Perspective07-01Final.pdf).

neutrality limiting premium services to content firms is obviously not a good thing in nearly any dimension.

With regard to the incentives to engage in the types of behavior network neutrality regulation aims to prevent, the most frequently cited paper is authored by Dr. Barbara Van Schewick.[20] The topic of exclusionary conduct has been widely studied by economists, and Joe Farrell and Phil Weiser provide a good introduction to that literature.[21] Their paper shows that while there are instances where firms have incentives to engage in exclusionary behavior, the general rule is that they do not.[22] Even in the presence of exclusionary conduct, the welfare consequences of exclusionary acts are often ambiguous, so in a policy context not only must one demonstrate the incentive exists for anticompetitive exclusion, but also establish that the act reduces welfare. This is no easy task.

Dr. Van Schewick claims to provide "new exceptions" to the general rule that a monopolist will not leverage its market power into related markets. While she purports to present "new theory," there is in fact no theoretical analysis in the paper of a technical nature, which is required for these problems. Essentially, Dr. Van Schewick adopts the theoretical conclusions from papers by Farrell and Katz (2000) and Whinston (1990), yet

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[20] Barbara van Schewick, *Toward an Economic Framework for Network Neutrality Regulation*, 5 JOURNAL ON TELECOMMUNICATIONS AND HIGH TECHNOLOGOY LAW 329-391 (Winter 2007).

[21] *Supra* n. 8.

[22] This point is echoed by Van Schewick, *supra* n. 20 at 340-1.

applies them to an entirely unrelated set of assumptions than those found in either of papers.[23] Obviously, this approach is invalid. Theoretical conclusions are intimately tied to the assumptions upon which they rest.

Upon closer inspection of Dr. Van Schewick arguments, neither the Farrell-Katz or Whinston paper have anything much to do with her scenarios. In fact, the notion of "outside revenues" that she introduces suggests independent rather than complementary goods, so it seems that much of the exclusionary literature is largely irrelevant to her problem. Models of exclusion, tying, and foreclosure are typically limited to goods with demand interdependencies. It is hard to say much specific about the Van Schewick paper, however, since there is no theoretical model to evaluate. Dr. Van Schewick does not indicate whether her "new theory" is one of fixed or variable proportions, whether goods are complements or independent, whether the cost and demand relationships are linear or otherwise, whether there is perfect or imperfect competition in the complementary market, and so forth. There is no way that the standard tools of economics can be applied to the scenario she describes given the lack of specificity.

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[23]   J. Farrell and M. Katz, *Innovation, Rent Extraction, and Integration in Systems Markets*, 48 JOURNAL OF INDUSTRIAL ECONOMICS 413-432 (2000); M. D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AMERICAN ECONOMIC REVIEW 837-859 (1990).

What we can loosely infer from her specific use of Whinston is the following, though I urge caution since it is impossible to say anything too specific given the vagueness of what is been provided in the paper. In the sense Dr. Van Schewick relies on Whinston, for tying to be a profitable strategy to the broadband provider it would need to eliminate all competition in the content market—every single firm.[24] The broadband firm, for example, must monopolize search engines, monopolize book sales, monopolize advertising sales, monopolize pornography sales, and so forth. This seems highly improbable.

The use of Farrell-Katz is perhaps even more awkward, but Dr. Van Schewick relies heavily on their conclusions. Farrell-Katz make the following observations, "[the monopolist] has broad incentives to cooperate with independents, and no incentives to hinder them, whether or not the [the monopolist] is integrated." And, the authors note, "threatening exclusion could be profitable [for the monopolist] although carrying out the threat is never profitable[]."[25] Obviously, if you are pushing for network neutrality regulation, this is a somewhat odd paper to rely on.

For one of her "new exceptions," Dr. Van Schewick merely observes the well known theoretical result that regulation can lead to sabotage. The treatment, or

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[24]   Whinston, *id* ("firm 1 would never commit to tying unless this would succeed in driving firm 2 out of the market.").

[25]   Farrell-Katz, *supra* n. 23, at 422.

mistreatment, of VoIP providers is generally based on the regulated price for access

charges for such providers (at zero), which incents some local exchange carriers,

primarily rural carriers with very high access charges, to sabotage VoIP. This finding is

not new, and Dr. Van Schewick mistakes the regulation-induced action for something

else. If local exchange carriers were allowed to price more freely, then they would have

no reason to sabotage VoIP.

The welfare effects are even more problematic for Dr. Van Schewick. Whinston

concludes "when tying does lead to exclusion of rivals, the welfare effects both for

consumers and for aggregate efficiency are in general ambiguous…. This fact, combined

with the difficulty of sorting out the leverage-based instances of tying from other cases,

makes the specification of a practical legal standard extremely difficult."[26] The same is

true for Farrell-Katz. The actions of the monopolist have ambiguous welfare effects.[27]

These first two studies make up the bibliography of the technical analysis that

allegedly supports network neutrality regulation. As discussed, neither really does in

any unambiguous sense, and one provides senseless results based on senseless

assumptions and mathematical error. Dr. Van Schewick's paper provides no technical

analysis, but incorrectly applies theoretical results from entirely different scenarios to

her own. Even absent this error, the welfare effects of her alleged exclusionary acts are

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[26] Whinston, *supra* n. 23, at 839, 856.

[27] Farrell-Katz, *supra* n. 23, at 430.

ambiguous, or perhaps uncertain is more legitimate given the lack of specificity in the analysis. The welfare effects in such models, however, are almost always ambiguous.

Advocates for network neutrality are today arguing for significant regulatory intervention into the operation of the Internet. Ignoring the welfare implications of such regulations is unacceptable. Supporting network neutrality regulation with papers showing that that consumers are made worse off by the regulation is shameful. In my opinion, ambiguity in welfare effects is evidence for inaction or at least caution; certainly ambiguity does not support a presumption that a behavior is undesirable.

IV.   Conclusion

Let me summarize my main points:

First, I recommend that the FCC insist that all proponents of network neutrality or network management regulation show convincingly that their proposed rules will indeed have the intended effect of increasing consumer and/or social welfare. Moreover, the regulation must do so efficiently, in that the costs of the regulations are less than the benefits. The burden of proof should rest on those proposing regulation, since the 1996 Act explicitly calls for deregulation in communications.

Second, I encourage the FCC to avoid policies that nudge the industry in the direction of economic consolidation. The market likely will be concentrated for the foreseeable future, and there is little one can do to improve things. But, policy can make it worse. As a result, try to avoid actions that shrink the revenues of facilities based firms by

excluding or limiting access to markets, avoid actions that increase fixed and sunk entry costs, and avoid exacerbating scale economies by commoditizing services. Policymakers must also recognize that network neutrality regulations are likely to have a disproportional effect on small firms and rural markets.

Finally, with regard to broadband traffic management practices in particular, recognize that contrary to popular belief, targeted remedies for congestion are welfare-enhancing. Consumer surplus and total social welfare rise when network operators use traffic management tools such as differential pricing, traffic prioritization, traffic shaping, and even blocking to manage congestion. The welfare gains are larger when the remedy is highly targeted to the source of the problem, even if that source is a particular application. Broad, untargeted solutions are likely to be highly inefficient. Further, because a for-profit network operator will not fully internalize the cost to society of a negative, we can presume that a for-profit network operator's actions to control congestion are legitimate absent compelling evidence otherwise.

Thank you once again for the opportunity to testify before you today, and I look forward to your questions.

Prepared Remarks of Brett Glass
Owner and Founder of LARIAT, an ISP serving Albany County, Wyoming
Delivered at the *en banc* hearing on network management practices
at Stanford University on April 17, 2008

Chairman Martin and Members of the Commission:

I'm extremely grateful for the opportunity to speak to you today and would like to thank you for inviting me. It's good to be back at my Alma Mater and again to be on this stage -- where I spoke and performed several times while I was here obtaining my Master's Degree in Electrical Engineering. When I arrived at Stanford in 1983, the ARPAnet -- for that is what it was called at the time -- had just transitioned from the outdated "Network Control Protocol" to the newfangled "TCP/IP", which is now *lingua franca* of the Internet. I followed the network's trials and tribulations as I studied, and also participated in a project, headed by Dr. Michael Flynn, whose goal was to develop digital radios for the recently available unlicensed 900 MHz band. As part of that project, I independently invented a digital coding technique known as Trellis Coding, which is used in all manner of modems and radio equipment today. At around the same time, our colleagues and football rivals across the Bay at UC Berkeley were working on a digital radio project called the Daedalus project. All of this work, and the work of other researchers, were eventually integrated by NCR into a product called WaveLAN -- the granddaddy of today's Wi-Fi.

Several years later, as the ARPAnet was becoming today's Internet, I moved from the San Francisco Bay area to Laramie, Wyoming, a city with which I had fallen in love when I was much younger and where I'd decided to put down roots. Folks there had heard about this Internet thingie, but all that was available at the time -- except on the University of Wyoming campus -- was CompuServe at 2400 bits per second. Not wanting our small city of about 25,000 people to fall behind the curve, I founded LARIAT -- a rural telecommunications cooperative -- to bring Internet to the community. I and other interested business owners started by borrowing a bit of bandwidth from the University to build a "proof of concept" network, and then transitioned to buying our own. At the time, a T1 line cost $6,000 a month, but we pooled our money and partnered with other providers to bring the connection into my office.

The problem, once we got it there, was how to divvy it up among all the people who were paying for it. The answer turned out to be the techology upon which I'd worked here at Stanford. We bought some of the NCR radio equipment and set up a metropolitan area network spanning downtown Laramie. As far as I or anyone else can tell, this made us the world's first WISP, or wireless Internet service provider.

Fast forward to 2003. The Internet was now well known, and the growing

membership of LARIAT decided that rather than being members of a cooperative, they simply wanted to buy good Internet service from a responsible local provider. So, the Board prevailed upon me and my wife -- who had served as the caretakers of the network -- to take it private. We did, and have been running LARIAT as a small, commercial ISP ever since. But after all these years, our passion for bringing people good, economical Internet service hasn't changed. And nothing can beat the sense of achievement we feel when we hook up a rural customer who couldn't get broadband before we brought it to them -- or when we set up a customer who lives in town but has decided to "cut the cord" to the telephone company or cable company and go wireless with us. We make very little per customer; our net profit is between $2.50 and $5 per customer per month. But we're not doing this to get rich. We're doing this because we love to do it.

In other words, from the Internet's earliest days, we at LARIAT have been the strongest possible advocates of consumer choice; of free speech; of inexpensive, fast, high quality access to the Internet. It's our mission and our passion. And we are unqualified advocates of network neutrality as it was originally defined: namely, the principle that Internet providers should refrain from leveraging their control of the pipes to engage in anticompetitive behavior. It is inexcusable for the cable company to throttle or block video because it competes with their own services, or for a telephone company to block Voice over IP because it's another way of making a telephone call. And I think pretty much everyone -- except maybe some of those monopolies -- agrees.

Unfortunately, because "network neutrality" seems like such a sensible idea and has so much momentum, various parties have sought to extend the definition beyond this basic principle -- in ways that favor their own interests and which are, ironically, non-neutral. These attempts to "hijack" the network neutrality bandwagon are dangerous because many of them seek to force ISPs not to manage our networks; not to stop abuse or exploitation of our networks; and not to insist that we be paid for the use of our networks. And if rules and legislation are enacted that enforce these expanded definitions of "network neutrality," they actually could put our small, competitive provider out of business.

Several people who have spoken before this Commission and before Congress have claimed that Internet service is the province of a cable/telco "duopoly" which must be reined in by regulations to keep it from exploiting its market power. Fortunately, as of the moment, this is not true. Estimates vary, but most agree that there are between 4,000 and 8,000 small, independent, competitive ISPs such as ourselves. These small operators need to be nurtured, protected from anticompetitive behavior, and given an opportunity to grow.

The "hot button" issue in the recent hearings has been ISPs' throttling or blocking of so-called "P2P" activities, including those carried on via software such as GNUtella, BitTorrent, eDonkey, and KaZaA. Because my time here is brief, I've

summarized the situation in two slides. Here, in the first slide, you see the way that content and services are normally delivered on the Internet. The provider of the content or service sets up a server -- usually in a building called a "server farm" -- where Internet bandwidth is cheap and plentiful. The information travels across the Internet backbone and reaches the ISP, which pays much higher prices for bandwidth -- often as much as $300 per megabit per second per month. (By the way, these prices have lately been increasing -- not decreasing -- due to mergers and consolidation in the backbone market.) The ISP also maintains the expensive infrastructure that connects users to the backbone. The user pays the ISP to do this. This situation fulfills the implicit contract of the Internet which has been in place ever since it stopped being the government funded ARPAnet: everyone buys his or her connection to the backbone.

In the second slide, you see what happens when you have P2P. In this case, the content or service provider doesn't pay its full freight for connectivity to the backbone. Instead, it turns the users' computers into servers, which in turn distribute its content or services. And users often don't even know that this is occurring. All they know is that they installed the "downloading software" or other software that let them access the product.

This situation is great for the content provider; its bandwidth costs are reduced to nearly zero. And the customer -- who in the United States virtually always has flat rate service -- doesn't pay any more, because the service is flat rate. So, where do the bandwidth costs go? The answer: they are dumped on the ISP. What's more, because the ISP -- especially a rural ISP, but it applies to all of them -- pays much more per megabit to buy bandwidth and deliver it to customers, the costs are not only shifted but multiplied several hundredfold in the process. It's obvious to anyone that this isn't fair and it isn't in any way "neutral." The content provider is, in essence, setting up a server on the ISP's network without permission and without compensation. This is why ISPs virtually always prohibit P2P and also the operation of servers on residential connections by contract. Our contract with our users says this, and we fully disclose it; we do not hide it. If someone does want to operate servers on our network, we can offer him or her "business grade" bandwidth, for which we charge a fair price that takes these extra costs into account. But P2P makes the bottom lines of such companies as Vuze look better, so of course they want to mandate that it be allowed on all connections -- no matter how non-neutral this is or what harm it does to ISPs.

This is clearly the motivation of companies like Vuze -- and also of BitTorrent, which provides its software -- in asking that P2P throttling be prohibited. But what about Free Press and the other petitioners who claim that limiting P2P harms free speech? As a strident advocate of free speech myself, I can say that their hearts appear to be in the right place, but they do not seem to recognize where the real threats to free speech lie. Throttling or prohibiting P2P activity is not a threat to free speech, because any content or service which can be delivered via P2P can also be delivered by conventional and fair means. (I've cited a few

examples in my third slide.) What *would be* a threat to consumers and to free speech is the elimination of competition -- which, ironically, is just what would happen if rules were imposed which prevented ISPs from doing something to rein in P2P. If this Commission grants the petitions entered by Vuze and of Free Press et al, it will sting some of the large providers like Comcast. But it would drive smaller competitors with higher backbone bandwidth costs out of business -- and thus would likely create the "duopoly" about which many are justifiably concerned. You may have seen the news reports from the United Kingdom that widespread deployment of the BBC's "iPlayer" P2P software is causing a similar effect. While the BBC is not a for-profit entity, the fact that it is shifting the cost of wildly popular and voluminous video content to ISPs is causing even some of the larger ones, such as Virgin, to cry "foul."

There are other problems with P2P as well. It congests networks, degrading quality of service for other customers. It exploits known weaknesses in the TCP/IP protocol -- which became obvious when I was here at Stanford but have never been adequately fixed -- to seize priority over applications such as voice over IP that really need priority. And it's mostly used for piracy of intellectual property -- something we can't condone.

What's the answer to this problem? Some parties claim that we should meter all connections by the bit. But this would be bad for consumers for several reasons. Firstly, users tell us overwhelmingly that they want charges to be predictable; they don't want to worry about the meter running or about overage charges -- one of the biggest causes of consumer complaints against cell phone companies. Secondly, users aren't always in control of the number of bits they download. Should a user pay more because Microsoft decides to release a 2 gigabyte service pack for Windows Vista? Or because Intuit updates Quicken or Quickbooks? Or because a big virus checker update comes in automatically overnight? We don't think so. And we don't need to charge them more, so long as they are using their bandwidth just for themselves. It's when third parties get hold of their machines, and turn them into resource-consuming servers on our network without compensating us for those resources, that there's a problem. Thirdly charging by the bit doesn't say anything about the quality of the service. You can offer a very low cost per bit on a connection that's very unsteady and is therefore unsuitable for many things users want to do -- such as voice over IP. And finally, a requirement to charge by the bit could spark a price war. You can just imagine the ads from the telephone company: $1 per gigabyte. And then the ads from the cable company: 90 cents per gigabyte. And then one or the other will start quoting in "gigabits" to make its price look lower, and so on and so forth. All Internet providers will compete on the basis of one number, even though there's much more to Internet service than that.

The problem is, small ISPs cannot win or even compete in this price war, especially when -- as is true in most places -- the monopolies backhaul their connections to the Internet and thus control their prices. Again, we wind up with

duopoly.

I would submit that the best answer is that, rather than micromanaging ISPs' businesses or trying to dictate their business models or price structures, the FCC should do three things. Firstly, it should make strong rules prohibiting anticompetitive behavior, since this is something nearly everyone agrees on. Secondly, it should ensure that all ISPs have access to the Internet backbone at a fair and reasonable cost -- something which, again, has become harder and harder due to mergers and acquisitions and refusal to deal. (For example, the three fiber backbones traversing the Laramie valley, once owned by Wiltel, Broadwing, and Level3, are now all owned by Level3 -- which sells access to very large companies such as Cox and Echostar but has been refusing to open a point of presence to sell access to us.) And finally, the Commission should require full disclosure from all parties -- not only ISPs but also content and service providers who try to commandeer users' computers as their own servers. I've laid out a series of basic principles for network neutrality and sound regulation on my Web site at http://www.brettglass.com/principles.pdf. You'll note that the very first principle says that users should absolutely have access to the legal content and services of their choice -- but not in a way that abuses the network or allows third parties to abuse it.

Please consider that document -- which I have also submitted as an attachment to an ex parte memo in the docket -- as a basis for sound regulation that will help, rather than hurt, the cause of true network neutrality.

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Testimony of Jon Peterson, co-director, Real-Time Applications and Infrastructure (RAI), Internet Engineering Task Force (IETF)

The Internet Engineering Task Force (IETF) is a multinational body of engineers participating on a volunteer basis as individuals rather than as representatives of their employers or other affiliations. Over the past twenty years, the IETF has managed standardization for protocols such as TCP/IP, DNS, and protocols underlying email and the web. It is not a membership organization; participation in its meetings and mailing lists is open to all who wish to contribute to the IETF's work. The IETF is committed to its mission as described in RFC3935: "to produce high quality, relevant technical and engineering documents that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better." As a purely technical body, the IETF does not establish consensus in matters of public policy.
The usage model of the Internet is changing, and traditional methods for managing high network load may no longer reflect the optimum responses to new applications. One example of this evolution are real-time applications, which suffer when exposed to significant latency. As link loads near capacity, latency is a common side-effect, and delay-intolerant applications bear the consequences.

New applications of the Internet inevitably introduce new challenges. While the IETF has not yet arrived at a consensus on a best current practice for managing resources in the face of competition between elastic and inelastic applications, various aspects of this problem space, including congestion control, quality-of-service, and friendliness of application behavior have been studied in the IETF for some time. It is likely that some of this previous work is relevant to the challenges raised by new applications; it is also likely that these new applications will require new thinking and some new technical development efforts. Some of these areas are within the IETF's expertise, and the IETF is considering whether it can make a useful contribution in this space.

In thinking about any potential IETF study of this space, there are a few points about the IETF to keep in mind:

First, as a volunteer, consensus-based body, the IETF is highly dependent on its participants. Our ability to address technical problems is predicated on the contributions of informed engineers and computer scientists from the academic, operator and vendor communities, especially those with first-hand knowledge of the problem space. The key to tackling serious issues in deployments is reliable information – knowing what practices are followed by Internet Service Providers and application implementers. If the IETF is to address the evolving challenges associated with managing network resources, we will need the participation of Internet community members on the leading edge of application development and deployment in order to reach a well-informed basis for industry consensus.

Second, the IETF does not attempt to judge what is or is not "Internet service," a term that resists easy definition. In the marketplace today, there exists a variety of operational policies, and the IETF does not attempt to rate their respective propriety. Instead, the

IETF looks at questions in more practical terms. For example, in order for application behavior to be deterministic, and to meet end-user expectations, the IETF notes in RFC4084 (BCP104) that "it is important that providers disclose the services they are making available and the filters and conditions they are imposing." RFC4084 goes on to recommend that

  More generally, the provider should identify any actions of the
  service to block, restrict, or alter the destination of, the
  outbound use (i.e., the use of services not supplied by the
  provider or on the provider's network) of applications services.

Third, The IETF does not have a policing function. IETF specifications can detail the pros and cons of particular approaches to engineering, but implementers and operators must make their own informed decisions based on the technical trade-offs associated with solutions.

We appreciate the opportunity to participate in this forum today, and we look forward to responding to any questions you might have.

Testimony of Gregory L. Rosston
Deputy Director and Senior Research Scholar,
Stanford Institute for Economic Policy Research
Deputy Director, Public Policy Program
Stanford University

Federal Communications Commission
En Banc Hearing on
Broadband Network Management Practices

Stanford University
April 17, 2008

Testimony of Gregory L. Rosston

Thank you very much for the chance to appear before you today. I have written academic articles about open access and network neutrality and generally my research focuses on the effects of regulation on communications networks so I am pleased to have the chance to share my views.[1]

Policy decisions regarding broadband networks and associated content and services can have important effects on the economy. The best broadband policy for the United States would result in lots of choice, innovation, and low prices. Such a utopian policy framework, however, may be hard to achieve.

Today's hearing focuses on how broadband providers' management practices affect consumers. The main issues are not new. Policy analysts and economists have debated broadband network management under names like "openness" and "network neutrality" for more than a decade; these same issues have been debated far longer in other contexts. Nonetheless, there is little agreement even about what the terms mean.

It is hard to be against openness and neutrality – they sound as American as apple pie. In some contexts, openness and neutrality have benefits, such as giving entrepreneurs easy access to networks and providing improvements to our democratic process by permitting fair and open debate of key political issues. But regulated openness and neutrality have costs, too, such as possibly reducing efficiencies from vertical integration.

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[1] For articles dealing directly with Network Neutrality, s*ee* "Communications Policy for 2005 and Beyond," Stanford Institute for Economic Policy Research Discussion Paper No. 04-07, August 2004 *Federal Communications Law Journal*, Vol. 58 No. 1, December 2005 (with Hundt, R.), and   "Local Broadband Access: Primum Non Nocere or Primum Processi? A Property Rights Approach," Stanford Institute for Economic Policy Research Discussion Paper No. 02-37, July 2003 in Net Neutrality or Net Neutering: Should Broadband Internet Services be Regulated, Lenard, T. and May, R. (ed.s) Springer: New York, 2006 (with Owen, B.)

The economic issues underlying network management, openness, and network neutrality are similar in that they all involve a network operator interacting with its end-user customers and also with companies that may compete with the network operator for other products. My goal is to provide an economic analysis of network management and some recommendations for regulatory policy to mitigate possible problems. Finally, I provide some reflections on wireless open access requirements in light of this analysis.

I. Economics of Network Management

Network management encompasses at least two broad economic issues: 1) management of a scarce resource that exhibits externalities; and 2) possible competitive issues surrounding vertical relationships.

A. Scarce resources, externalities, and pricing

Management of scarce and common resources occurs throughout the economy. For example, restaurants serve dinner to multiple customers who all enjoy the same ambience and service staff. One noisy or especially demanding diner affects how much other patrons enjoy their meals. We rely on market forces (competition among restaurants) to give restaurant owners appropriate incentives to deal efficiently with such patrons, but owner's decisions may not mean that all customers get the same service even in the same restaurant when they order exactly the same meals. In a competitive business like restaurants, management of the common resource will be different based on the demands of customers, costs, and other factors.

Like restaurants, broadband networks must satisfy widely varying demands for service. Some people use their connections sparingly, while others consume large amounts of bandwidth. Initial proposals for network neutrality and openness did not differentiate among different types of users. More recent proposals recognize the need to allow network owners to charge for bandwidth or usage in some circumstances.

If all purchasers face a uniform access price, without regard to usage, the common resource would be allocated inefficiently. Overall benefits to users can be increased by charging users in relation to their usage or to the costs they cause.

In some cases, the cost to monitor and meter may be high relative to the benefits. That means that there may be some benefit to having additional mechanisms in place for traffic management. For example, it may make sense to offer pricing that varies with usage in blocks, rather than continuously, and to find non-price means to limit high usage during peak periods, rather than offering a complex and confusing non-linear price schedule. It might be more transparent for firms to offer higher tier service for more intensive users, with charges based on upstream usage, downstream usage, or both.

Pricing can be an important tool for providing higher-value services. All packets do not have equal value. If consumers pay for bandwidth or capacity and are part of a shared network that treats "all bits equally," it might not be possible to offer broadband content that requires delivery priority or guaranteed arrival times. For example, high-quality real-time video conferencing requires that packets of bits not be delayed. But, if the local provider is required to treat all bits equally, the packets that are going to the high school student downloading a pirated copy of the new *21* movie and setting up a peer-to-peer upload will have the same priority as the conference call. Given capacity constraints in the network, the lack of prioritization could cause the video conference quality to be suboptimal, even though delay in delivering the movie to or from the student's hard drive would be completely inconsequential because such transmissions are easily buffered. Requiring that a network operator treat all bits equally would, in this and other cases, needlessly harm high-value services, reducing consumer welfare.

Similarly, some advocates propose that network operators should only be able to charge their own end-user customers for service and bandwidth choices. Such a requirement could actually harm consumers. For example, a network owner may charge its customers low rates for low bandwidth capacity. An unaffiliated content provider may develop a product that requires higher bandwidth. Under some proposals, the unaffiliated provider

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could not offer to pay the network owner to increase the user's bandwidth for its

application. Essentially, such a regulation would be the equivalent of banning toll-free 1-

800 calls. In the same way that changing the nature of payment for telephone calls can

increase efficiency, a bar on charging both sides of a broadband "two-sided market"

could harm efficiency.

Overall, network management issues are not unique to broadband. Many industries have

users that make intensive use of resources, and those users pay for the privilege.

Broadband should be no different – those who cause the costs should be charged. The

comments about network management above do not depend on the degree of competition

among network providers. Most "network management" proposals would be bad for

consumers even if there were only a single, monopoly, broadband network.

The next section takes up some of the competition issues that arise in the context of

network management.

B. Vertical Relationships

The economics of network management also involves the complex issue of relationships

between a network operator and other providers. Vertical relationships between network

operators and other providers—for example, the need for network operators to have

content flowing over their pipes—are an important part of broadband. No single firm will

ever provide all the content consumers want, so firms with conduit and content will have

to interact in some fashion to provide service. The relationship between suppliers and

conduit providers raises the competitive concern that a network operator could favor its

own content (or the content of an affiliate) over that of an unrelated competitor.

The economic literature on vertical relationships has gone through nearly a complete

circle, from broad agreement that vertical integration was bad to the Chicago School view

that all problems with vertical relationships stemmed solely from horizontal problems, to

the current nuanced "post-Chicago" view that there can be problems with vertical
relationships depending on the circumstances.

In the broadband context, the analysis should focus on whether a local broadband
provider has the incentive and ability to use its position to extract rents from content
providers and harm consumers in the process. Vertical integration may also have
beneficial efficiency effects. For example, vertical integration or vertical relationships
can align incentives for investment. For example, the early cable operators were the key
investors in cable television networks to ensure availability of programming. In theory,
vertical relationships could hurt consumers, help consumers, or both help them in some
ways and hurt them in others.

Which of these outcomes is most likely depends on supplier incentives, which in turn
depend on the market structure and regulation. In almost all models that predict adverse
effects from vertical relationships, the problems arise because of market power at one
level or another of the vertical chain. But often, vertical relationships raise no
competitive issues even if there is market power. In other cases, even if adverse effects
arise, the effects are less costly to consumers than inefficiencies that might arise from
regulatory intervention. Nonetheless, there are indeed instances where firms do have the
ability and incentive to harm competition in vertically-related markets. The *Madison
River* case is emblematic of this theory. In that case, the FCC stepped in to protect
consumers. The FCC and antitrust authorities (as well as private antitrust enforcers)
should intervene when a dominant network takes actions that harm competition and
consumers.

In general, an access provider wants to enhance the demand for its own services, in part
by promoting complementary services. This was the case with the early cable content
investments discussed above. An access provider cannot extract rents from services that
do not exist. There may be an incentive to exclude or raise the costs of those that offer
content that competes with its own, but only if the substitute content is offered at the
same or higher cost or if the content produces negative external effects on the overall

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demand for Internet content.[2] In this context, an access provider can act opportunistically to raise rivals' costs, but it cannot persist in such behavior without reducing the supply of content that it requires.

Yahoo! And AT&T provide an example of the fears and potential efficiencies from vertical relationships. Yahoo! and AT&T have had an agreement jointly to provide service for AT&T's DSL customers. This vertical relationship advantaged Yahoo! relative to other information portals such as AOL, MSN, and Google. But it does not appear to have harmed consumers. Bundled AT&T/Yahoo! service does not prevent subscribers from using any other Internet services, including Yahoo!'s most direct competitors. In principle, AT&T could do a variety of things to make it more difficult for users to turn to rival sources of aggregated content and premium service, but I am not aware of any allegations of such behavior. In these circumstances, a policy that prevents a relationship between AT&T and Yahoo! could deny consumers a more attractive product or lower cost. Rivals to Yahoo! may protest the vertical relationship with AT&T. But their protests need not stem from fear of discrimination; they may fear a more effective competitor.

The key conclusion here is that vertical relationships when a firm has market power can be both pro-competitive and anti-competitive depending on the circumstances and the actions. A preemptive regulation can prevent both types; relying on *ex post* antitrust enforcement can target more closely anticompetitive actions, but has a risk of delay and under-enforcement. These tradeoffs lead to the analysis of what government regulators should do at this point in time.

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[2]   See Farrell and Weiser (2002) for a discussion of incentives for a monopolist to exclude downstream content.

II. What should regulators do?

A. Framework

Evaluations of the competitive effect of broadband network management policies depend critically on one's view about the future of competition for broadband access. Policy choices can lead to self-fulfilling prophecies about the future of access competition.

If one believes that there is already as much competition and investment in local broadband access as possible, and one believes that two wireline providers is insufficient to provide a competitive deterrent, then one might think that *ex ante* regulation of actions by network providers would be appropriate. A dominant local access firm could use its power to extract rents from upstream providers through a variety of pricing and discrimination methods. Whether a firm with such power would take advantage of its power would also depend on the nature of demand of its subscribers.

If, on the other hand, one believes that competition for local broadband access is not as vigorous as it could be, then one might have a different conclusion about regulation. With the potential for additional competition, one would not want to institute rules that would frustrate new competitors and new investments. If vertical integration was an important competitive strategy, new entrants might be frustrated from entering if they could not vertically integrate. For example, some new entrants in broadband markets have usage restrictions to manage their networks and make entry more attractive.

Policy can affect the entry incentives of new entrants and investment incentives of incumbents. For any investment to take place, firms have to believe they will be better off from having made the investment than not. If policy reduces the returns to investment, at the margin, firms are less likely to invest. For new entrants, more onerous regulation can affect the scale and scope of entry, or make entry unviable.

B. Specific Proposals

I think that we can have more competition for local broadband access. Therefore, my policy proposals focus on facilitating new entry and investment to reduce the potential problems from vertical relationships. The FCC in particular has tools that can increase local competition, and remove barriers to new entry – it just needs to use them. At the same time, we need to ensure that the regulatory authorities have the power, will and tools to step into the market when there are competitive problems.

Since most of the problems and concerns about vertical leveraging arise from concentration at the local access level, the most important thing that government should do is to stimulate competition at that level. Obviously, it would be great if it were economic for multiple firms to string fiber optic cable around all neighborhoods in the United States. That is unlikely to happen. But the FCC has tools to make facilities-based competition more likely and more viable.

First and foremost, the FCC should get even more spectrum out into the marketplace. And it is probably important that the spectrum not continue to go into the hands of the two incumbent landline telephone companies that also have by far the most valuable wireless spectrum. In the 700 MHz auction, Verizon and AT&T each bought large amounts of spectrum and, in many geographic areas, control more spectrum than the FCC's threshold of 95 MHz. While they each will use the spectrum, they do not have the same competitive incentives that independent competitors would have. The FCC should investigate to see if there are competitive problems in the wireless business and more importantly in the ability of a competitor to use wireless to provide a competitive alternative to the cable and DSL lines.

One quick way to get more spectrum into the market is to push government users to relocate more quickly. Leap Wireless, MetroPCS and T-Mobile all bought spectrum in the AWS band in 2006 and but cannot use it because the US. Government has not

vacated the spectrum. The FCC should do whatever it can inside the government to expedite this process and enable these competitors to use AWS spectrum.

Competition from independent wireless companies should benefit consumers and provide a competitive alternative. Independent broadband wireless providers would provide competitive pressures on the cable and DSL companies not to abuse vertical relationships. Increased competition in broadband access is the best way to "regulate" vertical relationships.

The current universal service program is also a barrier to competition and is so inefficient that it should be scrapped. Instituting a low-cost, efficient and competitively neutral universal service program would be much better for competition. Perhaps the most obvious and egregious problem is the proposal to pay incumbent telephone providers more than new competitors for providing the same services. The incumbents are right that we should not pay the new entrants the high rates that incumbents get – instead, all providers, including the incumbents, should get the minimum amount necessary for the most efficient provider to provide service. But incumbents have been able to use the regulatory process to forestall competition. Getting rid of this bias would help competition and again diminish the need for *ex ante* regulation of vertical relationships.

In addition, the antitrust authorities and the FCC should continue to be vigilant. Until we have more competition, there may be more instances like *Madison River* and the regulatory authorities should be ready to step in when there is abuse.

Increasing the amount of spectrum, speeding the relocation of government users, vigorous antitrust enforcement (including the prevention of excessive aggregation of wireless spectrum) and revamping universal service to be competitively neutral are "easy" economically. The answers are clear, and the benefits are big. The only question is whether we have the political will to do the right thing.

Appendix: The 700 MHz Openness Provisions – the good and the bad

The 700 MHz C block is useful for illustrating some of the issues related to network management: competition, complexity and regulatory uncertainty.

The FCC mandated that the 700 MHz Upper Band C Block have an open platform for devices and applications, subject to "reasonable network management." The Commissions order was vague on the actual requirements for openness, and it was also vague about the meaning of "reasonable network management."

It is curious that the FCC required openness for a Commercial Mobile Radio Services (CMRS) when has deemed CMRS to be competitive. As discussed above, the competitive issues in vertical relationships almost always require some degree of market power. While wireless service is not a perfectly competitive market, the FCC competition reports year after year have claimed that the service is competitively provided. As such, it is unlikely that there is a problem that an openness mandate will solve. So, there may be a cost to the provision and enforcement of the provision because other firms will rely upon the "right" to openness and defend that right, while at the same time, there may be little benefit from the new rule.

In addition, the vagueness of the openness requirements and network management exceptions make it difficult to believe that the enforcement will be satisfactory. Proponents of openness are likely to say that the licensee has not gone far enough in opening its network and the network operator is likely to say it has gone further than necessary. In addition, there are likely to be disputes about what "reasonable network management" for a wireless provider means. It may well be different than "reasonable network management" for a wireline broadband operator.

One potential benefit of the imposition of the openness requirements on the C block is the ability to use this "experiment" in openness to shed some light on the costs and benefits of such provisions on a more widespread scale. If openness is problematic, the

interactions between the C block licensee and upstream providers and downstream customers are likely to reflect such problems. If openness provides large benefits and works smoothly, then other carriers, having to compete with an open access provider, may also adopt open platforms.

In addition, by limiting the scope of the openness provisions to a single block of spectrum that it was auctioning for the first time, the Commission was able to avoid any concerns about "takings" due a change in rule for existing licensees. Instead, bidders knew (to some extent) the rules on the spectrum they were buying.

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Future of the Internet Debated at Stanford

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FOR IMMEDIATE RELEASE

Date: April 17, 2008

Contact: Jen Howard, Free Press, (202) 265-1490, x22 or (703) 517-6273

PALO ALTO, Calif. -- At a public hearing today at Stanford University, legal scholars, technology experts, entrepreneurs and industry representatives will go before the Federal Communications Commission to discuss the future of the Internet.

Listen to live audio of today's hearing at **http://www.fcc.gov/realaudio/**

WHAT: A Public Hearing on the Future of the Internet
WHEN: Thursday, April 17, 2008, 12 p.m. to 7 p.m. PT
WHERE: Stanford University, Dinkelspiel Auditorium, 471 Lagunita Drive, Palo Alto, Calif.
WHO: FCC Commissioners; legal scholars and technology experts from Stanford Law School and Carnegie Mellon University; public interest advocates; songwriters and independent filmmakers; executives from Skydeck, Sling Media, Common Sense Media

View the agenda and a complete list of panelists at
http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-281597A1.pdf

Today's event is being held in response to a complaint filed by Free Press and members of the SavetheInternet.com Coalition about Comcast blocking the Web sites and services of its competitors. A previous hearing was held Feb. 25 at Harvard University. Among those testifying at Stanford will be **Ben Scott**, policy director of Free Press.

Read his prepared testimony below:

Statement of Ben Scott, Policy Director, Free Press

This hearing is a pivotal moment in the short history of Internet policymaking.

There are two competing visions for the future of the Internet -- open versus closed. Will we embrace the openness that has shaped the Internet to the present day? Or will we permit network owners to move to the closed systems of content control we have had with cable television and broadcasting?

It is not hyperbole to say that few choices in the history of the FCC carry as much weight as this one does.

Let's be clear: Openness does not mean an end to all network management. It does not mean every bit should be treated exactly alike on the Internet. Openness does not stop us from protecting children or copyright or security on the Internet.

Openness simply means that Internet policy should promote free speech and commerce in the online marketplace. Openness means faithfully guarding against interference from the cable and telephone companies who have the power to become gatekeepers between consumers and producers of Internet content.

The Comcast case is a bellwether that will guide our communications system for a generation. That is why it has been the focus of so much money, influence and attention. It is not ordinary.

The Commission adopted its 2005 Policy Statement to stand in place of long-established and successful nondiscrimination provisions in the Communications Act. Many of us feared then that handing over the legacy of an open communications systems that has served us so well to such a weak guardian was a dangerous business. Today we are testing the mettle of that guardian.

This history of deregulation has led us to a bright red line of basic consumer protection -- beyond which we should not stray. We see the clash between open vs. closed most famously in the Net Neutrality debate -- but it is also in merger proceedings, spectrum auctions, wireless policy, white spaces, text messaging -- and now, network management. I'm pleased to point out that several key decisions have leaned toward openness, rather than against it. Throughout, the network owners have asserted their right to create a closed Internet.

So what plot line in this story brings us to Stanford? Was it Silicon Valley finally organizing its corporate might to challenge the telephone and cable companies in a battle of the titans?

Nope. It was a barber shop quartet. Robb Topolski began the testing that ultimately exposed Comcast's interference with peer-to-peer software because he couldn't share with his friends his favorite recordings of early 20th century barber shop tunes. Comcast first denied blocking, then acknowledged it, then directly challenged the legitimacy of the Policy Statement, and finally reversed itself and promised to stop in the future.

Robb has proven why this debate isn't about Google, AT&T or Comcast. It's about every consumer wanting to seek or share information on the Internet.

But few of us are even capable of doing what Robb did. Fewer still will witness their personal conflict with the cable company become first tier business for a federal agency. Yet the pressure of public scrutiny and regulatory oversight was highly effective -- triggering industry collaboration previously deemed impossible. But that doesn't mean the FCC can pack up and go home.

A cursory glance at the record makes that clear. The response has been extraordinary precisely because it is a bellwether, a one-off chance to pass or fail a signal test. The side deals and announcements of self-regulation are not the magic of the market at work. It is the magical threat of regulatory intervention.

If the agency doesn't act decisively, it will not have sent the correct signals to the market. Violations are almost certain to recur when the dust settles.

From a consumer perspective, Net Neutrality, or openness on the Internet, is a user experience. That's what is at risk here. In turn, that user experience depends on preserving the seedbed for emerging technologies, new ideas and the latest invention. The test case of Comcast-BitTorrent will shape the future of investment in innovation.

It will determine whether entrepreneurs choose to introduce their ideas in our markets or others. It will determine whether consumers get access to the new services, devices and content that this environment breeds -- or whether they will never have a chance to exist. These are the stakes of this debate.

Finally, I would be remiss if I did not extend the olive branch to the cable industry. In my view, cable Internet service providers have a legitimate issue with network congestion -- in part because they have not yet upgraded their networks for the future of broadband. It will only get worse if we do not acknowledge and address it.

There are many other legitimate ways for network providers to handle capacity problems together with consumers and innovators. Application blocking simply isn't one of them. Meanwhile, consumers pay for all-you-can-eat broadband that is too limited and a specific menu of cable TV that is too broad. As consumer demand for bandwidth increases, the cable industry will shift capacity to high-speed Internet services.

Consumers are relying on the Commission to set a baseline standard to protect openness on the Internet. A duopoly market of access providers will not discipline itself. Nor can we expect that fans of barber shop quartets will always be the white knights that ride to the rescue. This is a clear moment for the FCC to act. The future of the Internet for everyone depends on it.

For more information, visit **www.savetheinternet.com/=stanford**

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Free Press is a national, nonpartisan organization working to reform the media. Through education, organizing and advocacy, we promote diverse and independent media ownership, strong public media, and universal access to communications.

Lessig

Testifying @ FCC @ Stanford

April 18, 2008 2:08 PM - comments (56)

I was asked to give some overview testimony at the FCC's "Network Neutrality" hearing at Stanford yesterday. Here's the testimony.

One panelist, George Ou, was particularly exercised about what he perceived to be a policy by Free Press and EFF to push for "metered access." I don't speak for the Free Press or EFF, but my view is simply that tiered access for consumers does not violate "network neutrality" principles. Obviously I'd prefer a world of flat rate, fast service. And if we actually had any meaningful ISP competition, we might get to that. But the narrow question I've addressed here is whether it would violate neutrality principles for ISPs to offer different bandwidth commitments for different prices. I don't believe it does.

Posted on April 18, 2008 2:08 PM | Permalink | technorati

TrackBack

TrackBack URL for this entry:
http://lessig.org/mt/mt-tb.cgi/2209

Comments (56)

M. David Peterson: April 18, 2008 3:10 PM

>> But the narrow question I've addressed here is whether it would violate neutrality principles for ISPs to offer different bandwidth commitments for different prices. I don't believe it does.

Absolutely 100% agree! The argument that everyone should pay the same price regardless of their Internet connection and/or that

content providers shouldn't have to pay more to gain bigger pipes to pump the content through has nothing at all to do with Network Neutrality. If I consume more, I pay more. That's a pretty simple concept that *MOST* people understand and agree with. But for some reason various folks have attempted to cloud the issue -- that of ensuring open pathways exist between any two points on the Internet -- by suggesting that the speed of everyones connection is what truly matters.

When I read posts such as @http://torrentfreak.com/virgin-media-ceo-says-net-neutrality-is-a-load-of-bollocks-080413/ it really makes me wonder if anyone truly understands what the argument for NN is all about. Glad to see you've been able to bring clarity and focus to the real problem at hand!

Tom Poe:
April 18, 2008 5:48 PM

Aside from the network neutrality issue, any discussion about tiered service must have an assumption that all tiers will be available in a competitive market place. We are talking about our airwaves, the airwaves we own, right?

So, where do you see any competition being offered in the United States? It sure isn't here in north-central Iowa.

Of course, there's AT&T's handy dandy Fios in Minneapolis for $150 a month. Is that what you mean by tiered service? For some of us, network neutrality is indeed clouded by access, period. We can't even get to a point where we can complain about pricing for tiered service. Remember, back when the Internet was getting started, dial-up plans invariably included monitoring and throttling and being taken off-line by ISP's to manage their networks. Those issues were supposed to have been resolved years ago. Why would we still have to battle with thugs, today? When you get time, please address the above. Better, please address them at your next appearance on our behalf.

Beatrice M:
April 18, 2008 8:16 PM

Thank you for giving a presentation to the FCC and for posting this video for all to watch. Can you please provide a download link via BT or archive.org or something like that? I'm trying to access this from Argentina and it's really jumpy and makes it hard to watch.

M. David Peterson:
April 18, 2008 8:53 PM

@Tom Poe,

What you are referring to is market availability of broadband, which has nothing to do with the focus of Net Neutrality. Mixing the two as if they were one in the same only confuses the more important of the two issues, that of guaranteeing that regardless if you are on dial-up connection in the US and your friend on his/her personal OC3 (which is basically what they have over there) connection in Japan, you can still communicate with one another. That's it. And that's all it should ever be about, else we find ourselves in a world where we are regulating everything from the price of a car, regardless of how fast it can go or the gas mileage it gets, to the price of a computer, regardless of how many cores and how much memory it contains.

Peter Rock:
April 19, 2008 3:17 AM

The tiger analogy was excellent. For anyone wanting to look at this in more depth, I recommend The Corporation - both the book and film provide an abundance of case studies.

Thank you Lawrence, for this. I'll be fitting this presentation into my Technology in a Global Society class when we look at the e2e (aka NN) argument. This is rich stuff.

Matthias Bärwolff:
April 20, 2008 5:11 PM

Two comments, one on equating end-to-end with a free and open market, and a second on equating end-to-end and net neutrality

First, "the market" is, of course, a fiction, a helpful metaphor if you will. In actual fact, there are loads of markets around, each different from the other, and the important thing being that making markets is itself a competitive process. It takes effort and risk to "make markets". Why would I want to mandate which items a shop has to stock, and whether or not to discriminate between suppliers? Now, as for monopolies, there is always an element of monopoly in virtually every part of an economy as Chamberlin has pointed out in the 1930s. This may be seen as something bad (as Smith did in the late 18th century, bear in mind the historical context of his writing, though!) (the tiger analogy is fun, though), but it may with equal plausibility be seen as something that incentivises production and risk taking in the first place. Conceiving the internet as a natural monopoly, as a well defined infrastructure where no such incentives are required is IMHO a shortcut that simply serves to avoid the trickier questions ahead. (And, the linking of low broadband coverage to lack of net neutrality regulation is an assertion, not proof of the link.)

Second, you equate end-to-end (in the sense of Saltzer, Reed and Clark 1981, I suppose) to net neutrality, that is, a "neutral" network, "open", and "competitive". While is is possible to interpret end-to-end to mean neutral, the original paper never said anything like that. It said that functions should be put with the ends rather than the network, and the network should be kept free of functions that are not essential to its functioning lest future apps may be hindered. Now, you cannot keep an internetwork, a network of heterogeneous interconnected networks, free from any functions at all. You can do that with a small Ethernet, but not with the internet. Thus technically speaking a network cannot be neutral. Think packet sizes, think reliability, think routing in general, think congestion by UDP which will make well behaved TCP connections suffer, etc. It's just not possible to have it all. Designing networks is an exercise in trade-offs much like anything else in the world.

Raging Grannies:

April 20, 2008 9:18 PM

Prof. Lessig's presentation at the FCC hearing was delightful and straightforward. The Raging Grannies (many of us Stanford alums) are of an age where we rely on our kids and grandkids to help us navigate the mysteries and wonders of the internet, but as frequent users of it we came to voice our opinion for internet freedom with songs and chants.

We also were taken aback by George Ou's incessant hammering away at www.FreePress.net folks on what he perceived to be their policy on "metered access", a distraction from the real issue at hand, as you hint at above. Two of the Grannies who remained until the bitter end met with Democratic FCC commissioners who thanked us graciously, yet George continued to hammer away at the tiered access issue, going so far as to call the Grannies "bllind". Not a nice thing to say to someone on a disability scooter!

Prof. Lessig you are one of our big heroes. Thank you for posting your presentation and we will be forwarding it far and wide. The greater peace and justice community has a need to understand the issue. Ironically, we Grannies found the panelist from the Christian Coalition to be among the best speakers making the case for net neutrality. We are at polar opposites on most political issues with her but found solidarity with one another on this position.

Richard Bennett:

April 20, 2008 10:23 PM

I agree with Matthias that Lessig's equation of e2e with non-managed networks was fundamentally deceptive. The partial quote from Gerry Faulhaber was similarly dishonest (see:
http://techliberation.com/2008/04/18/what-did-he-say/#more-10673)

It appears that nobody can make a case for new regulations on the Internet can do so without lying.

And BTW, the Grannies shouted Ou down before he started speaking. They should have been expelled.

Seth Finkelstein:

April 20, 2008 11:50 PM

" ... Grannies found the panelist from the Christian Coalition ..."

My mind boggles.

I shouldn't say any more.

Raging Grannies:

April 21, 2008 12:02 AM

Grannies responding to Richard Bennett comment above:

Not true that we asked "Who sent you, Comcast?" before Ou even spoke. We didn't even know who he was (only found out later in the day) but his introductory statement and his demeanor were strong indication of what/who's position he was taking. Also, the FCC had just a few minutes earlier announced that "although all the ISP's we contacted declined to come, they suggested people for the panel".

Furthermore, immediately after Ou spoke, someone from the FCC said, "as just asked by someone in the audience, and with all due respect to our panelists, it would be a good time for everyone to state whether they have accepted any payment of any kind, including subsidizing of their travel here today...George?" So the FCC obviously has their concerns on this matter.

When you are at Stanford you are in Raging Granny territory. We will never be expelled, as you suggest should have happened. www.RagingGrannies.com

George Ou:

April 21, 2008 2:54 AM

"But the narrow question I've addressed here is whether it would violate neutrality principles for ISPs to offer different bandwidth commitments for different prices. I don't believe it does"

"Bandwidth commitments" is code for "Volume caps" which is a form of "Metered Internet". It's the same when Free Press say "Charge for usage" in their complaint to the FCC over Comcast.

Whenever you say "bandwidth commitments", you're talking about a volume cap like they have in Europe or Australia where if you go over say 2GBs of pre-paid bandwidth volume, you start paying by the megabyte after that. I just love how you speak in code and say how while you don't like metered Internet that you think it's a necessary evil.

It's obvious that it goes over your audience's (primarily Raging Grannies and Poor Magazine) heads. Apparently it also goes over the Press' heads too and I'm sure you're well aware of this.

George Ou:

"We also were taken aback by George Ou's incessant hammering away at www.FreePress.net folks on what he perceived to be their policy on "metered access", a distraction from the real issue at hand,"

I find it comical that you Raging Grannies cannot see that Lessig is pushing for Volume Cap pricing RIGHT HERE IN THIS BLOG ENTRY when he says "different bandwidth commitments for different prices". His colleague Barbara van Schewick even said that we should be more like Europe and have volume caps which are just a less extreme form of Metered Pricing since there's a flat cap for the first few gigabytes. His other Stanford colleague Gregory L. Rosston said that while he doesn't like Metered Internet, he doesn't like Metered Gasoline either.

"Not true that we asked "Who sent you, Comcast?" before Ou even spoke."

No, you people just started shouting me down as soon as I said my name on the panel. It's obvious your buddies at Free Press or their friends told you to attack me as soon as I speak. You people are an embarrassment to Stanford.

Seth Finkelstein:

With a certain amount of trepidation ... I believe Ou and Lessig are talking past each other here. The issue is the difference between 1) starting from a first principle that metered pricing is a good idea, and 2) having metered pricing be what comes out as a result of other axioms assumed.

I think Ou believes it's case #1, while the situation is really case #2.

Raging Grannies:

George, George, George: We have to stop meeting like this~
Sounds like we are having a Rashomon experience when it comes to recalling who said what/when at the hearing. Meet us for tea and cookies? You know where to find us.
When we have different outlooks from people we are happy meet for discussion. Notably Marine Corps recruiters in Belmont who are unfailingly polite to their elders....you could learn from their example.

Richard Bennett:

Given that the status quo (5% using 70% of b/w), the question is what's the best s0lution?

George wants prioritization and perhaps a services subsidy (i.e., HSI gets more capacity as a result of a build-out TV services in a triple-play combo), while Lessig wants tiered pricing and/or taxpayer subsidy. Lessig's plan is bad for the elderly and infirm on fixed incomes, of course.

But it's hard to say what Lessig really wants because it changes from day-to-day.

Richard Bennett:

If we reckon age emotionally or cognitively, the RGs are toddlers.

George Ou:

"With a certain amount of trepidation ... I believe Ou and Lessig are talking past each other here. The issue is the difference between 1) starting from a first principle that metered pricing is a good idea, and 2) having metered pricing be what comes out as a result of other axioms assumed."

No Seth. We're not talking past each other. I'm the only one not talking in code. I was the only one consistently arguing before and during the Stanford FCC panel AGAINST any kind of Metered Pricing. I believe we consumers should be able to download as

much as you can get away with at hopefully close to peak advertised speeds. The "as much as you can get away with" part means that the ISP should prevent someone from taking a larger piece of the pie than other people who want bandwidth. I believe that consumers who don't use high volume should get high priority bursting or people who do use high volume should be lower priority than people who don't use high volume. The only way you achieve this is with a well managed intelligent network

Free Press in their complaint to the FCC said that "charging for usage" would be a better alternative. Free Press' Marvin Ammori and Media Access' Harold Feld also stated that metered Internet would be better on a vontv debate and I wrote in from the audience criticizing them saying that Metered Internet is a bad idea.

Larry Lessig in THIS BLOG is arguing for Volume Caps like his two other Stanford Colleagues on the panel yesterday. That's why when Lessig says "But the narrow question I've addressed here is whether it would violate neutrality principles for ISPs to offer different bandwidth commitments for different prices. I don't believe it does.", he's saying he supports volume caps as a necessary evil due to the lack of competition in ISPs. I'm saying that any kind of metered pricing including volume caps or "different bandwidth commitments for different prices" is a BAD idea.

Seth Finkelstein:

I took Lessig's phrase "what he [George Ou] perceived to be a policy by Free Press and EFF to push for "metered access."" to mean that Lessig thinks that Ou perceives Free Press/EFF/Lessig want metered pricing as a policy goal in and of itself, and they aren't saying that they want metered pricing for its own sake.

I don't believe FP/EFF/Lessig are disputing they'd take metered pricing as a necessary evil. Then I think you [George Ou] are misreading what Lessig wrote as a denial of support by Lessig of metered pricing as a necessary evil, and hence writing extensively that they'd take metered pricing as a necessary evil.

That's what I mean by "talking past each other here".

George Ou:

Raging Grannies said: "Sounds like we are having a Rashomon experience when it comes to recalling who said what/when at the hearing."

It's easy to miss for someone like yourself when you have your mind made up and your instructions to shout me down on first contact. But it's obvious that Lessig's words right on the top of this page in this blog entry is beyond your comprehension. But I'll put up a reminder here for everyone else's benefit.

Go to the video archived at http://www.vontv.net/events/080417/default.cfm?id=9667&type=wmhigh
At 1:22:50 Lessig argues for metering and the opportunity to buy metered service.
"I agree on George on the history of Metered access, in fact there's a history of strong consumer rejection, but it's my view that if you're going to create an incentive to build broader infrastructure, just as modems use to create an incentive, people would buy faster modems to get faster connections, providing a way for people to provide a signal that they want to be high bandwidth users versus low bandwidth users I think is an important way to do it. I would love to be in a world of gigabit Internet access, where assuming the video doesn't swamp everything and you don't actually have to worry about it, so too cheap to meter as what they expect a nuclear power to be, they were wrong about that too. But we're not in that world; we're in a world where right now I think we need the opportunity to opt up"

As with the blog posted here, Lessig refuses to actually say the words "I'm for volume cap pricing" - though Lessig's colleage Barbara van Schewick explicitly said it - so that it goes over the heads of his mindless followers like the Raging Grannies.

George Ou:

Seth says: "I don't believe FP/EFF/Lessig are disputing they'd take metered pricing as a necessary evil."
I don't either, but their followers and the press aren't perceptive enough to catch that part. FP/MAP/EFF/Lessig all state that Metered Pricing is better than what Comcast is doing today and I disagree with them. Lessig goes further to say in his Thursday testimony as well as this blog post that because we don't have enough competition to spur on super fast broadband connections, some form of metered pricing like Volume Caps (though he's careful not to use those words) is a necessary evil. I happen to vehemently disagree with FP/MAP/EFF/Lessig that metered pricing or volume caps that convert to metered pricing are a good idea or a necessary evil.

So no Seth, FP/MAP/EFF/Lessig and I not talking past each other and I understand their view point very well. I don't care if FP/MAP/EFF/Lessig "aren't saying that they want metered pricing for its own sake"; I'm saying that FP/MAP/EFF/Lessig just pushing for any form of metered pricing as the better (less evil) alternative is dumb and bad for consumers and it's bad policy.

FP/MAP/EFF/Topolski also state that no network management (using the existing TCP standards) would be better than what

Comcast is doing with TCP resets today. I vehemently disagree and think that would result in the 10% of the population (using P2P software) oppressing 90% of the population by leaving them with 25% of the resources.

Seth Finkelstein:

Ah, it turns out the Raging Grannies were catspaws of Tim Karr/SaveTheInternet. Wow. Just ... wow ...

http://www.indybay.org/newsitems/2008/04/16/18493241.php

"RG" - this is an impertinent, but very serious question: Would you personally care if you're being *used*? I mean, if I were to say to you that you're being manipulated as cannon-fodder in a fight between two sets of big corporations, would you be open to that possibility? I get into trouble for doing things like that question, but I'm fascinated as to people's motivations.

Seth Finkelstein:

Sigh ... looks like I asked a stupid question ...

http://www.indybay.org/newsitems/2008/04/18/18493824.php

"The FCC announced that big telecom DID, however, suggest speakers for the panel. One George Ou, who is most certainly on the payroll of big telecom (we hear it's AT&T) was on the panel and was heckled with: "Who paid your way, George?" The FCC asked the entire panel shortly after that interjection if any of them were paid, even if just for travel expenses. Mr. Ou answered, "I drove myself here", avoiding the question as best he was able. Later in the day, one of the Grannies and George Ou got into heated discussion outside the hearing and things looked dicey until Granny defender Byrd Hale of KZSU told Ou, "Don't mess with the Raging Grannies if you know what's good for you," to which the Grannies added, "That's right, when you are at Stanford you are in Raging Granny territory."

George Ou:

Seth, indybay.org is libeling me just like Free Press' Marvin Ammori slandered Richard Bennett on Capitol Hill by saying Bennett was brought in by Comcast at the Harvard hearings. Indybay.org can't even quote me correctly. I didn't dodge any question, I told FCC Commissioner McDowell no I didn't get paid and I drove there with Richard Bennett.

I have never taken a dime for any political or policy activity from any telecom or cable company and my last employers were CNET Networks and Fujitsu where I worked as Technical Director and Sr. Network Engineer respectively. I wouldn't doubt that SaveTheInternet.org (Free Press) has a hand in this attack against me because I've seen Marvin Ammori call Richard Bennett a Comcast shill on Capitol Hill first hand. That's the way these people operate since it's inconceivable to them that someone would do policy work for free.

Seth Finkelstein:

Sorry for posting that item without thinking more carefully.

It seemed to me so ranty that it reflected badly on the subjects, not you.

raging Grannies:

Raging Grannies speak for the people! Always have, always will. And yes we are in solidarity with orgs working for NN. We also align with NARAL/Planned Parenthood others for pro-choice. We are a multi-cause group.
NOT ONE person in the FCC public comment period spoke up for the ISP's. The PEOPLE have spoken and we shall leave it up to the techies to debate the science of how it is to be done.
Signing off the internet, as we are back on the streets tomorrow, actually on campus with students for free speech at Stanford and later on the streets of SF with the ILWU. So go at each other guys and enjoy your debates.

Seth Finkelstein:

I take it that was a "no" - as in, you don't care about being *used*.

[I'm not cut out for politics, I'm really not.]

George Ou:

Funny the grannies mention NARAL and Verizon. It's even more pathetic that Larry Lessig continues to mislead the public and repeat the lie that "Verizon blocked text messages". Verizon NEVER blocked a single text message; they had a one-day

bureaucratic snafu that prevented NARAL from obtaining a 5-digit short code (like a shortened phone number) and they have apologized for it. Yet Larry Lessig and Tim Wu continues going around saying that Verizon is blocking NARAL text messages when not a single text message was ever blocked.

I guess the grannies can't help themselves from being brainwashed on this matter, but it's rather pathetic that Larry Lessig and Tim Wu resorts to this kind of made-up propaganda.

three blind mice: April 21, 2008 3:37 PM

It's even more pathetic that Larry Lessig continues to mislead the public and repeat the lie that "Verizon blocked text messages".

if our provider blocks text messages from the National Mice Rights Action League, all we need do is choose among the the dozen or so others who do not. for here in stockholm we have the choice of three ISPs that offer DSL, or the three ISPs that provide service over cable, or the three ISPs who provide 3G wireless access... or we can go to one of scores of WiFi hotspots.

what is pathetic is that this "debate" (are you people really still talking about this?) seems to miss the point that there is a pathetic lack of compettion in the United States for all communication services - not just broadband. competition and choice is the solution, not burdensome regulations that destroy competition by forcing ISPs to offer the same one-size-fits-all access.

we mice remain hard-pressed to see how imposing the burdens of "net neutrality" and/or unmetered access is going to encourage build-out and competition - because it isn't. it will only keep that poor person in Iowa tethered to his third-world communication link while the rest of the world marches furher ahead.

ekinoksforum: April 22, 2008 9:16 AM

Thanks! very good.

Giovanni: April 22, 2008 12:08 PM

Thanks for the info

Alice Marshall: April 22, 2008 6:12 PM

You did a great job at this morning's Seanate hearing. I think it is obvious the opponents of net neutrality are going to try to win by confusing the issue. Phrases such as "price flexibility" to describe access discrimination, and conflating the price difference between dial up, DSL, and broadband, with pricing for content access are going to be the order of the day.

I love Justine Batemen's phrase "corporate tax" to describe what ISP's want to charge content providers. For what it is worth, I Twittered much of the hearings http://twitter.com/PrestoVivace

M. David Peterson: April 23, 2008 12:07 AM

@George Ou,

You really are an arrogant prick. Regardless of whether or not I agree or disagree with your points, your ongoing comments such as,

"so that it goes over the heads of his mindless followers like the Raging Grannies."

... suggest you are of the obvious belief that you are far superior to any one and everyone who doesn't agree with your view point.

Do you honestly believe that people will respond to you with respect when you continually showcase the fact that you have none for them?

Seth Finkelstein: April 23, 2008 1:27 AM

I'd say to cut George Ou some slack, being that the Raging Grannies did indeed heckle him during his presentation, are unapologetic about it, and are obviously bandwagon-jumpers (tedious anti-strawman: All statements converting this to some form of "Huh, you think ALL PEOPLE WHO ..." are categorically denied - I claim THESE PEOPLE ARE, got it?).

It's extremely frustrating to do activism on your own, and to be confronted with political attackers who simply throw mud and hope something sticks. Look up this group if you doubt my characterization of them. They're not exactly advocates of rational informed debate.

M. David Peterson:

@Seth,

>> I'd say to cut George Ou some slack, being that the Raging Grannies did indeed heckle him during his presentation, are unapologetic about it...

It's tough to cut George any slack when he continues to cut-down the intelligence of everyone who disagrees with or contends directly against his viewpoint. It would be one thing if it was a single remark. Though still not justified, at least it could be seen as a one off rant, as opposed to a true representation of his character. Unfortunately, he has continued on throughout most of his follow-up posts to cut down the Grannies at every opportunity,

e.g. >> It's easy to miss for someone like yourself when you have your mind made up and your instructions to shout me down on first contact.

e.g. >> But it's obvious that Lessig's words right on the top of this page in this blog entry is beyond your comprehension.

e.g. >> I guess the grannies can't help themselves from being brainwashed on this matter,

My point is that it's difficult to take his comments seriously when he continually uses the "Well, I wouldn't expect you to understand because your simply not intelligent enough." card as his defense.

@George Ou,

If at all possible, please present your views in a format that doesn't use contention and/or slander and/or derogatory comments and/or statements pertaining to other peoples intelligence as the backbone of your argument. Something similar to,

"I believe that X is a [good|bad] thing because of Y+. Here is some additional information you can use to better understand my position."

... would be really helpful in better understanding your overall stance, something that is difficult to understand when it's clouded with trash talk about other peoples intelligence and/or intent.

>> It's extremely frustrating to do activism on your own, and to be confronted with political attackers who simply throw mud and hope something sticks.

Fair enough. I can certainly understand the frustration in this regard.

>> Look up this group if you doubt my characterization of them. They're not exactly advocates of rational informed debate.

/me is researching...

M. David Peterson:

>>>> Look up this group if you doubt my characterization of them. They're not exactly advocates of rational informed debate.

>> /me is researching...

I guess maybe I'm missing something, because the only thing I have come across is examples of women who -- while obviously passionate (that's not a bad thing!) -- believe in their cause and are willing to go out on a limb to bring notice to what they believe in. The questions that keep popping into my head with all of this is,

> Why are they so passionate about their cause?

> Why is George Ou continually patronizing them?

From the outside looking in, my immediate impression is not "You know, George has got a point." and instead "Wow, he really is an arrogant prick." Maybe my impressions are wrong, but that's the way things appear, which leads me to the same two questions from above.

Why?

Seth Finkelstein:

"Raging Grannies" doesn't have "a cause", except perhaps in a very general sense of that term. Do a e.g. Google News search for their name, and read their blog on Yahoo, and you'll see they show up on a bunch of hot topics, garnering media attention. The key thing to realize is that these people are not interested in the specifics of any issue. It is not that they lack the raw intelligence

to comprehend it - but, bluntly, they don't care and they aren't going to listen. The most charitable description of these types is "performers". There are some common less-charitable descriptions.

Now, if you're going to say that liberal/intellectual codes of conduct require someone to try to patiently reason with a PR flack, I would say you're mistaken. One thing an activist has to learn to be effective is when you're wasting your time and energy with a person who is just there to make political attacks. These kinds of people do exist, that's reality.

George Ou is annoyed at them because they hassled him and they're obviously "performers". That's the answer to the "Why?" (again, saying someone should be saintly in this situation is not really achievable by average people).

Seth Finkelstein:

FYI, for George Ou's presentation material, follow the links he has on his 4/19 blog post at:

http://www.lanarchitect.net/

(this should not be taken as an endorsement of all that's written in said blog post)

George Ou:

To Mr. Peterson,

I did present hard data, so why don't YOU stop referring to people as "pricks"? Despite your name calling, I'm going to refrain from doing it back to you.

I presented all the data here
http://www.formortals.com/Home/tabid/36/EntryID/3/Default.aspx
That has my presentation and my letter to the FCC.

You're so focused on me attacking the Grannies but I was just telling it as I saw it. Those old ladies attacked me as soon as I spoke my name on the panel and they attacked me personally outside after the event. I'd never met these ladies in my life and I had never said a single nasty word to them.

As for that audience, nearly half of them were literally bused in from "Poor Magazine" who came in there to knock anything corporate or seen as corporate.

As for the media, they failed to pick up on Larry Lessig's support for the need on "bandwidth commitments" AKA "volume caps" AKA "metered pricing" and they were fooled by Larry's subtle wording. The Grannies here are still insisting that Free Press and Larry Lessig are against metered pricing when they're saying they think metered pricing is a better alternative. It's 100% obvious they're not picking up on the subtle support for metered pricing and they're slamming me when I'm the one that's actually in support of their position which is against all forms of metered pricing. So it's quite obvious we're dealing with people playing with less than a full deck of cards in the intellect department.

As for Larry Lessig, he MISLEAD the public again repeating the lie that Verizon blocked text messages. That's a fact which you seem to be willing to ignore.

As for Jon Peha, Richard Bennett and I took him to task for knowing little or nothing about P2P or BitTorrent. The man's testimony was so filled with errors that he was plastered when Richard and I corrected him before and after the panel.

As for this event, let's stop pretending it was some sort of fair and civilized debate. You had one side getting 10 times the amount of time to speak and everyone that didn't agree with Lessig and Free Press were essentially outnumbered and weren't given nearly the same amount of time to speak.

George Ou
http://www.formortals.com

Stephen Fitch:

It seems free market capitalism is lost from the USA - there really is no choice - only Telco or Cable.

It would seem the USA has lost its way leading capitalist innovation.

A sad state of affairs.

Interested Bystander: April 23, 2008 2:06 PM

The fundamental problem with a non-neutral internet and metered service as well is the Atificial Monopolies created for communication services in the US. If anyone could provides their own infrastructure and in turn provide service to customers without being blocked by negotiated monopolies at the cit, state and even national level there would be competition.

Noone other then Comcast is allowed to lay cable and provide service in my community and nobody other then AT&T can run local copper. This together with the fact that they are no longer required to share their infrastructure at a reasonable rate allowed them to kill any and all broadband competition. The have become a duopoly that is every bit as flawed as the old Ma Bell was and like any public service monopoly need to either be very strictly regulated to ensure that the Public is best served or their monopolies need to be eliminated by allowing free and unfetered competition. In addition require that contracts all be month to month to prevent the bait and switch vendor lockin that is rampent in the industry and you will finally have a true free market for these services.

Once this occurs customers will be free to deal with issues such as content throtling/blocking and bandwidth limits/caps by voting with their feet/dollars by changing suppliers. This is what will drive infrastructure buildout and improvement by allowing those who do to offer a superior product and reap the benefits from doing so. At present there is no incentive for the entrenched monopolies to do much beyond setting up more and more barriers to switching providers.

Chuck McCown: April 23, 2008 4:01 PM

Only choice is telco or cable?
I beg to differ. There are thousands of companies delivering high speed internet (10 Mbps in my case) via high speed wireless. We do it at $29.95 per month. These companies are called WISPs. Don't think that telco and cable are the only choices, most of the nation is getting blanked with WISP activity.

DB: April 23, 2008 4:55 PM

There is currently a bill working its way through the California legislature (SB 1438) to implement the precise type of non-neutral electricity grid network management that you cautioned against in your presentation:

These "smart grid" technologies include:

"Development and incorporation of demand response, demand-side resources, and energy-efficiency resources."

"Deployment of smart technologies, including real time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices for metering, communications concerning grid operations and status, and distribution automation."

The bill's sponsors have not met the ridiculous burden of proof which you recommend, yet most people recognize that a neutral electricity grid is wasteful and inefficient. Why shouldn't we embrace new technologies to save energy and ensure better service and lower prices for all?

The bill passed committee with unanimous bipartisan support. Where do you stand?

X: April 24, 2008 12:56 AM

I agree with the views presented in the talk, they make economic sense both for businesses and consumers. However, I think "volume caps" are a dangerous business practice that can leave ISPs free to jack up the overlimit charges, advertising one lower rate in very large print, and then adding the higher overlimit rate in very fine print. Sure, it is a form of metered access, but is it good for consumers? I say no for this reason. I'm sure no consumer likes the sometimes outrageous overcharges that cell phone companies enforce for going over your minutes.

Another point against this type of metered access is the consumer's concept of their own consumption. With other commodities, we can accurately judge how much we will need, ie: "I think I'll only eat X # of apples this month". We can't accurately judge how much bandwidth we'll use over a given period of time, which I think will allow the "tigers" out there to feast on consumer's wallets, and take advantage of them. Why would this happen?

The main answer is: **Lack of Competition**. Without adequate competition in the market, companies will be free to jack up prices and encourage low volume caps and high overlimit charges, therefore resulting in a lack of abundance. Consumers will have no choice but take the only offer out there if they want access, which many of us do nowadays. How to fix this? The barriers to entry in the ISP market need to be broken down. One way this can be done is through new technologies. Cables and fiber are expensive to deploy, wireless is not. There have been some progressive initiatives in this area to acquire free wireless internet in some cities, but which are being stifled for strange issues being brought up such as their being used for pornography and other

things. That's a whole other can of worms though. I think that's a step in the right direction for the market.

In conclusion, if we are to allow metered access, a form of speed regulation in price tiers is the way to go. Consumers benefit from the choice of different speeds with no limit to how much data they push at that speed, companies benefit from more adequate allocation of network resources to those that want or need them. The question of network regulation due to congestion is *not* due to consumption over time, it's due to too many people consuming data all at the same time at the highest speed they can push through the pipes until they are clogged.

X:

Apologies for the double post, I got an Internal Server Error the first time, and it didn't seem to go through. You may remove the duplicity if you please (and perhaps this post).

Brian:

Thanks for sharing your thoughts on FFC it was a good read, I am loving the blog...finding plenty to read but theres not much work getting done here lol

- Britec - http://www.britec.org.uk
http://www.britec.co.uk

M. David Peterson:

@George Ou,

>> I did present hard data, so why don't YOU stop referring to people as "pricks"?

I wasn't calling you a prick because you didn't present hard data. I was calling you a prick because you were being one.

>> Despite your name calling, I'm going to refrain from doing it back to you.

Thanks! ;-)

No, in all seriousness, I appreciate the fact that you feel you were being attacked and felt the need to defend yourself. I honestly do. But from the outside looking in, when I read your comments I kept coming across bits and pieces in which you felt the need to question the Grannies intelligence, suggesting it was because they couldn't grok the subject matter and therefore had no clue what they were talking about. I disagree with that viewpoint. From what I've seen the Grannies had showcased the fact that they understood the material being debated quite well, so attempting to use the "You couldn't possibly understand because you're just not smart enough." card was completely out of line.

In this regard, it was hard to see the forest for the trees when it seemed your primary argument was one of patronizing rather than presenting the facts as you saw them.

>> You're so focused on me attacking the Grannies but I was just telling it as I saw it.

And I'm telling you how I saw it, my point being that it's a lot easier to understand your argument when that same argument doesn't make every attempt to patronize your critics. In my experience, those in whom feel the need to patronize their critics do so because they feel their primary argument in and of itself isn't strong enough to stand on it's own. So they cloud and confuse the issue with patronizing comments. Whether this is or is not the case with you it's tough to overcome that impression when it sits at the center of nearly every comment I have seen you make on the matter.

>> As for Larry Lessig, he MISLEAD the public again repeating the lie that Verizon blocked text messages. That's a fact which you seem to be willing to ignore.

I haven't ignored any "facts". I just haven't given any air time to the specifics of anyones argument for the same reason outlined above.

>> As for that audience, nearly half of them were literally bused in from "Poor Magazine" who came in there to knock anything corporate or seen as corporate.

Wow. You really insist on continuing down this path of class deviation, don't you. George, stop clouding the damn issue with random side-clutter that has no relation to the argument of Net Neutrality. Just because someone disagrees with your opinion on a subject matter doesn't mean they are stupid, incompetent, and/or poor and therefore "obviously biased by their hatred towards corporations and/or people who have more money than they do" which is exactly what you are attempting to do.

Quit the bullshit, George. Stop trying to cloud the issue and focus on the primary argument. Otherwise why should anyone pay

attention to what you have to say? 90% of it is just random fluff, with a primary focus on using personal attacks justified by playing the "victim" card.

George, you're not a victim so stop using this as the central focus of your argument.

>> As for this event, let's stop pretending it was some sort of fair and civilized debate. You had one side getting 10 times the amount of time to speak and everyone that didn't agree with Lessig and Free Press were essentially outnumbered and weren't given nearly the same amount of time to speak.

So your argument seems to be that regardless of the number of people at any given event who stand on one side or another of a given topic, each specific stance should be given equal airtime. In other words, if there are eleven people in a room and each of them are given equal airtime to speak their minds on a given subject matter, you feel that if ten are of one opinion and one of them another, then the overall debate was unfair because one stance got ten times more airtime than did the other.

Is this true?

M. David Peterson:
April 25, 2008 3:07 AM

@Seth,

>> (again, saying someone should be saintly in this situation is not really achievable by average people).

I'm not suggesting "saintly" as a requirement for anything. But I've read thousands of arguments in my lifetime that didn't including patronizing those in whom disagreed with their position. Professor Lessig, for example, provides a perfect example of how you can present your argument while at the same time being respectful to those in whom disagree with his opinion. What I am suggesting is that it's a lot easier to pay attention to someone's primary argument when it's not filled with patronizing acts of "self defense."

Seth Finkelstein:
April 25, 2008 4:19 AM

Lessig has at times gotten angry when he's felt himself under attack by what he views as unprincipled opponents. My point is that it's overall simply not helpful to finger-wag at someone who is upset from being heckled or smeared. It has the effect of rewarding the tactics of the attacker, by adding to the grief of the target.

At the core, the P2P-throttling is not an especially difficult issue to lay out - there is X capacity, Y users, some uses crowd out others, what to do, what's fair. There is an *enormous* amount of noise-making around that basic question, some of which is in very bad-faith (let's not have an Attack Of The Strawmen here, of "You think EVERY ...", when in fact "I think THIS ...").

Look, this exchange is repeating itself. George Ou is upset, and I'd say for a very understandable reason. You can keep saying that interferes with purely rational argument. I heard you. He heard you. That's obviously not sufficient to change anything in terms of "is" versus "ought". Now what?

bs:
April 25, 2008 8:31 AM

@ m. peterson:

Very constructive comments.

@ george ou

I was personally at the hearing, and you didn't get it half as bad as George Ford did. The problem is that you were at a public hearing. And we public can be unruly.

I heard many comments about the fact that industry representatives chose not to attend. Your side deserted you to the public by failing to stand up for themselves at this hearing. That is why it was so one-sided. I do not think you should have gotten extra time to speak simply because your fellows were so ashamed of themselves they couldn't bring themselves to show up. I showed up and I only got 90 seconds to speak because you guys ran over.

Personally, I'm trying to read all the coverage I can find to find out more about concrete solutions that have been proposed. And personally, I thought it was very telling to hear about how the networks have been allocated to favor television over internet. The ratio I heard was 98% to 2%. If this is correct, then I have to confess, this is not really the scarce resource it's made out to be. It's all bandwidth, right? Is there no way to address that in your view?

I mean, it seems like that's the tiering we're all describing already. The cable channels get a ton, and I get a pittance. Now the ISPs want to shave my pittance. That may be a rather simplistic view, but I don't yet understand that it's wrong from anyone. And

unfortunately, this was not adequately addressed at the hearing.

@ lessig
I really appreciate the additional content you're making available here for us. It's really wonderful to see professionals who are not only willing to argue on behalf of the public good, but also to then extend a hand to the public to help us understand these issues. Thanks for your efforts and patience.

C. Feryurself: April 26, 2008 7:32 AM

You can see the entire hearing here.

http://www.vontv.net/default.cfm?id=9667&clip=2&type=wmhigh

George identifies his position on the topic before the "heckler" calls out., "Who sent you, Comcast?" Later, someone on the FCC side says, "as someone in the audience asked" and questions panel members on whether they are representing someone other than themselves. He asks George specifically and he only says, "I drove myself here," not addressing the question about who he might be representing. Probably an oversight butthat probably did not play well with this audience.

Looked carefully and it does NOT look at all like "nearly half the people" in the audience are from Poor News as George states above.

I will say for George he had a tough act to follow, the lady from Christian Coalition was a surprise panelist who got a big cheer from the left-wing crowd. Abandoned by the ISP's who wouldn't show put a lot of onus on him as well.

Seth Finkelstein: April 26, 2008 9:05 AM

I listened to parts of it. This portion is at around time 2:03.

The moderator refers to "someone shouted out a question about this", talks about compensation "Is anyone receiving any compensation, has your travel here been paid for ..." [talks about consulting ... something hard to hear about someone (George?) not having to travel far].

Then: "So everyone is here on their own dime? ... George, you're here own your own dime?"

[Note he's addressing George Ou in specific because of the accusation.]

George Ou: "I drove here. With Richard Bennett."
(someone else jokes - "We're taking collections later.")

Moderator: "OK, I just wanted to get that out of the way."

It's clear in context that George Ou is not evading anything, and the moderator is satisfied with the response.

M. David Peterson: April 28, 2008 12:52 AM

@Seth,

>> I heard you. He heard you. That's obviously not sufficient to change anything in terms of "is" versus "ought". Now what?

We agree to disagree?

M. David Peterson:

April 28, 2008 12:55 AM

@bs,

>> @ m. peterson:

>> Very constructive comments.

Thanks! :D

George Ou:

April 30, 2008 6:54 AM

To Mr. Peterson,

"So your argument seems to be that regardless of the number of people at any given event who stand on one side or another of a given topic, each specific stance should be given equal airtime. In other words, if there are eleven people in a room and each of them are given equal airtime to speak their minds on a given subject matter, you feel that if ten are of one opinion and one of them another, then the overall debate was unfair because one stance got ten times more airtime than did the other."

No, it wasn't just a numerical advantage; it was a time given to individuals advantage. Not only were there mostly people who knew nothing about networking invited to speak, they got more time to speak. Lessig who hardly contributed anything substantive took 26 minutes to give a presentation while I had about 7 minutes with a minute of that interrupted. Lessig spent 8 minutes just answering 2 questions back-to-back from the Chairman while I was prevented from giving even a quick reply.

The fact is that much of the key testimony from Jon Peha and Robb Topolski was just wrong.
http://www.formortals.com/Home/tabid/36/EntryID/11/Default.aspx

And to Feryurself,
I dodged nothing and I satisfied the question from the Commissioner. I have never to this date taken a dime from any cable or telecom company for any political activity. Here is my full disclosure from my last employer CNET Networks
http://blogs.zdnet.com/Ou/?page_id=557 as of last month. As Technical Director and Editor at Large at ZDNet, full disclosure was mandatory for employment and I've been talking about Net Neutrality since middle of 2006 with no pay from anyone. On the other hand, all the folks from Free Press do get corporate money and they should have been the ones getting the questioning.

Quiz:

May 5, 2008 4:45 AM

I don't believe this will violate any neutrality policies whatsoever. We need this for better business.

Post a comment

Name:

Email Address:

URL:

By entering the words in the box, you are also helping to digitize texts that were written before the computer age. The words that you see were taken directly from old texts that are being scanned and stored by the Internet Archive. This CAPTCHA helps proofread the books. If the sample is too hard to read, click the recycle button to get another two. A space between each word is required. And thanks for the comment and help.

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Raging Grannies Serenade Net Neutrality Hearing

By Ryan Singel ✉   April 17, 2008 | 3:31:21 PM   Categories: Network Neutrality

STANFORD -- A posse of women calling themselves the Raging Grannies greeted attendees at Thursday's FCC hearing on net neutrality at Stanford Law School with a selection of internet freedom ditties, sung with gusto, if not skill.

For instance, the ladies sung one number called "We Need Internet Freedom" set to the tune of "God Bless America."

We need the internet. It must be free.

No more screening or blocking

We are here to instruct the FCC

Say to Comcast, to Verizon

and to AT and T

Hands off the internet it must be free

Hands off the internet it must be free

Independent Film & Television Alliance®

10850 Wilshire Boulevard / 9th Floor
Los Angeles, CA 90024-4321
310-446-1000 TEL / 310-446-1600 FAX
www.ifta-online.org / info@ifta-online.org

For Immediate Release
April 17, 2008

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IFTA Calls on FCC to Keep Internet Open
*Independents Voice Concern that Competitive Access
Will Be Thwarted By Broadband Providers*

PALO ALTO – In testimony presented today to the Federal Communications Commission, the Independent Film & Television Alliance (IFTA), the global trade association representing independent producers and distributors of motion pictures and television programs, urged "the FCC to establish rules to prevent network operators from blocking or discriminating against lawful use of the Internet."

Media consolidation has all but eliminated independent programming from network television and cable and imposed uneconomic conditions on independent film makers, said Jean Prewitt, IFTA's President and CEO. She testified, "The Internet offers a new route to reach consumers and a new creative medium that will change the very form that story-telling will take. The Commission has the chance now to set down policies that will keep the Internet open and competitively accessible to all users. Neither we, nor the consumers, can afford to have large gatekeepers lock up the Internet as they have locked up television and cable."

Prewitt's testimony warned of abuse by gatekeepers based on their claims of "network management." Prewitt told the FCC Commissioners, "While we acknowledge that there are some legitimate issues related to the technical management of networks, the imprecision of the term offers far too much opportunity for providers to discriminate against some users. We have already seen cases of unequal treatment, a prime example being the decision by Comcast to slow traffic to peer-to-peer sites. Blocking Internet applications and interfering with the public's ability to access information is discriminatory and must not be a consequence of acceptable network management practices.

(more…)

Said Prewitt, "We must not allow a small group of companies to engineer the Internet by reference only to their own financial interests. The interests of the public and other participants in the competitive marketplace must be addressed. There must be transparency, equal treatment and a method of redress when the providers' private decisions impair fair rights of others and the public interest."

For a copy of Ms. Prewitt's statement before the FCC, please visit http://ifta-online.org/Uploads/Issues/39.pdf.

The Independent Film & Television Alliance (IFTA) is the trade association for the independent film and television industry. IFTA is a nonprofit organization that represents more than 180 members from 22 countries, including independent production and distribution companies, sales agents, television companies, studio-affiliated companies and financial institutions engaged in film finance.

FCC hears calls for net neutrality from lawyers and executives

BY DAN STOBER AND ARIELLE LASKY

Net neutrality—the notion that everyone has a right to equal access to the Internet—should be a bedrock principle of life on the web, Lawrence Lessig, Stanford law professor and intellectual property expert, told the Federal Communications Commission on Thursday as the FCC commissioners took the stage at Dinkelspiel Auditorium for a daylong public hearing.

In fact, Lessig said, net neutrality should be to the Internet what the First Amendment is to the U.S. Constitution.

An audience of several hundred gathered to listen and participate in a lively dialogue before the five commissioners. Perhaps not surprisingly, given the Silicon Valley location, the crowd was overwhelmingly in tune with Lessig's views, expressing little sympathy for the big Internet service providers.

The hearing at Stanford was a followup to one held at Harvard in February. That event drew wide attention after Comcast, one of the nation's largest Internet providers, admitted that it hired people to fill seats, a move that prevented some members of the public from attending.

Comcast was under scrutiny for interrupting the net traffic of users of BitTorrent, a peer-to-peer file-sharing program that consumes large chunks of Internet bandwidth. Comcast first denied the tactics, then said they were intended only to reduce traffic on its networks. Critics charged that the company in essence attacked a method of movie and video distribution that competes with Comcast's own business plans.

L.A. Cicero

Lawrence Lessig, a Stanford law professor and proponent of net neutrality, spoke at the FCC hearing on broadband network management practices Thursday, April 17, in Dinkelspiel Auditorium.

L.A. Cicero

Barbara van Schewick, on screen, spoke at the FCC hearing on broadband network management practices.

Comcast was invited to appear at the Stanford hearing, along with the other big network operators, Time Warner, AT&T and Verizon, but all declined, according to FCC Chairman Kevin J. Martin.

Last year, Verizon Wireless stirred up the net neutrality issue by rejecting a request from NARAL Pro-Choice America, an abortion rights group, to make Verizon's mobile network available for a text-message program.

Lessig is the founder and co-director of Stanford Law School's Center for Internet and Society. He is also on the board of Free Press, an organization that filed a complaint with the FCC about the Comcast/BitTorrent episode.

At Thursday's hearing, he warned the FCC commissioners of the dangers of letting control of the web slip into the

hands of giant cable and phone companies, which together provide more than 90 percent of U.S. residential Internet connections. He quoted Adam Smith, the 18th-century champion of capitalism, who declared that any gathering of the producers of goods would end in a conspiracy against the public.

Lessig dismissed the suggestion that the big companies be left to regulate themselves. It is not a matter of trust, he argued, but of the basic nature of companies that exist to provide economic gain for their owners. "A tiger has a nature. That nature is not one you trust with your child," he said. Likewise, a company cannot be trusted to follow good public policy, he said.

Stanford alumnus Brett Glass—he received his master's degree in electrical engineering—brought a different perspective to the hearing. As the CEO of Lariat.net, a wireless Internet service provider in Laramie, Wyo., Glass argued that peer-to-peer traffic is more than a free-speech issue. The expense of providing low-cost bandwidth for pirated music and videos is potentially fatal to small Internet providers, he said. Even legal video sharing over peer-to-peer shifts the cost of distribution from the content provider (the BBC, for example) to the network operator, he said. A customer's computer may receive one copy of a video and then send out 100.

"And we have to pay the freight," Glass said in an interview after the hearing. Because of these costs, Lariat.net does not allow peer-to-peer file-sharing in its lower-tier contracts.

Barbara van Schewick, assistant professor of law and co-director of the Center for Internet and Society, also was invited to address the commission. Armed with a doctorate in computer science as well as her law degree, she laid out three main points. First, she said, "Allowing network providers to single out specific applications [such as BitTorrent] harms user choice and innovation." Second, even if there is disclosure that a network operator is interfering with data traffic, the market will not correct the problem by itself. Finally, she said, the FCC must "clarify that singling out specific applications is not reasonable network management."

Van Schewick told the story of a Stanford graduate student who developed a successful peer-to-peer video application. He presented the product to several firms, and though the product was highly innovative, each firm took a pass on the opportunity to fund it. "The fear that network providers would block it was one of the top issues" in those decisions, she said. The potential funders realized that "the more likely it was to succeed, the more likely it was to be blocked."

Van Schewick noted that the current flat-rate pricing structure for ISP consumers incentivizes companies to block high bandwidth rather than upgrade their network.

"This year it may be P2P, next year it may be YouTube, and next year it may be some exciting program" yet to be invented, she said.

"Any traffic-limiting tools should apply to all applications equally," she argued.

Jason Devitt, chief executive officer of SkyDeck, spoke of net neutrality and cell phones. His company helps users "take back control of their cell phones and cell phone bills." Holding up both his cell phone and laptop, he explained that the two computing devices are treated very differently: Even though both connect to the same broadband wireless network, he has much less control over his cell phone. He can't track what happens inside his phone, he said, because he can't install applications on it.

"If this were a Dickens novel, I would be the ghost of Internet's future," said Devitt, positing that the neutrality taken for granted on laptops and desktops will soon disappear. "Quit worrying about if the network is neutral, because soon you

won't be able to tell."

Harold Feld, senior vice president of the nonprofit Media Access Project, suggested that without net neutrality, activity on the Internet "will become innovation by permission, speech by permission."

According to Feld, Comcast's actions are not about controlling access to inappropriate material. A tester at the Media Access Project, attempting to download the King James Bible, failed 276 times in 300 attempts. Downloads of adult material, on the other hand, "did not fail once," according to Feld.

Gregory L. Rosston, deputy director of the Stanford Institute for Economic Policy Research, suggested that metered pricing, which charges consumers for the amount of bandwidth they consume (rather than a flat fee), could be a good solution. Though it might not be popular, Rosston argued that other consumption works that way: "I don't want metered pricing for my gas, but I have to pay for it—it's a scare resource."

He also challenged the idea that "you can only charge the end-user customer, not anyone else." One option would be to shift the expense for a specific transaction—"have different people pay for different things," much like an 800 phone number, he said.

Ben Scott, policy director at Free Press, framed the issues with two opposing visions for the Internet: open or closed. "Few choices in the history of the FCC carry as much weight as this one," he told the commissioners. "So—no pressure." The audience laughed.

Arielle Lasky is a science-writing intern at the Stanford News Service.

Comcast refuses invite

Major service providers absent from hearing

April 18, 2008
By Kamil Dada

A gang of women known as the Raging Grannies greeted attendees at Thursday's Federal Communications Committee (FCC) hearing on net neutrality held by Stanford Law School at Dinkelspiel Auditorium. The grannies sung "We Need Internet Freedom" set to the tune of "God Bless America" to members entering the auditorium.

The hearing came about because of BitTorrent, peer-to-peer software that allows its users to exchange content such as music and video. A peer-to-peer network is a decentralized network in which users are directly connected to other users' computers. These networks, such as BitTorrent allow file sharing, while others, such as Skype allow people to speak to each other over the Internet for free.

Comcast was recently caught restricting customer access to BitTorrent traffic but argued that it should have the ability to control its network under "reasonable network management" practices in order to avoid the network becoming congested and thus slowing down the Internet for all the company's users.

Comcast officials, however, as well as representatives from the other broadband giants, were not present at the hearing. FCC Chairman Kevin Martin said that Comcast and other broadband providers had been invited to testify but chose not to attend.

"I do wish there were some network operators here to answer questions," Commissioner Robert McDowell said. "I am very disappointed that they aren't here."

In a public statement on Thursday, Comcast said that it had appeared at the previous commission hearing at Harvard and felt no need to attend another hearing.

"[Comcast has] already appeared before the Commission on network management issues and has made extensive filings at the FCC both on our past and current practices as well as our recent announcements," said a Comcast spokeswoman in a statement released by the provider. "We felt issues specific to us were well covered at the first hearing and the focus of this event should be broader than any individual company's issues."

While Comcast declined the FCC invite, AT&T, Verizon and Time Warner Cable also turned down invitations. Free Press, an advocacy group that promotes diversity in media, has made allegations that Verizon has been caught blocking text messages and that AT&T reportedly wants to inspect and filter Web traffic.

Comcast worked to prove that it did not wish to restrict access to any particular application by striking a deal with BitTorrent last month. Under the deal, Comcast said it would attempt to change its network management practices on its network to analyze data in a "protocol agnostic" way. Comcast publicly admitted to "delaying" uploads to the BitTorrent protocol at peak congestion times, but under the new practice, Comcast would likely manage traffic according to how much bandwidth consumers use, rather than what sort of applications they're running.

BitTorrent Chief Technology Officer Eric Klinker said in a statement that the initiative was to develop "techniques that the Internet community will find to be more transparent."

But Robb Topolski, the software quality engineer who first discovered Comcast's blocking methods did not

see the benefits of the agreement with BitTorrent.

"The situation continues today," he said at the hearing. "It has not stopped, despite all the wonderful agreements between BitTorrent and Comcast. I'm a ham radio operator. And Comcast is jamming authorized communication [on the Internet]. I ask that before you {the FCC] leave today you signal your intent to stop these interferences."

Comcast's absence at Thursday's hearing was certainly felt. George Ou, an independent consultant and former network engineer, was notably alone in his support of Comcast's and other ISPs' abilities to throttle traffic. He argued that ISPs should have the right to defend themselves against the peer-to-peer networks which consume the majority of the traffic on the Internet.

"Video is causing a new collapse [of the Internet]. It requires a 100- to 1000-fold increase in capacity to deal with current crisis."

Ou referred to traffic figures from Japan — where there are larger bandwidths — which showed that 1 percent of Japan's Internet users comprised 47 percent of the data traffic. He pointed out that since 90 percent of the population was only left with 25 percent of the Internet capacity, network traffic management was vital to the Internet. He argued that without better restrictions, the Internet was highly unfair.

"It is a common misconception that more bandwidth solves all problems," he said.

FCC convenes at Stanford

Commissioners discuss net neutrality and restrictions by Internet service providers

April 18, 2008
By Kamil Dada

The Federal Communications Commission (FCC) convened a public hearing at Stanford on Thursday to examine whether broadband Internet service providers (ISPs) should be allowed to restrict access to certain Internet software applications.

Speaking at a public seven-hour hearing at Dinkelspiel Auditorium, FCC Chairman Kevin Martin said that the commission would decide whether certain ISPs are honest with their customers about how they manage their networks and if they deliver on the speeds that they advertise. Martin said the commission should scrutinize these two factors as it decides what constitutes "reasonable network management practices" by ISPs such as Comcast.

The hearing on the issue of "net neutrality," the notion that all Internet traffic should be unrestricted, comes after a similar hearing held at Harvard earlier this year at which Comcast reputedly paid seat-warmers to take up space and prevent members of the public from voicing their concerns.

"Application designers need to understand what will and what will not work on the network, and consumers must be fully informed about the exact nature of the service they are purchasing," Martin said. "Particularly as broadband providers are trying to provide tiers of service, it's critical to make sure that we are understanding that the broadband network operators are able to deliver the speeds and service that they are selling."

Democratic FCC Commissioners Jonathan Adelstein and Michael Copps called for the agency to utilize its power to prevent Comcast and other ISPs from unfairly discriminating against some software traffic, such as BitTorrent, a popular peer-to-peer file sharing program.

"Consumers have come to expect and will continue to demand the open and neutral character that has always been the hallmark of the Internet," Adelstein said to an audience of about 400 people. "The movement for Internet freedom is tapping the same American spirit that fueled the movement against media consolidation."

Copps cited the desperate need for greater competition in the broadband marketplace. He said that effective competition would provide incentives for ISPs to maintain neutral and open networks and added that the FCC's own statistics show that telephone and cable operators control over 90 percent of the residential market.

"[The] wonderful, open and dynamic Internet — perhaps the most liberating technology since the printing press, if not even greater than that — is, in fact, under threat," Copps said. "We will keep it open and free only by acting to make it happen. Its future is not on autopilot and, indeed, powerful interests would bring it under their control for their own purposes; which may not be your purposes."

On the other hand, Republican Commissioners Deborah Tate and Robert McDowell warned against additional and costly government regulations. They said that while the anti-competitive allegations should be taken seriously, network issues were better settled by engineers in the private marketplace rather than by the government.

"The point is that the Internet has flourished by operating under the principle that engineers should solve engineering problems, not politicians and bureaucrats," McDowell said.

Members of the panel testifying at the hearing generally favored barring companies from blocking subscriber

usage even in the name of controlling Internet traffic.

Stanford Law Professor Lawrence Lessig, founder of the Center for Internet and Society, said he was worried about the lack of competition among ISPs and that consumers do not get what they pay for, arguing that providers advertise certain connection speeds but then do not deliver upon those promises.

"We are facing these problems because of a failure of FCC policy," Lessig said. "The FCC failed to make it clear to the network owners that if they are building the Internet they need to build it neutrally."

Lessig compared the circumstances facing the Internet to a hypothetical situation of an electricity grid that restricted usage depending on whether the appliance plugged in was made by Sony or Toshiba. He noted that such an electrical grid would be possible to build but that one would need very strong arguments in order to convince the world to change. He argued that the Internet should be considered in the same manner.

Software quality engineer Robb Topolski, whose initial discovery of Comcast's methods of blocking access to BitTorrent ignited the net neutrality debate, also voiced opposition to restricting the Internet.

"It's the great firewall of China technique," Topolski said. "And it has not stopped. The behavior hasn't stopped."

Topolski explained that he also tested Cox Communication's network and found that they too were using the same technology that Comcast uses to block access to certain applications.

Comcast, with over 13 million broadband subscribers, has previously publicly denied restricting some applications and said it simply practices network management to deal with congestion — a statement Topolski refuted.

The entertainment industry was also represented at the hearing. Rick Carnes, president of the Songwriters Guild of America, noted his disappointed at how filtering technology was not more universally applied by ISPs to prevent users from exchanging pirated and copyrighted materials.

"Stealing music is not a victimless crime," Carnes said. "I have seen it destroy the lives of my friends and colleagues."

Jean Prewitt, president of the Independent Film and Television Alliance, called for non-discrimination policies so movies that were not associated with the seven major production studios could find an audience and innovate, citing the examples of independent films such as Juno and Lord of the Rings.

"We need to take proactive measures so that Internet does not become the closed bastion that television has become," Prewitt said.

Regulations enforcing net neutrality, however, were contested by some.

George Ford, chief economist at the Phoenix Center for Advanced Legal & Economic Public Policy Studies argued that there was no evidence that requiring network neutrality would encourage competition, increase bandwidth or reduce prices. He added that there are studies that indicate the inverse is true.

"The issue for me is not that we take Internet regulation too lightly but that we don't take it seriously enough," Ford said.

Michelle Combs, the vice president of the Christian Coalition of America, raised the issue that restricting access to a certain applications can also block legitimate material from being distributed. She pointed out that while the cable companies have a lot of pornography on their networks, the material that was not able to be downloaded on BitTorrent and sparked the entire controversy was a copy of the King James Bible.

"It offends me, and it ought to offend you," she said.

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FCC Hearings at Stanford: Towards a Consensus on ISP Transparency?

Posted by Peter Eckersley

Yesterday, the FCC held a second hearing in its investigation of Comcast's use of forged RST packets to interfere with BitTorrent and other P2P applications. Free Press has a page linking to written testimony, statements, and audio and video recordings from the Stanford hearing.

At the previous hearing at Harvard Law School, Comcast attracted criticism for filling the auditorium with paid attendees. This time around, the telcos declined to participate at all. They sent proxies in their place: a conservative think tank called the Phoenix Center, freelance tech pundit George Ou, and one ISP: Lariat.net of Wyoming. It's a pity that ISPs aren't willing to participate in public debate about their own practices.

EFF has argued that the FCC should use its position of leadership to clarify that ISPs should, at the very least, provide adequate disclosure of any discriminatory network management practices that they deploy (we are also trying to get similar information by promoting independent testing of ISP networks with our Test Your ISP project). This kind of transparency is essential for a properly functioning marketplace: the public must be able to know when their software doesn't work because it's buggy, and when it doesn't work because of interference by an ISP. Without this information, users don't know which tech support line to raise hell with, whether they need to switch to new software, or whether they need to switch to a new ISP.

Transparency and responsiveness is also essential for application developers to understand the way that their applications will have to fit into ISPs' networks.

We were very pleased to see that requirements for disclosure and transparency seemed to command a near-consensus amongst the Commissioners and those testifying. The devil will be in the details, of course: will disclosures be informative enough for programmers to work with and for consumers to make good decisions?

One prevailing point of confusion in the discussion was the relationship between the lack of information about network traffic in general (eg, how much of Internet traffic is P2P? What kind of P2P?), the lack of information about Comcast's discriminatory network management practices (what percentage of BitTorrent seeds has Comcast been reseting? How has that varied at different times, and in different locations across the country?), and the lack of information about discrimination by other ISPs (Cox Communications, for instance, discloses that it uses "traffic prioritization" and "protocol filtering", but we don't know if its techniques are precisely the same as Comcast's, or whether it is planning to phase them out). These are all separate known unknowns and we know the FCC should look in different places if it wants to resolve them.

Another interesting question raised by Commissioner Tate was how an FCC disclosure obligation or principle would fit together with new software tools to test ISPs. We think the answer is that both are required: disclosures by ISPs and independent tests by the public are complimentary; neither of them will tell us everything we'd like to know about the network, and each of them will act as a cross-check for the other.

In the mean time, the threat of intervention by the FCC has caused Comcast to eat a great deal of humble pie. They're promising to work with BitTorrent Inc — we hope they'll also work with the wider Internet community — to find less discriminatory ways to manage their network.

In closing, we doubt that RST forgery will be the last "network management" practice to spark consternation and controversy. But we hope that in future, it won't take the best part of a year of wrangling and an FCC proceeding before transparency and common sense start to prevail.

'Future of Internet' debated at FCC hearing

Free speech threatened by 'corporate gatekeepers,' some say

by Arden Pennell
Palo Alto Weekly Staff

The future of Internet use — and First Amendment rights to free speech, some said — was discussed at a roughly seven-hour hearing convened by the Federal Communications Commission with panels of experts at Stanford University Thursday.

At issue was whether, and how, the federal government should regulate companies that sell Internet access to help relieve growing Web congestion.

"Few choices in the history of the FCC carry as much weight as this one does. ... The future of the Internet for everyone depends on it," said Ben Scott, policy director at open-media advocacy nonprofit Free Press.

Speaking at a panel about consumer access, Scott urged the commission to enforce its current policy that Internet-service providers may not block users from certain information or services.

The commission's investigation of the issue was sparked by complaints last summer that Internet-service provider Comcast was preventing consumers from using BitTorrent, a file-sharing application, when the Web was busy in order to free up bandwidth.

It was the FCC's second such hearing.

For the first, at Harvard University on Feb. 25, Comcast hired people off the street to pack the audience and prevent the public from gaining entry.

Comcast and representatives of large Internet and cable companies declined to attend Thursday's hearing.

Yet two expert panels and at least 300 members of the public were present to debate the principle of "net neutrality," or that all Web traffic be treated equally, even though some use, such as video or music downloading, takes up more bandwidth.

Some called the question of net neutrality and federal regulation a First Amendment issue.

Free speech must not sit in the hands of "corporate gate keepers" who can block users from certain types of information, Nicole Ozer of the ACLU of Northern California said in the public-comment period. The future of the Internet as a "marketplace of ideas" depends on the commission enforcing equal-access rules, she said.

Others, including economists and the director of a smaller Internet-service provider in Wyoming, Lariat.net, which lacks Comcast's near-monopoly market dominance, called regulation a financial issue.

Brett Glass, Lariat.net's CEO, said companies like his don't have the bandwidth to handle large volumes of big, bulky downloads. Many file-sharing applications, such as BitTorrent or Skype, don't provide bandwidth but rather use fuel their service by drawing on bandwidth from consumers using their application. The consumer then passes on costs to the company providing his or her Internet access, he said.

"Peer-to-peer [applications] is not a free speech issue. It just shifts costs," he said, noting his company prohibits peer-to-peer applications in its user contract.

People using bandwidth-gobbling applications should pay more for the privilege — his firm charges more for more intense Web use, he said.

The one-size-fits-all version of Internet sales popular among larger providers such as Comcast, with which users pay a fixed rate regardless of use, could be jettisoned in favor of individualized packages, agreed moderator Barbara van Schewick, an assistant professor at Stanford Law School. The customized model of Internet use is popular in Europe, she said.

Metered pricing, or charging for Internet use like gasoline, was also discussed as a possible solution to Web congestion.

Questioned by Commissioner Robert McDowell, no speakers from the consumer-access panel — including economists, an engineer, free-speech advocates such as Scott and business owners such as Glass — disputed the premise that Internet users should pay more for faster-speed or higher-bandwidth service.

That was a marked change from the FCC's 2005 hearings on Internet use, McDowell said.

Two economists told the commission to increase competition among Internet-service providers to head off attempts to control how individuals use services.

"Everything you do should be aligned towards increasing competition," said Gregory Rosston, deputy director of the Stanford Institute for Economic Policy Research. He said the commission should help smaller companies enter the market by reducing subsidies to "incumbents" such as Comcast, a current practice he called "incredibly anti-competitive."

Yet George Ford of the Phoenix Center for Advanced Legal and Economic Public Policy Studies said regulation would decrease competition among companies.

He urged the panel not to regulate and called Comcast's earlier use-blocking a "market failure," rather than a moral failure, sparking boos from the audience.

"I'm a citizen, not a consumer!" one man yelled.

Drawbacks to leaving file-sharing programs completely unregulated were also discussed in a panel on networks and consumer expectations.

Rick Carnes, president of the Songwriters Guild of America, said musicians' livelihoods were threatened and sometimes destroyed by music piracy.

And some members of the public, commenting in an open forum after the expert testimony, disputed the notion of staggered prices for Web access.

The "pay-to-play" premise hurts community-news providers, which rely on the Internet for information, according to Erica Bridgeman of Berkeley-based radio station KPFA.

Those already struggling and largely disenfranchised, such as the poor and immigrant workers, would be further left behind if Internet access became a costly commodity rather than a right, according to Lisa Gray-Garcia, co-editor of POOR magazine.

In neutrality debate, carriers get blamed for Net's weaknesses

By Richard Bennett

Article Launched: 04/17/2008 01:35:28 AM PDT

The circus is coming to Stanford University. The network neutrality circus, that is, which makes cable companies the whipping boys for underlying flaws in the design of the Internet.

The Federal Communications Commission is investigating petitions from consumer groups and a local start-up, Vuze, against Comcast. The cable broadband giant is accused of disrupting video traffic uploaded by users of the BitTorrent peer-to-peer network. But Comcast says its network management practices are legitimate, needed to ensure that other broadband subscribers aren't starved by bandwidth hogs.

The commission already held one public hearing in February on network management practices at Harvard University, and is holding the follow-up today at Stanford.

Little light came from the Harvard hearing, where FCC Chairman Kevin Martin badgered Comcast's solitary witness with loaded questions and failed to display any insight into broadband carriers' management challenges.

What's more, Martin and the broadband critics have failed to acknowledge an underlying truth about the Internet: It was originally designed for the polite society of network engineering professors and students, not our rough-and-tumble world of large-scale copyright theft and video file-sharing. And it has design defects - bugs - that make it vulnerable to overload and abuse.

Peer-to-peer applications are designed to consume a disproportionate share of network bandwidth, so carriers have to limit their traffic to provide good service to most of their other users. Japan, with the fastest residential broadband in the world, applies similar practices, having learned that adding capacity isn't enough. Peer-to-peer consumes the largest share of the pipe, no matter how big the pipe is.

The Internet has long had growing pains. Researchers encountered "Internet meltdown" in the mid-1980s, and the World Wide Web became a "World Wide Wait" in the late 1990s. The solution to these problems was re-engineering both applications and network protocols, but that's a dicey proposition now that more than 1.3 billion people use the Internet.

Broadband carriers struggle to balance cost, performance and fairness, all the while hectored by well-meaning activists oblivious to the Internet's real technical underpinnings.

The public is unlikely to benefit from the FCC's protracted hearing process unless there's a change of emphasis. Comcast has already announced upgrades to its network that will make it more application-agnostic, so the basis of the complaints is already moot.

The commission should use the Stanford hearing to explore how the Internet is unique among networks and to improve disclosure so consumers can better evaluate competing Internet services. Consumers should understand that unlike the telephone system, residential Internet is a variable-delay system, with advertised caps on download and upload speeds that are often confused with guaranteed minimums.

Consumers need to know what averages rates they can expect at different times of the day, and to have additional tools to control their own traffic.

What the FCC shouldn't do is impose new network management rules on broadband providers. Industry, in collaboration with responsible consumer groups, is already working on disclosure and management standards. That work should be allowed to continue.

RICHARD BENNETT is a Bay Area network architect who designed the twisted-pair cabling system for Ethernet and key portions of Wi-Fi. He was an expert witness at the FCC's Harvard hearing. He wrote this article for the Mercury News.

FCC hears 'net neutrality' arguments

At Stanford, tales of blocked access

By Troy Wolverton
Mercury News

Article Launched: 04/18/2008 01:31:03 AM PDT

The Federal Communications Commission was at Stanford on Thursday to talk about the hot-button issue that falls under the broad, prosaic name of "network management."

The discussion centered around the questions of whether and how Internet service providers can block or slow access to specific Web sites or online services, most notably file-sharing protocols such as BitTorrent.

Many of the experts who testified at the hearing and members of the public who attended warned that by managing traffic in that way, service providers risked thwarting innovation and stifling free speech. Many urged the commission to enforce "network neutrality," the idea that service providers should treat each bit of data the same way.

"This is a clear moment for the commission to act," said Ben Scott, policy director of Free Press, an advocacy group that promotes diversity in media. "The future of the Internet depends on it," he added. The audience loudly cheered.

Not everyone, of course, was urging the commission to take action. Although the major service providers were notably absent from the hearing, despite being invited, some panelists took up their defense and argued that they had legitimate reasons for blocking particular services. The

minority of Internet users who swap files on peer-to-peer networks gobble up the majority of the available bandwidth, noted George Ou, an independent consultant and former network engineer.

And others warned about the dangers of regulation.

There's no evidence that requiring network neutrality will increase bandwidth, reduce prices or encourage competition, said George Ford, chief economist at the Phoenix Center for Advanced Legal & Economic Public Policy Studies. But there are studies that indicate the inverse is true, he said.

"The issue for me is not that we take Internet regulation too lightly, but that we don't take it seriously enough," Ford said.

The hearing, the first held by the entire commission in the Bay Area, came in the wake of reports that Comcast and other Internet service providers were blocking access to peer-to-peer file-sharing services and some Web sites, allegedly in part to limit congestion on their networks. The FCC is investigating complaints that Comcast didn't tell customers what it was doing and that it was violating the net neutrality principles the commission had previously laid out.

In recent weeks, Comcast has sought to address some of the concerns by publicly vowing to cease limiting customers' access to file-sharing services and to work together with BitTorrent and other companies to find an amicable solution. BitTorrent is a company that uses peer-to-peer technology to distribute media files.

But many at the meeting pressed the commission to take action against Comcast anyway, perhaps in the form of a fine.

"These side deals are not the magic of the market at work," Scott said. "They are the magic of a regulatory threat at work."

Public must fight to maintain net neutrality

Lawrence Lessig,Ben Scott
Thursday, April 17, 2008

The Internet is an engine of economic growth and
innovation because of a simple principle: net neutrality,
which assures innovators that their next great idea will be
available to consumers, regardless of what the network
owners think about it.

No previous mass media technology has been so
remarkably open. Traditional media - newspapers, radio,
TV - have gatekeepers standing between consumers and producers, with the power to control content. The
Internet eliminates the gatekeeper.

Now, however, the Internet's unprecedented openness is in jeopardy.

Comcast, AT&T and Verizon have been lobbying to kill net neutrality. They say they won't build an
information superhighway if they can't build it as a closed system. No other industrialized country has made
that devil's bargain, and neither should we. Without net neutrality, online innovation is vulnerable to the
whims of cable and phone companies, which control 99 percent of the household market for high-speed
Internet access. And Silicon Valley venture capitalists are unlikely to bet the farm on a whim.

Network owners say the threat of abuse is hypothetical. But actions speak louder than words. Last fall,
Comcast was caught secretly blocking popular technologies that can bring HDTV to your laptop - used by
everyone from the Hollywood studios to NASA. It was no coincidence: Comcast is targeting a growing
competitor to its cable TV service.

In response, the media reform group Free Press and a coalition of public interest organizations and legal
scholars filed a complaint with the Federal Communications Commission calling for urgent action. This is a
bellwether case - a signal of whether we're headed toward an open or a closed Internet.

After the FCC started an investigation, Comcast admitted to blocking, but thumbed its noses at the
government and the public - going so far as to hire seat-fillers at an FCC hearing at Harvard University to
stifle the debate.

Public, government and media scrutiny ultimately forced Comcast to stop blocking one of the file-sharing
companies. But we can't expect everyone to negotiate a side deal for permission to innovate. This limits the
online marketplace to ideas and commerce that don't pose a threat to network owners - a chilling prospect.

This type of behavior shows why we can't trust the future of the Internet to these companies. Just two years
ago, telecom executives went before Congress vowing never to interfere with the open Internet. Their broken
promises are exactly why we need net neutrality laws back on the books. Fortunately, members of Congress
from both parties have introduced legislation that would do precisely that.

But net neutrality is just the first step. If this nation is to return to the economic growth of the 1990s, it takes
a renewed commitment to Internet deployment and technology. The past eight years have seen America fall

behind other industrial nations - a deficit that we will pay for in jobs, wealth and social opportunity.

Better policies in other countries have created a competitive high-speed broadband market. But these policies require political leadership - and public pressure to ensure that politicians aren't distracted by the telecom industry's cash and clout.

Today, the FCC is holding a hearing at Stanford University - the birthplace of our Internet economy - to give the public a chance to weigh in on this debate. It's not often that federal regulators leave the Beltway to ask people what they think. It's time to stand up and make your voice heard.

The threat posed by would-be gatekeepers is real and getting worse. The success of future innovation depends on an open Internet for everyone.

*Lawrence Lessig is a law professor at Stanford University and founder of the Center for Internet and Society. Ben Scott is policy director of Free Press, the national, nonpartisan media reform organization (*www.freepress.net*). The FCC hearing will be held at Stanford University's Dinkelspiel Auditorium today from noon to 7 p.m.*

FCC hears net neutrality arguments at Stanford

Ryan Kim, Chronicle Staff Writer
Friday, April 18, 2008

The Federal Communications Commission ignited a fierce debate on net neutrality in the heart of Silicon Valley Thursday when it convened a rare public hearing on network management practices at Stanford University.

The meeting sprang from an investigation the FCC launched this year into Comcast Corp., which has been accused of turning back heavy peer-to-peer traffic on specific applications.

But the gathering of about 300 people uncorked a larger debate about the need to keep the Internet unfettered. The issue has come to a head because of an explosion of Internet traffic, primarily video content, that network operators say clogs their systems.

The focus has fallen on peer-to-peer providers, which allow users to exchange large files, at times slowing service for other users. Advocates for network management tools said the problem defies simply increasing bandwidth, which would quickly be swallowed up.

Even in Japan, which boasts speeds 10 times faster than those in the United States, 10 percent of users - mostly peer-to-peer users - account for 75 percent of the traffic, said panelist George Ou, a network consultant who favors what is called traffic throttling.

"This would be like 10 passengers going onto a 100-seat plane and sitting down across 75 seats," he said.

Representatives from Comcast, AT&T, Verizon and other Internet service providers declined to attend the hearing.

Network neutrality advocates pushed the commission to adopt specific regulations prohibiting the discrimination of traffic. Led by Stanford law Professor Lawrence Lessig, who introduced the first panel of speakers, open-Internet backers said the Web must remain free to ensure consumer choice and technological innovation, which could be hampered by allowing operators to pursue arbitrary traffic-shaping rules.

"We need to be conservative in this debate and preserve what has worked in driving this economy," Lessig said. "And what has worked is a neutral network."

The commission, which took testimony from two panels of speakers, appeared split on the issue. Democrats Michael Copps and Jonathan Adelstein advocated a firm policy that describes which traffic shaping practices are unacceptable to the FCC.

"It's essential we maintain an open network," Adelstein said. "It's not only helpful for the economy but also for consumers, who have access to a wide array of services."

But Republican Commissioners Deborah Taylor Tate and Robert McDowell sounded a cautious note about

relying too much on regulation, which they said may do more harm than good. Both seemed hopeful that the private sector could resolve the problem without regulation, as Comcast is trying to do by recently signing agreements with peer-to-peer providers BitTorrent and Pando.

"The Internet has flourished under the principle that engineers should solve engineer problems and not politicians and bureaucrats," McDowell said.

Commission President Kevin J. Martin, the likely swing vote, appeared to take a middle ground in the debate. He said there should be no arbitrary blocking of traffic and reiterated that the commission has the ability to enforce existing Internet policy rules against the network providers. But he also said reasonable network management must include full disclosure for consumers, suggesting that traffic throttling mechanisms might be acceptable as long as they are advertised.

Stanford law Professor Barbara van Schewick warned against giving network providers too much leeway.

"It's impossible to predict what applications the network provider will block," van Schewick said. "This year it may be P2P, the next year it may be YouTube."

It's unclear when or if the commission will formally consider any rule changes or consider fining Comcast for its practices.

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http://sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/04/18/BUM3107KI0.DTL

This article appeared on page **D - 1** of the San Francisco Chronicle

Christian Coalition Backs Net Neutrality at FCC Hearing

Sun, Apr. 20, 2008 Posted: 12:01:34 PM EST

Organizations that don't have "deep pockets" should have the same access to the internet "without snooping or blocking or slowing down" by internet providers, the vice president of a conservative Christian advocacy group said Thursday at a meeting on network management.

Michele Combs of Christian Coalition of America received some of the loudest applause at the Stanford Law School gathering for airing her supportive views of net neutrality – the principle that all Internet traffic should be treated equally without regard to the source or subject matter, according to Tech Policy Central.

It was the second hearing on network management held by the Federal Communications Commission. In February, the agency held a similar hearing in Cambridge, Mass., to investigate allegations that cable provider Comcast, and other ISPs, were slowing or throttling file-sharing traffic over its network.

Large service providers – Comcast, AT&T, Verizon and Time Warner – were invited to Thursday's hearing but all were no-shows.

That left the floor open to mainly to advocacy groups that spoke against closed networks and in favor of stronger net neutrality rules, which would prevent internet service providers from filtering Web content in a way they claim manages congested traffic.

In response to arguments espoused by cable companies that net neutrality regulations would prevent them from filtering illegal content like child pornography, Combs said she finds such claims "disingenuous."

"Let's remember: it was the King James Bible that Comcast blocked that caused the current controversy," said Combs, according to Tech Policy Central.

She had also accused cable companies like Comcast for using the same technology that the Chinese government to suppress Christians in China using the Internet and potentially using it to block online programs from her organization in favor of another Christian-oriented channel, International Data Group News reported.

Michael Copps was one of two FCC commissioners who strongly supported net neutrality.

"The dynamic Internet, perhaps the most expansive and liberating technology since the printing press, is, in fact, under threat," he said, according to IDG News. "We will keep it open, we will keep it free, only if we act forcefully to make that happen."

FCC chairman Kevin Martin said its current net policies are sufficient but only needed to be enforced, reported Information Week.

And Stanford Law professor Larry Lessig said regulation of the platform would hurt investment in technological innovations and consumer choice, according to The San Francisco Chronicle.

Among the minority who opposed net neutrality at the meeting was songwriter Rick Carnes, president of the Songwriters Guild of America, who said piracy that resulted from the lack of regulation have dealt a huge blow to the music industry, according to IDG News.

Comcast last month agreed to work together with BitTorrent, a company that uses peer-to-peer technology to distribute media files, to address concerns over its network practices. The FCC is still in the process of investigating Comcast network management practices.

Lawrence Jones
Christian Post Reporter

April 17: Carnegie Mellon's Jon Peha To Testify at FCC Hearing About Broadband Network Practices

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Carnegie Mellon's Jon Peha To Testify at FCC Hearing About Broadband Network Practices

PITTSBURGH—Carnegie Mellon University's Jon Peha will recommend that Comcast be investigated for its broadband network advertising practices during a Federal Communications Commission (FCC) hearing today, April 17.

This is the second in a series of public hearings hosted by the FCC to hear testimony from experts on broadband network management practices, according to the FCC.

"In this hearing, I will recommend that Comcast be investigated for false advertising because they blocked peer-to-peer traffic on their network, and may have deliberately misinformed their customers about the practice," said Peha, a professor in the Department of Engineering and Public Policy and an associate director of the Center for Wireless and Broadband Networking at Carnegie Mellon.

At the same hearing at Stanford University in Palo Alto, Calif., chaired by FCC Chairman Kevin J. Martin, Peha also will urge the FCC to continue careful oversight on issues of network neutrality. "I will argue for oversight but I want the FCC to remain cautious about adopting broad restrictions," Peha said.

The FCC is reviewing Comcast's practices of slowing down or blocking the delivery of some Internet content over its cable network. The company says it is engaging in routine network management, but critics have accused the communications giant of trying to hobble potential rivals in the competitive and lucrative video-on-demand business.

The FCC has guidelines saying that networks should not discriminate in the provision of broadband service or applications.

"These hearings give us a chance to weigh in on important public policy issues that will shape the future of the Internet," Peha said.

Other FCC commission members attending the hearings include Michael J. Copps, Jonathan S. Adelstein, Robert M. McDowell and Deborah Taylor Tate.

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IFTA chief to call for Net oversight

By Brooks Boliek

April 14, 2008

WASHINGTON -- The major studios may have staked their flag on network neutrality at ShoWest in Las Vegas last month, but independent filmmakers plan to take their side of the argument to the FCC in Palo Alto, Calif., this week.

Independent Film and Television Alliance chief Jean Prewitt is scheduled to be the "content industry" witness at the commission's Thursday field hearing on the issue at Stanford University.

The FCC has scheduled a panel discussion on the issue before opening the hearing to the public for comments. While the commission had not released a witness list by late Monday, sources said Prewitt was tapped as the content community's representative.

The content community is split over the network neutrality issue, with the major studios condemning government intrusion into network management issues.

MPAA president and CEO Dan Glickman used his state-of-the-industry speech at ShoWest to underscore the major studios' opposition to government intervention, saying that it would undermine studio efforts to fight piracy and reach consumers.

"Government regulation of the Internet would impede our ability to respond to consumers in innovative ways," Glickman said. "And it would impair the ability of broadband providers to address the serious and rampant piracy problems occurring over the networks today."

Prewitt, however, has a different view.

She fears that indies will get shut out if the government doesn't take action preventing the network companies from blocking content or favoring their own programming or programming in which they have a interest.

Following Glickman's speech, she sent a letter to him explaining their differences.

"The issue is not whether government should regulate the Internet, but whether there will be effective oversight to prevent a handful of corporate giants from imposing their own versions of private regulation to the public's detriment," she wrote.

The FCC has two petitions before it asking the commission to take action on the issue.

April 17, 2008, 9:06 pm

Comcast Absent, Anything But Forgotten

Amy Schatz *reports from Stanford University at the FCC's hearing on net neutrality.*

Comcast Corp's decision to skip the **Federal Communication Commission**'s second hearing on net neutrality, or Internet network management practices, did not go unnoticed.

"I'm very disappointed they're not here," FCC commissioner **Robert McDowell** said, during questioning at the day-long hearing, which drew anywhere from 300-500 people throughout the course of the day.

FCC Chairman **Kevin Martin** started the event noting that he'd invited Comcast and other Internet providers, including **Verizon Communications** and **AT&T** to testify. They all declined.

Mr. Martin said his staff extended the invitation to Comcast again earlier this week, after Comcast announced it would work with a peer-to-peer software company called **Pando Networks** to develop a "bill of rights" for network owners and consumers.

In a statement, Comcast said it felt the "issues specific to use were well covered at the first hearing." People close to the situation said the Comcast executive invited to speak, Chief Technology Officer **Tony Werner**, couldn't attend because of a death in the family.

The one network owner who did show up was **Brett Glass**, owner of small internet provider in Laramie, Wyoming, who provides broadband Internet services to about 700 business and home customers.

Mr. Glass routinely debates net neutrality activists in online forums, taking the side of Internet providers who are using various methods to manage network traffic. Earlier this week, Mr. Glass says he was on a customer's roof when he received a call from one of Mr. Martin's aides, inviting him to testify. With a little more than a day's notice, Mr. Glass hastily made arrangements to be at the Thursday afternoon hearing.

A majority of the panelists, consequently, focused on the importance of the FCC getting involved to prevent Comcast and other Internet providers from blocking, slowing or otherwise messing with Internet traffic for their own benefit.

Last year, the FCC received complaints that Comcast was blocking Internet traffic using peer-to-peer software like BitTorrent. Comcast initially denied it was blocking traffic but later admitted it had slowed some traffic to prevent what it considers bandwidth hogs from over-taxing its network.

"The most outrageous part of this story is that you can't get the facts straight. The company is constantly misrepresenting to you what's going on," Stanford Law professor Larry Lessig told FCC commissioners during the hearing, urging them to investigate what actually happened in the Comcast case.

"I don't know if we know if they're engaging in fraud," he said, adding, "It just might be confusion going on here."

Comcast's absence from the hearing at least left many open chairs open in the Stanford Law School auditorium, which was mostly half full throughout the day. In a similar hearing at Harvard Law School in February, Comcast paid people to sit through the hearing, drawing loud scorn from bloggers and Internet activists.

Trackback URL: http://blogs.wsj.com/washwire/2008/04/17/comcast-absent-anything-but-forgotten/?mod=WSJBlog/trackback/

Net Neutrality Hearing Hits Silicon Valley

By Cecilia Kang, Washington Post Staff Writer - Friday, April 18, 2008

Silicon Valley high-tech entrepreneurs told the Federal Communications Commission yesterday that there needed to be more oversight of phone and cable companies at the agency's second off-site hearing on broadband Internet rules.

The agency heard from legal scholars, Web start-ups, the Christian Coalition and the Songwriters Guild of America, and debated the impact of Web regulation on high-tech innovation and investments, copyright protections and freedom of speech.

At issue is whether the Internet needs rules that mandate it remain open and unfettered by network operators. On one hand, allowing network controls could prevent the sharing of copyright material online. On the other, proponents of openness rules say allowing phone and cable companies to restrict content could unfairly limit consumers.

"The Internet connects people all over the world in a manner and scope of ease that is impossible if it were not online," said Michelle Combs, vice president of the Christian Coalition, a proponent of rules that would force Internet providers to keep their networks open to content. "Organizations like the Christian Coalition should use the Internet to communicate with our members and worldwide audience without snooping or blocking or slowing down," she said at the hearing at Stanford Law School.

The agency's first hearing in Cambridge, Mass., in February was inspired by complaints that cable provider Comcast had delayed file-sharing traffic over its network. That practice, acknowledged by Comcast, prompted public-advocacy groups to push for new rules to prevent Internet providers from discriminating against some forms of content.

However, none of the largest service providers -- Comcast, AT&T, Verizon and Time Warner -- attended the hearing yesterday, despite requests by the FCC to participate, according to FCC Chairman Kevin J. Martin.

Comcast said in a statement: "We felt issues specific to us were well covered at the first hearing and the focus of this event should be broader than any individual company's issues."

Martin urged the FCC to evaluate the issue in the narrower context of Comcast's case. But yesterday's panelists took a broader view of net neutrality rules and how, if enacted, such policies could affect consumers.

"The FCC is trying to figure out what are the broader implications of this issue, a lot of which doesn't even fall under the jurisdiction of the agency," said Carol Mattey, a former FCC official who is a managing director at Deloitte & Touche.

Venture capitalists "are investing money in the future," said Larry Lessig, a professor of law at Stanford University and one of the original advocates for net neutrality. "If they believe the platform will be controlled tomorrow, there will be less investment today."

The two Democratic commissioners, Michael J. Copps and Jonathan S. Adelstein, indicated they were sympathetic to Lessig's concerns. Adelstein said he met with venture capitalists who stressed the need for clearer rules that could be enforced on network operators, and Copps said he would support such regulations.

Comcast last month agreed to work with BitTorrent, the file-sharing application provider that it had been targeting with its network management practices. Comcast also said earlier this week that it would work to establish a "Bill of Rights and Responsibilities" for network operators and consumers who use such technology.

But advocacy groups including Public Knowledge say that the industry proposing its own solutions won't go far enough to protect consumer interests.

"The Comcast case is a bellwether that will guide our communications system for a generation," said Ben Scott, the head of policy for public interest group Free Press, in the hearing. "That is why it has been the focus of so much money, influence and attention."

FCC wrangles over 'Net neutrality' issue

Industry's largest companies decline invitation to testify at hearing

By Paul Elias
The Associated Press
updated 3:46 p.m. PT, Thurs., April. 17, 2008

PALO ALTO, Calif. - A divided Federal Communications Commission on Thursday grappled further with the thorny issue of how to relieve increasing online congestion, disagreeing sharply over whether government regulations are needed.

The five-member commission met at Stanford University during a planned seven-hour meeting delving into "Net neutrality," the principle that all Internet traffic be treated equal.

It was the second such hearing the FCC has held this year, its interest on the subject piqued by formal complaints that Comcast Corp. is blocking certain of its customers who upload videos, music and other large data files from using its network during peak traffic times.

FCC commissioners Michael Copps and Jonathan Adelstein called for the agency to strengthen its power to prevent Comcast and its competitors from unfairly discriminating against some customers. But two others, Deborah Tate and Robert McDowell, warned against burdening the industry with additional, costly regulations.

FCC Chairman Kevin Martin argued that the FCC's current Internet policy is sufficient, appearing to side with the anti-regulation camp. But he said the FCC's policy needs to be enforced to guarantee that whatever actions Internet service providers are taking "is tailored to a legitimate purpose."

Martin is seen as a swing vote on the commission for his insistence that the FCC's Internet policy, which guarantees that consumers can access all the lawful content they desire, is enforceable. Comcast officials and other service providers argue that the FCC's Internet policy is merely advisable and not a regulation.

Martin also broke with the anti-regulation commissioners by agreeing that Comcast and other companies should be permitted to manage their networks to ensure traffic flows smoothly, but that customers should be given notice.

"There must be adequate disclosures of the particular traffic management tools," Martin said. "Consumers must be fully informed of the exact nature of the service they are purchasing."

McDowell argued, however, that requiring such disclosures could expose companies to exposing trade secrets.

Copps called for strengthening the FCC's Internet policy to include an anti-discriminatory rule.

"These are evolving technologies, and sometimes the line between reasonable network management and outright discrimination can be less than crystal clear," Copps said.

"Now is the time for the FCC to add an enforceable principle of nondiscrimination to our Internet policy statement," Copps told an audience of about 400.

The FCC is formally investigating whether Comcast should be fined for blocking some subscribers from uploading files.

Comcast has acknowledged that it sometimes delays file-sharing traffic for subscribers as a way to keep Web traffic flowing for everyone. After the FCC's initial hearing on the issue in February, the company said it plans to change the way it manages its network and points to recent partnership announcements with BitTorrent Inc. — a company founded by the inventor of a more efficient successor to file-sharing services such as Napster and KaZaa — and with file-sharing software developer Pando Networks.

Comcast officials, as well as executives with the company's largest competitors, declined the FCC's invitation to testify at the hearing Thursday.

URL: http://www.msnbc.msn.com/id/24189840/

News

Net Neutrality

FCC Addresses Network Management
In Public Hearing at Stanford Law School

The five members of the Federal Communications Commission April 17 were scheduled to hear from policy advocates, network engineers, and the public at a seven-hour hearing on network management practices at Stanford University in Palo Alto, Calif.

The hearing, which began at noon Pacific Standard Time, was continuing late April 17.

FCC Chairman Kevin Martin opened the hearing by saying that during his tenure as chairman, he had tried to reach beyond Washington to discuss issues that affect the public. He also stressed that several carriers, including Comcast, Time Warner, and AT&T, had been invited to participate, but that they had declined.

Also declining an invitation was Pando Networks, which the week of April 14 announced its intent to establish a peer-to-peer (P2P) file-sharing "bill of rights" with cable operator Comcast. At the time, the commission expressed interest in hearing more about this proposal.

Martin also read a statement from Rep. Anna Eshoo (D-Calif.), in whose congressional district the hearing was being held. Eshoo said the openness of the Internet has been its hallmark since it was created.

Advantage of 'Chokepoint.'

Even with all the rapid change in the development of the Internet, one thing has not changed, which is that most Americans have little choice of network provider. Eshoo said 98 percent of Americans have only their Bell or cable company as choices for broadband access.

"The failure of competition for high-speed broadband access permits broadband operators to take advantage of this chokepoint and dictate what content will be available to whom, and at what speeds," Eshoo said in her statement.

Congress granted the FCC expansive authority, which it has used sparingly to promote openness, Eshoo said. The commission should more closely examine network management practices, she said.

There are reasonable needs relative to managing the network to address congestion caused by insufficient bandwidth, Eshoo said. But this should not result in the outright blocking of content or applications that do not harm the network, she said.

Rep. Edward Markey (D-Mass.), the chairman of the House Energy and Commerce Subcommittee on Telecommunications and the Internet, also issued a statement directed at the FCC's hearing. Markey has introduced a bill (H.R. 5353) that addresses net neutrality.

"I am pleased that the FCC is continuing its oversight and serious inquiry into Internet freedom issues. Every Internet user, from entrepreneurs, to inventors, to students and consumers, from the high tech corridor of Massachusetts' Route 128, to Silicon Valley, will be impacted by this examination and the wider debate over Internet freedoms and the future of the Internet. I look forward to working with the commission and my colleagues in Congress on these issues in the

months ahead," he said.

Copps: Change Is Possible

FCC Commissioner Michael Copps, a Democrat, said he hoped additional hearings would be held around the country given the importance of this issue.

Innovators, inventors, and entrepreneurs got their start in Silicon Valley, but they should not be considered a "luxury" but an urgent necessity for the economy and the nation's competitive position in the world, Copps said. However, the open Internet is in fact under threat. It can be kept open and free only if people act forcefully to keep it that way, he said.

"History shows that when somebody has the ability to control technology, and also has a business incentive to do so, they're going to try," Copps said.

These are not bad people, but they can produce bad policy results, Copps said. Inventors need to know they can get their product to market without having to go "on bended knee" to the nation's network operators.

Still, important decisions that could codify the right to innovate without seeking permission have been postponed or avoided, Copps said. Now is time for FCC to adopt an enforceable principle of nondiscrimination to its Internet policy statement, applicable to wireline and wireless carriers.

"I grant this won't be simple to do," Copps said. The line between reasonable network management and discrimination is a "fine" one, and time is needed to develop case law and precedents to make it more clear, he said.

"This is an issue in which you must engage," Copps said. He said if he was seeing what is happening accurately, there will be an opportunity before long to decide this issue. But it will be a fight against powerful interests.

Proceeding Underway

FCC Commissioner Jonathan Adelstein said the public had already filed more than 35,000 comments in this proceeding, showing a deep interest.

The hearings are a part of a three-pronged proceeding into network management practices launched by the commission in January.

Adelstein said that since their last hearing, Comcast and BitTorrent had announced an agreement on network management (13 ECLR 474, 04/2/08). He said he was interested in the status of broader industry discussions, and whether individual company agreements will be beneficial to everyone.

"Basic decisions are being made about the development of Internet that will shape it for years to come," Adelstein said.

FCC Commissioner Robert McDowell, a Republican, said this issue started with allegations that Comcast was limiting BitTorrent applications and a suspicion was that it was not limiting bandwidth for management needs but for competitive, discriminatory reasons.

However, streaming video and online video has exploded, which presents a significant network management challenge, McDowell said. By some estimates, P2P accounts for 75 percent of all traffic, and pirated traffic is a part of this. Some have said 5 percent of subscribers use 95 percent of network capacity, he said.

Still, the issue of network management must be examined carefully before codifying a solution that may cause future problems, McDowell said. He urged the audience to be careful before wishing for regulation.

Martin Still Unconvinced

Martin said that in August 2005, the commission adopted an Internet policy statement with the goal of providing critical principles to "evaluate" practices.

The goal of the statement was to protect consumers and their access to lawful content, and to foster the creation of applications and services, Martin said. Anti-competitive actions are viewed under separate rules, he said.

Throughout the net neutrality debate, he has said consistently that the FCC will be vigilant in watching and that it has the authority to take action against violators, Martin said. Industry should take seriously complaints against it, he said.

In evaluating potential violations, the FCC should look at several critical factors, such as whether there is adequate disclosure of the tools the operator is using, Martin said. Application designers need to know what will work and consumers must know nature of service they are receiving. In other words, can operators deliver the speeds they are selling, he said.

Cable operators sell unlimited service, while wireless provides "buckets" of minutes, Martin said. Also, are operators degrading a particular application? These factors must be evaluated under strict scrutiny as to whether they are serving a legitimate purpose. This will be the "critical question" before the commission, he said.

But the most important step they can take is being fully informed, Martin said.

By Cheryl Bolen