

12/24/09

Comments to the FCC Net Neutrality NPRM

GN Docket No. 09-191

WC Docket No. 07-52

Mr. Chairman and Commissioners,

I am Paul Dauby VP/COO at Perry-Spencer Rural Telephone Coop, Inc. d.b.a. PSC, in Southwest Indiana. I have been fortunate to work for PSC 35 years. I oversee PSC's Unlicensed Fixed Wireless Broadband, DSL and Fiber to the Premise (FTTP) systems.

Briefly, as reported on the 2008 RUS form 479, PSC's part D system data was 569 square miles served, 11.15 access lines per square mile and 3.24 subscribers per route mile. We serve 2,696 ILEC DSL customers as recorded for our November 2009 billing. In addition to the ILEC services, PSC operates a CLEC which uses a FTTP platform and an unlicensed wireless broadband network. You may want to keep this data in mind when reading my comments.

These are my personal comments not necessarily the position of PSC.

I want to help move the process along for the benefit of all Americans.

I feel that the Net Neutrality NPRM is very important in gaining a better understanding of the many complex issues that are discussed in it and allow anyone to be heard. It is important to codify enforceable principles that will serve, as fairly as possible, all stakeholders and especially the American consumer and America as a whole.

I am filing as an individual because I want to help see to it that our nation deploys as soon as possible, to all Americans, a top notch broadband network with the proper enforceable principles. I feel that rural America is critical to the welfare of this great country. Broadband is critical to the rural citizens of this great country. I live in rural Southern Indiana and I am not pleased with the degree broadband is deployed in the area I live. PSC has done a great job in its serving areas but others have not in the surrounding areas. Many small providers have done the same. I want to fight for rural Americans.

I feel the principles need to be applied to all broadband network providers but not in a way that places them in a defensive mode. These principles should also apply to content and application providers as well. Some feel Comcast is a threat to the Net Neutrality principles but I feel that Google is a threat too and warrants scrutiny as well as other application and content providers/distributors.

Executive Summary:

Before codifying principles there are four root problems that need to be addressed and solved first:

- A. Peer to Peer file sharing consuming huge amounts of capacity and thus costing providers large amounts of dollars to deliver broadband services to the customer.
- B. Copyright infringement/downloads of illegal content which cost providers and artist, indirectly all of us.
- C. Over the Top Video (OTT Video) getting a free ride and drives up the cost of middle mile for the small providers thus causing inflation of the customer's cost for broadband Internet (Affordability) access.
- D. Refusing to admit and come to grips with the fact that general purpose Internet/content is requiring more and more capacity. It is moving away from bursty traffic to higher speeds, larger data transferred amounts (throughput) in a given time period and for a much longer time period. OTT Video and P2P will drive up the middle mile cost to where small providers may not be able to survive if the principles or proposed principles are codified and enforced and the Broadband USF Fund is not implemented properly.

With that said I am convinced that without an excellent Broadband USF Fund, it is not likely the goals of the National Broadband Plan, once developed, can be achieved nor can the Net Neutrality principles or proposed principles be enforced in a way that all network providers including rural network providers can comply.

Respectfully submitted,

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First of all we must never forget who we are serving- the American Consumer. Missing from this NPRM are goals clearly stating that at the end of the day the American Consumer will have **Affordable Broadband Service**. This is not mentioned in the Executive summary or in the goals. I consider this an oversight.

I want to also mention that when it comes to transparency, I have been very open with sharing my ideas about Net Neutrality. I have had the opportunity to meet in person and discuss Net Neutrality with Marvin Ammori and Derek Turner of the Free Press and many others in the industry. I made an offer to the Free Press for them to visit PSC in order to help them understand the Net Neutrality issues I feel PSC faces as a rural broadband network provider. I respect the work and positions of the Free Press but they have positions that I can not agree with but that is okay for we are fighting for the same cause but from a different perspective.

Before trying to codify principles the FCC should study and solve **Four Root** causes of Net Neutrality arguments:

A. Study (hold hearings) how Peer to Peer (P2P) file sharing networks, the application and its protocols operate and how very much they vary from Web surfing, e-mail and even streaming video applications like You Tube as delivered today.

The FCC needs to fully understand the impact of Peer to Peer (P2P) applications and just how dramatically they effect the utilization of networks and how negatively they affect the usable bandwidth (capacity) available for use for the average user. FCC Engineering staff or possibly the IETF or NONAG can advise the FCC about this.

Please review work by George Ou who gave testimony at one of the Broadband Management Hearings held in early 2008 at Stanford:

Broadband Network Management Practices

En Banc Public Hearing

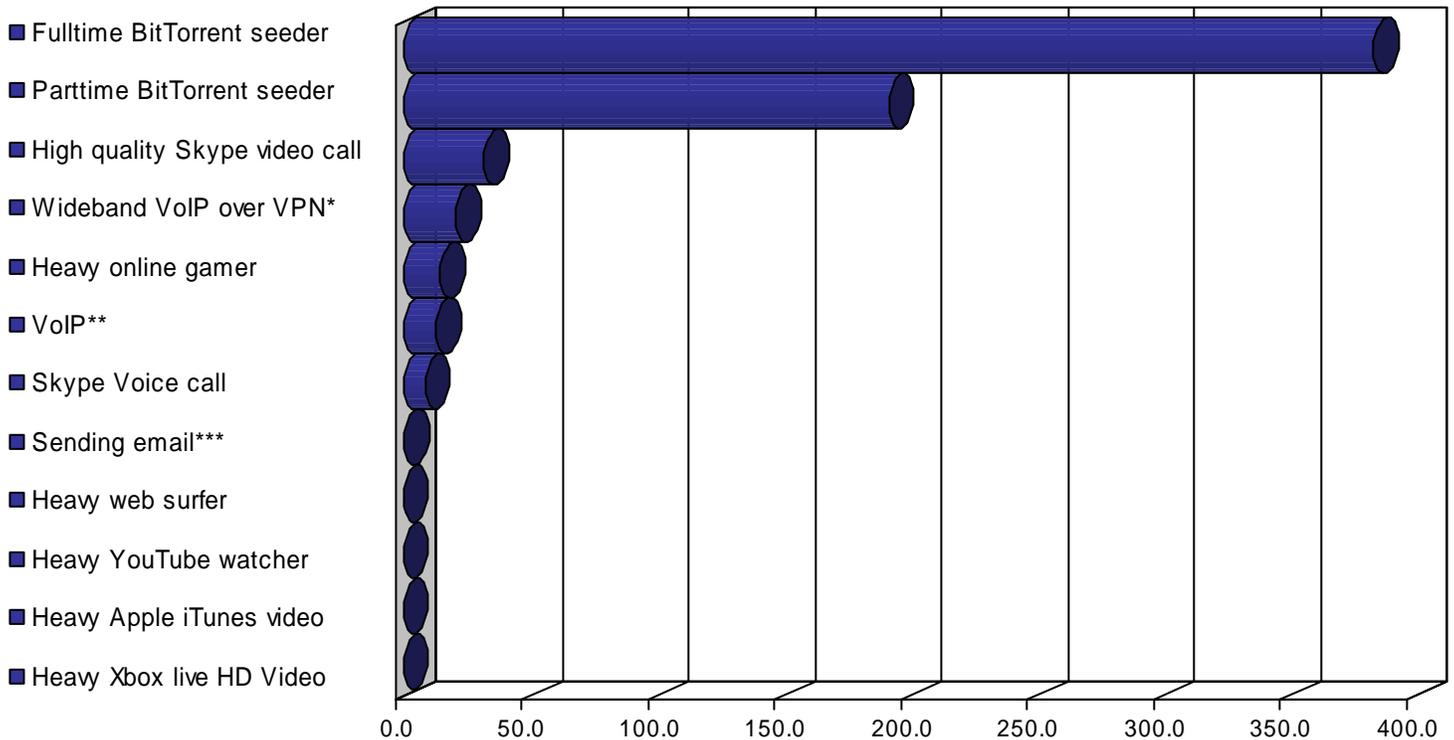
Stanford Law School's Center for Internet and Society, Palo Alto, CA - 4/17/08

http://www.fcc.gov/broadband_network_management/041708/ou-slides.ppt

See the chart below for the comparison between protocols and applications. Logically this should show us that there are operating characteristics that are unique about Peer to Peer (P2P) protocols. One thing that is unique is the number of connections that can be established. PSC has had customers with hundreds of connections up and running simultaneously on **one residential computer**. The customer/account owner is totally unaware of this most of the time. I know this for certain for I am the designated agent on file with the Copyright Office concerning Copyright Infringement Notifications. Keep in mind that this negatively affects affordability of local broadband service. I thank George

Ou for his work and for his time in the past for communicating with me.

Persistence Advantage in P2P Apps-
Internet application usage average *upstream* kilobits per second



By George Ou- 4/17/08

Corporate VPN telecommuter worker using G.722 codec @ 64 kbps payload and 33.8 kbps packetization overhead

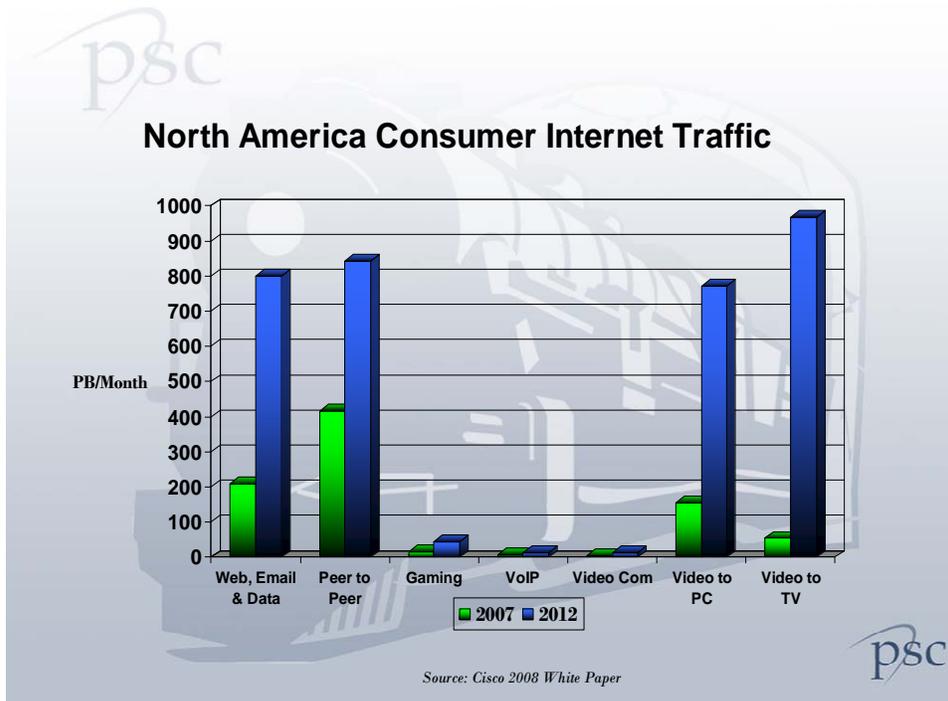
**** Vonage or Lingo SIP-based VoIP service with G.726 codec @ 32 kbps payload and 18.8 kbps packetization overhead**

***** I calculated that I sent 29976 kilobytes of mail over the last 56 days averaging 0.04956 kbps**

PSC's cost for one full time seeder per month is **\$40.83. This is just middle mile cost!** The following graph shows the P2P traffic for 2007 and 2012. Note: The middle mile cost I mention includes the transport fee and the port to the Internet Backbone.

The following chart was compiled using data from the 2008 Cisco White Paper:
Please note how P2P traffic will continue to grow. Also note the huge increase

in Over the Top Video to the PC and the TV.



Even though this NPRM does not mention the words Affordable Service in its Executive Summary on pages 5 and 6 (paragraph 16) nor in the goals - paragraphs 51- 55, it really zooms in on competition as a goal.

The NPRM really zooms in on openness, nondiscrimination, and transparency but keep in mind that it is the Network Service Provider that builds and operates infrastructure in our local communities and who helps to enable economic development, pay property taxes, general taxes, hires people who are well paid employees who are consumers that utilize our Health Care Systems, Schools, Libraries. Etc.

What does an Over the Top Video (OTT) competitor do to help plow money into the local economy? How does OTT Video competitor affect the pricing in Market Failure Areas (MFAs)? And P2P? P2P bandwidth consumption with its content is stealing from many.

B. A sub-root problem (under the hood) of P2P file sharing is **copyright Infringement**. There needs to be a national policy in which we all share in the expense to implement and operate an educational and enforcement program. The network provider should not eat the expense of these reports and abatement. This is an International issue and the United States should be a role model in solving this serious issue. Illegal uploads and downloads are costing all stakeholders millions of dollars in Internet bandwidth utilization alone. In the NPRM it asks for proof and examples. Please see below one example that PSC has received. One of 22

copyright Infringement notifications received so far in November up to the 20th. With around 5,000 broadband customers PSC has to spend hours abating these notifications. What is the FCC doing about this? Appropriate laws in this arena will help lower operating cost for the providers and help make broadband affordable. Think about the loss of revenue that artists in America are missing out on, dollars lost and not there to support our businesses and the nation. This is a National Disgrace!

Here is an example of one of the 22 notifications thus far this month-up to November 20, 2009:

Thursday, November 19, 2009

Perry-Spencer Communications, Inc.
11877 East State Road 62
P.O. Box 126
Saint Meinrad, IN 47577-0126 US

RE: Unauthorized Distribution of the Copyrighted Motion Picture Entitled
The Hangover

Dear Paul Dauby:

We are writing this letter on behalf of Warner Bros. Entertainment Inc. ("Warner Bros.").

We have received information that an individual has utilized the below-referenced IP address at the noted date and time to offer downloads of copyrighted motion picture(s) through a "peer-to-peer" service, including such title(s) as:

The Hangover

The distribution of unauthorized copies of copyrighted motion pictures constitutes copyright infringement under the Copyright Act, Title 17 United States Code Section 106(3). This conduct may also violate the laws of other countries, international law, and/or treaty obligations.

Since you own this IP address [REDACTED], we request that you immediately do the following:

- 1) Disable access to the individual who has engaged in the conduct described above; and
- 2) Take appropriate action against the account holder under your Abuse Policy/Terms of Service Agreement.

On behalf of Warner Bros., owner of the exclusive rights to the copyrighted material at issue in this notice, we hereby state, that we have a good faith belief that use of the material in the manner complained of is not authorized by Warner Bros., its respective agents, or the law.

Also, we hereby state, under penalty of perjury, under the laws of the State of California and under the laws of the United States, that the information in this notification is accurate and that we are authorized to act on behalf of the owner of the exclusive rights being infringed as set forth in this notification.

Please direct any end user queries the following.

Warner Bros. Entertainment Inc.
Attn: Worldwide Anti-Piracy
4000 Warner Blvd.
Burbank, CA 91522
818.954.3091 – phone
infringements@warnerbros.com – email

Kindly include the Case ID 998093106, also noted above, in the subject line of all future correspondence regarding this matter.

We appreciate your assistance and thank you for your cooperation in this matter. Your prompt response is requested.

Respectfully,

A Kempe
Enforcement Coordinator
MediaSentry

INFRINGEMENT DETAIL

Infringing Work: The Hangover
First Found: 18 Nov 2009 20:26:19 EST (GMT -0500) Last Found: 18 Nov 2009 20:26:19 EST (GMT -0500) IP Address: [REDACTED] IP Port: 26638
Protocol: BitTorrent
Torrent InfoHash: 501823DE10694F454E7BE297D163D909E4E57680
Containing file(s):
The.Hangover.DVDRip.XviD-DoNE.torrent (741,733,802 bytes)

*** By the way it cost PSC 24.33 cents for this one transfer of illegal content. Think what this figure is nationally for the transfer of illegal content in bandwidth consumption not to mention the overall economical affect to this Nation and the artists.**

- C. Over The Top Video (OTT Video)- Don't be a witness or contributor to the slow death of the small rural network provider.

Review testimony from 2007:

Broadband Network Management Practices

En Banc Public Hearing

Harvard Law School, Cambridge, MA - 2/25/08

http://www.fcc.gov/broadband_network_management/022508/clark.pdf

Written statement of Dr. David D. Clark

MIT Computer Science and AI Lab

FCC public hearing on network management

February 25, 2007

The best way to deal with high demand is to identify the customers that want to do more and find a reasonable way to price the service so that they become a partner, not an enemy. I believe that this can be done over time, but it will require consumer education and market studies. I said that video does materially increase the loads on the network, and that usage does cost money. I know that some have the opinion that all the costs of an ISP are fixed costs and that usage is incrementally free, but this is not at all true if the ISP must increase the capacity of its backhaul and interconnection links, etc. To understand the impact of video, it is important to have a rough model of what usage costs. However, it is very hard to get these numbers, since most ISPs view their cost structure to be confidential. There is an unsubstantiated number, widely circulated (it is to be found on Wikipedia, without citation of source, at http://en.wikipedia.org/wiki/Broadband_Internet_access) that cost to a broadband access ISP to cover usage is about \$.10 for each Gigabyte per month used by a customer. If we estimate (very roughly) that a typical user, pre-video, uses about 5 GB/month, this would imply that the cost of usage to the ISP is about \$.50/month. For a cable system that charged perhaps \$40/month, less than a dollar goes to usage—the rest goes to fixed costs, including cost recovery on their outside plant, and other costs such as billing, marketing, customer service, and so on. Using these rough numbers, what might video cost? Assume that a customer watches television for 8 hours a day, and the video stream is 2 mb/s (all these numbers are highly speculative, of course, but I want to offer only an order of magnitude estimate). Those numbers work out to over **200 GB/month**, or more than **40 times the pre-video estimate of 5 GB/month**. Usage of 40 GB/month would cost the ISP \$20 in usage-related costs. What can we conclude from these very rough numbers? **First, no ISP can absorb an additional \$20/month in usage cost and make money if they continue to charge the same \$40/month.** But on the other hand, that \$20 estimate is based on today's costs, and the full TV experience over the Internet is still a few years away. And third, this number does not take into account any special steps that the ISP (and others) might take to reduce the cost of delivery. But even if that \$20 drops over time, there is still a real difference in the cost to serve customers that do and do not transfer lots of video. So what sort of pricing can respond to this situation? One idea is different usage tiers for monthly usage. An ISP could charge \$40/month for today's usage pattern, and perhaps \$60 for substantial

video downloads. Could the market tolerate that? I think so, and the price and service will only get better if the ISP takes technical and business steps to reduce costs.

Dr. Clark also says:

I believe that the simple flat-rate “all you can eat” pricing for residential broadband will have to be modified over time to deal with the usage generated by video.

I want to thank Dr. Clark for his work for coming up with a way to identifying the cost of delivering video over the Internet. From his work I was able to identify cost estimates for our company and present many of the comments in this paper. By using his concept/model, we can identify the cost causer and the cost.

Let 's also protect the American consumer who wants broadband but also a way to kept their expenses to a minimum.

Please reference paragraph 68 in the NPRM:

In Dr. Clark's written statement he uses **rough numbers** to explore the cost of Video over the Internet (OTT Video). **He used 200 Gigabytes as a possible monthly data transfer amount (a user's consumption). At PSC's current average cost per Gigabyte, for the backbone (middle mile) portion alone, operating at 50% duty cycle, would be \$65.60 per OTT Video customer utilizing this free OTT service.** This is one reason why we must have a robust USF fund that allows recovery of the middle mile costs. How does all of this data transferred get paid for? In order to keep the service affordable can this be passed on to the user? Many say no.

In the 3rd quarter 2009 Nielsen A2/M2 Three Screen Report it stated that the per user monthly time spent watching TV in the home was 129 hours and 16 minutes. Using 129 hours per month for an average OTT Video user instead of the 8 hours per day like in Dr. Clark's example, the totals change to approximately 116 Gigabytes (GB) of usage per month thus PSC's cost for the middle mile portion is \$38.04 /month/average OTT Video user. This is assuming 2 Mbps streaming. Note in the VUDU FAQ, a few pages later, that HD can be twice this and their HDX is greater yet. I think it is safe to say the minimum going forward is at least 2 Mbps and thus a total monthly OTT Video data transfer amount of 116 Gigabytes per month.

I thank Pivot-Media for the link to the Nielsen report.

This was presented at the November 18, 2009 FCC Open meeting:

Transit and Transport cost for rural areas is 25 times that of Urban.

Rural providers are at a huge disadvantage, we are not peering like the big guys. We have to pay

monthly for Internet Backbone (middle mile) and the cost increases as the users increase their consumption-bandwidth utilized. We don't have a deal where Google is connected directly to our Core Router. I wonder what Comcast's, AT&T and Verizon's monthly middle mile cost are?

How does OTT Video affect PSC's Revenue Stream? This follows Dr. Clark's work above assuming 200 Gigabytes (GB).

Revenue Comparison IPTV/OTT

IPTV BASIC & BROADCAST		OTT VIDEO 8 HRS @ 2Mbps	
Programming Cost \$30	Selling Price \$33	Backbone Cost for Data Transferred \$65.60	Revenue \$0
Difference	+ \$3.00/month per customer	Difference	-\$65.60 per Customer

Please reference Paragraph 72 and 73 in the NPRM.

PSC's current average cost per Gigabyte, for the Internet backbone (middle mile) portion alone, operating at 50% duty cycle, would be \$65.60 per OTT Video customer utilizing this free OTT service. I am using 8 bits to a byte in my calculations. Thus, a 1 Mbps service operating 100 % of the time during a month will result in 324 Gigabytes of data transferred. These are approximate numbers but the **information revealed is very alarming.**

It needs to be noted that **PSC's average Gigabytes transferred per month per user is less than 4 Gigabytes at this time.** Dr. Clark assumed 5 GB. This number will become huge as OTT Video becomes common place. Please refer to the Cisco bar chart. In 2012 OTT Video to the computer and TV alone will exceed all of North America's bytes transferred in 2007. Also please note that Dr. Clark's example shows how the average usage will grow to 200 GB. Using the Nielsen report data of 129 hours as the average viewing time, this number is approximately 116 Gigabytes of video transferred per month for a user who replaces their standard CATV service with OTT video.

Let's talk about the details a little. PSC offers IPTV and incurs programming cost of \$30 for a certain PSCtv package- see the illustration on the previous page. PSC is charged by the programmer, on a per subscriber basis, for the monthly content purchased. The user can leave the TV on 100% of the time and it doesn't affect the user's price. PSC in turns bills the customer \$33 as the illustrations above depicts. These numbers are approximate but the point is PSC passes on the programming cost. Ideally there will be a profit. Note with OTT Video PSC loses the revenue stream from their IPTV offering and in addition the user's OTT Video cost PSC \$65.60 in **Middle Mile Access** to the Internet Backbone. The customer's usage goes from an average of 4 Gigabytes transferred (used) to over 116 Gigabyte transferred. Unlike IPTV the longer the user is streaming their video the larger our middle mile cost is per month. Is this the type of competition the FCC is talking about in paragraph 72, 73 and throughout the NPRM?

As per the NPRM:

Proponents therefore argue that the Commission should take steps to preserve the Internet "**as a general purpose technology that supports wide open speech.**"¹

I agree that with this type of advantage, OTT Video will definitely be able to compete with Cable, IPTV, etc, but is this "general purpose"? I agree it meets the wide open part of Marvin's definition. Maybe I have the wrong definition of "general". General, like a General in the U.S. Army or general like in general public? I am unsure what this means.

Also I ask, which is of greater importance to the Nation and all stakeholders: wide open speech or Copyright Law concerning copyright infringements?

The NPRM talks about competition a great deal. What about rural America competing for jobs or being able to afford to get access to the Internet. As mentioned earlier, the following information was recently presented to the FCC:

Presented at the November 18, 2009 FCC Open meeting:

Transit and Transport cost for rural areas is 25 times that of Urban.

If the user is going to transition their video viewing habits to OTT Video then rural America is at a tremendous disadvantage because of the transport cost just shown.

How can anyone think that Broadband USF isn't needed? I am assuming that one of the goals is the rural network provider is kept financially viable. If the rural network

¹ Letter from Marvin Ammori, General Counsel, Free Press, to Marlene H. Dortch, Secretary, FCC, WC Docket 07-52, at 11 (filed June 12, 2008); *see also, e.g.*, ACLU Apr. 7, 2008 Comments, WC Docket No. 07-52, WT Docket No. 08-7; Media Access Project June 8, 2008 Comments, GN Docket No. 09-51.

provider is going to pick up the cost of all of the increase of capacity that will be needed because of the OTT Video then the Broadband USF fund will have to be uncapped.

In the NPRM it talks about Discrimination. I think rural America is Discriminated against. I call it GOEGRAPHICAL DISCRIMINATION or maybe I should call it MARKET FAILURE AREA (MFA) DISCRIMINATION. Rural America providers should have the same deals with the content and application providers as the large broadband providers have. Why don't we? Neutrality should apply to all providers not just network providers. Maybe Google, Yahoo and other content providers should be required to place their distribution systems in each DMA (designated market area) at their cost and keep the private deals out of it? We have to remain neutral. This will reduce rural America's middle mile cost and be fair across the Nation since the market areas were developed with no interest at the time in Net Neutrality.

If the Internet is so neutral then why am I reading that the large broadband network providers are working deals with the large content and applications providers? I believe it was during the Free Press Filing against Comcast that I read one way of alleviating congestion was to develop a better distribution architecture. Please read the following:

<http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=740>

BitTorrent and Comcast have also agreed to work with other ISPs, other technology companies, and the Internet Engineering Task Force, to explore and develop a new distribution architecture for the efficient delivery of rich media content. "In the spirit of openness and fostering innovative solutions, BitTorrent will take the first step in enhancing our client applications to optimize them for a new broadband network architecture. Furthermore, we will publish these optimizations in open forums and standard bodies for all application developers to benefit from," said Ashwin Navin, co-founder and president of BitTorrent, Inc.

Oh, so we are admitting there are serious issues with getting all of this content through the network? Suddenly money is talking and they move around content distribution so it makes the most economical sense and works special deals with large network providers?

Please read this article:

http://blog.streamingmedia.com/the_business_of_online_vi/2009/01/verizon-cdn-announcement.html

Thursday, January 08, 2009

Verizon Cuts Peering Costs To CDNs: The Real Story Is More Than Price

Dan Rayburn | Thursday January 8, 2009 | 01:27 PM | [Comments \(7\)](#)



Yesterday, [Verizon announced](#) a new program dubbed the "Verizon Partner Port Program" which gives content owners and CDNs the benefit of a direct connection from their content storage devices to the Verizon Internet backbone network. While Verizon is saying that they are offering "*a significantly lower price to connect directly to the Verizon Internet backbone network,*" this is about more than just lower pricing.

I am not opposed to making networks more efficient. Collaboration is important.

In my opinion, it is sensible for someone like a Google or Bit Torrent to work closely with large network providers like Comcast because they have a huge customer base consuming huge amounts of Internet access and data (Gigabytes/Terabytes) of through-put, but does this place the large providers in a competitive advantage over rural broadband network providers who purchase expensive middle mile? Is this what Net Neutrality is all about?

It's possible that both the content and network providers could agree to peer or the large network provider could sell inexpensive Tier 1 access and have the content and application servers right at their core router's back door. Once the content is at the broadband network provider's core router then suddenly things change. Now, all that traffic is Intra-company (2nd mile and last mile). For the broadband network provider this means there aren't monthly recurring charges from a 3rd party for the Internet backbone access.

There is little way for the rural broadband network provider to escape the middle mile cost which can be 25 times that of urban areas. For the above described reasons that is why we have geographical discrimination. Actually I view it as anti-competitive instead of network neutral.

It doesn't make economical and logical sense for the broadband network provider to transport OTT video free across our expensive middle mile pipes.

Why would anyone want to, in any way, negatively effect the welfare of the network provider? How can anyone expect the broadband network provider to pick up the transport of OTT Video especially in light of what has been revealed through Dr. Clark's rough cost of Internet video model-an increase from 5 Gigabytes of monthly usage per user of data transferred to over 116 Gigabytes of OTT Video of Internet data transferred per month?

Reference NPRM statement Paragraph 72 and related to 73 it states:

"For example, a broadband Internet access service provider that is also a pay television provider could charge providers or end users more to transmit or receive video programming over the Internet in

order to protect the broadband Internet access service provider’s own pay television service. Alternatively, such a broadband Internet access service provider could seek to protect its pay television service by degrading the performance of video programming delivered over the Internet by third parties. The result may be higher prices or worse service for some content and applications and inefficiently low investment in some content and application markets.”

This paragraph creates a few key issues and will help prove in the need for a Robust uncapped Broadband USF fund that includes cost recovery for the middle mile which includes the cost for Gigabytes transferred and the bigger yet issue, enabling rural network providers to build their fiber in the 2nd mile and last mile to the customer. Here are a few issues:

- 1- PSC is providing IPTV today. Many of our customers are served by DSL. Our DSL lines on average deliver 18 Mbps. Depending on how many TVs a customer has and if they have a Digital Video Recorder (DVR), the capacity of the DSL line is mostly utilized by IPTV. Most of our users choose the 1 Mbps Internet access tier.

Now take a look at what VUDU’s FAQ says about what type of Internet connection is needed for viewing. The minimum is 1 Mbps and the maximum is 9Mbps. I assume this is per streaming device or player.

What kind of Internet connection do I need to have?

Your Internet connection is vital to your VUDU experience. Bandwidth requirements vary between VUDU players and CE-branded VUDU-enabled devices. Please refer to the chart below:

	Streaming devices CE-branded	VUDU Players
SD	1 Mbps to 2 Mbps	1 Mbps delayed delivery 2 Mbps instant
HD	2.25 Mbps to 4.5 Mbps	4 Mbps for instant delivery
HDX	4.5 Mbps to 9 Mbps	Delayed delivery

You will need an ethernet connection available near the TV that the VUDU device is connected to. If this is not possible, then you will need the VUDU wireless kit (sold separately) in order for the VUDU device to connect to your broadband internet connection.

It doesn't take long to see we have a big problem. The FCC has stated in this NPRM that Competition and Non-Discrimination are key goals.

Here is the fourth principle taken from the NRPM:

4. *Subject to reasonable network management, a provider of broadband Internet access service may not deprive any of its users of the user's entitlement to **competition** among network providers, application providers, service providers, and content providers.*

How does PSC or other network providers today meet this principle as long as we offer IPTV? We are caught in a trap! There is little bandwidth (capacity) left in the DSL last mile.

Here is the proposed fifth principle from the NPRM:

5. *Subject to reasonable network management, a provider of broadband Internet access service must treat lawful content, applications, and services in a **nondiscriminatory** manner.*

I pointed this out a few pages earlier:

Reference NPRM statement Para 72 and related to 73:

"For example, a broadband Internet access service provider that is also a pay television provider could charge providers or end users more to transmit or receive video programming over the Internet in order to protect the broadband Internet access service provider's own pay television service. Alternatively, such a broadband Internet access service provider could seek to protect its pay television service by degrading the performance of video programming delivered over the Internet by third parties. The result may be higher prices or worse service for some content and applications and inefficiently low investment in some content and application markets."

What we have here is unintended discrimination/anti-competitiveness. PSC doesn't have enough bandwidth (capacity) left in its DSL last mile to deliver the throughput (sustained data transferred) as VUDU requires as stated in its FAQ above. Also, PSC uses a different circuit called a VLAN for its IPTV. The 'general purpose Internet access' is on a different circuit (VLAN). **I am using VUDU only as an example. I do not mean anything negative about VUDU.** I have used and look forward to using these types of delivery of content.

PSC cannot live up to either #4 or #5 if enforced in this way. When PSC started its IPTV business, there was no intention of discriminating against OTT Video. There was little of it available. Nor does PSC mean to be anti-competitive in my opinion.

So, I agree with Marvin Ammori of the Free Press, we are talking about the general purpose Internet thus the quoted text above from the NPRM doesn't make sense. It doesn't hold water for IPTV is on a different circuit and not the general purpose technology pipe. The customer can choose to not subscribe to PSC's IPTV service.

These are important principles and they sound good. Here is what must happen before the FCC can codify these principles:

- 1- Have as a National Goal to become #1 Internationally in Broadband Deployment and in Broadband Robustness.
- 2- Pass Broadband USF legislation which enables cost recovery of Broadband upgrades for all or nearly all middle mile, 2nd mile and last mile facilities in rural America or have others pay their fair share of the network providers cost. As I pointed out earlier Dr. Clark had this to say:

Taken from a written statement of Dr. David D. Clark

Broadband Network Management Practices
En Banc Public Hearing
Harvard Law School, Cambridge, MA - 2/25/08

http://www.fcc.gov/broadband_network_management/022508/clark.pdf

“I believe that the simple flat-rate “all you can eat” pricing for residential broadband will have to be modified over time to deal with the usage generated by video.”

- 3- PSC's financial analysis for a total Fiber to the Premise build out proved we could only afford 60% of the cost of the project. Now what?

Solving the last mile capacity issue would best be accomplished by deploying fiber. In order to fulfill principles #4 and #5 nationally, network providers must upgrade their networks to accommodate OTT Video as well as IPTV or standard CATV service.

This backs up my original statement that first we have to solve root broadband issues before codifying principles. I would suggest that Best Practices/Standards be developed for all providers to follow until principles can be codified. Maybe organizations like NANOG or IETF as mentioned in the NPRM could assist. I don't know, maybe there is a more appropriate organization to do this. Whomever, get them engaged.

While on the Over the Top Internet (OTT Video) topic and the competition principle, here is a statement made by Derek Turner of Free Press:

Statement by Derek Turner, research director for Free Press, at:

HIF071.160

HEARING ON ``UNIVERSAL SERVICE: REFORMING THE HIGH-COST FUND''
THURSDAY, MARCH 12, 2009
House of Representatives,
Subcommittee on Communications, Technology, and the Internet
Committee on Energy and Commerce
Washington, D.C.

“The path to universal broadband and the ending of the over-reliance on subsidies begins with recognizing how convergence has changed the business of telecommunications. Before broadband, carriers were only able to earn perhaps \$20 per customer each month selling local phone service. In today's converged world, a carrier can well over \$100 on that same line by offering phone, TV and Internet services. Unfortunately, our current regulatory structure does not account for this potential, ignoring that with this additional revenue many high-cost carriers can operate profitably without ongoing subsidies.”

I think this statement needs to be evaluated. I thought in the NPRM great concerns were expressed about discrimination and competition. Please read NPRM 72 and 73 or see above.

There is convergence and integration but wait a minute, the network provider will not necessarily have a triple play.

Principles #4 and #5 addresses this. So, Derek's arguments above do not hold water. Also as time goes on more and more landlines are being removed and replaced with Wireless and VoIP (OTT Voice).

On top of that there is little margin if any in IPTV being provided by rural telcos/providers. Then once all the OTT Video kicks in, the network provider will be loosing money because of the huge middle mile cost as discussed earlier.

Principles #4 and #5 seals the coffin.

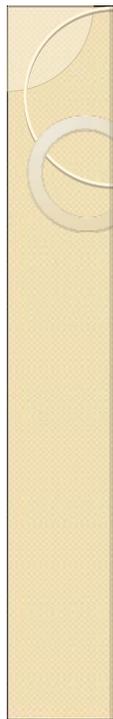
An Uncapped Broadband USF is the only hope to bringing this great nation to #1 Internationally in Broadband Deployment and in Speed Ratings if Rural America is included. We have to get fiber deployed immediately to meet the requirements of the Net Neutrality Principles, OTT Video and services the network providers are delivering too and do it all simultaneously.

Is OTT Video a real thing? Please read below:

OTT Video is on the eve of taking off since this Holiday season Broadband Ready TVs are coming out- see USA Today article dated 11/13/09 “ Could this finally be the season for Web TV”? In the article it mentions Sony, Samsung, LG, Panasonic and Vizio all say they’re poised to revolutionize television this holiday Christmas shopping season. All without the fuss of connecting the TV to a Set Top Box.

Please read below for further proof that OTT Video will present huge issues:

Comment and slide from George Ou’s testimony:



Today’s crisis on the Internet

- Video-induced congestion collapse
 - Efficient existing broadcast model migrating to bandwidth-intensive Video on Demand model over IP
 - Full migration of video could require 100- to 1000-fold increase in Internet capacity
 - Exponentially more bandwidth required as video bit-rate and resolution increase to improve quality
- P2P is the dominant distribution model because most of its content is “free” (read pirated)
- Video can fill any amount of bandwidth

4

http://www.fcc.gov/broadband_network_management/041708/264,4, Today’s crisis on the Internet

For further proof that Dr. Clark’s rough assumptions are on target please see below what VUDU states in their FAQ. It clearly shows the bandwidth speeds needed for Standard Definition (SD), HD, etc. From this you can easily deduct that Dr. Clark’s numbers are conservative especially if a user has multiple TVs and computers.

What kind of Internet connection do I need to have?

Your Internet connection is vital to your VUDU experience. Bandwidth requirements vary between VUDU players and CE-branded VUDU-enabled devices. Please refer to the chart below:

	Streaming devices CE-branded	VUDU Players
SD	1 Mbps to 2 Mbps	1 Mbps delayed delivery 2 Mbps instant
HD	2.25 Mbps to 4.5 Mbps	4 Mbps for instant delivery
HDX	4.5 Mbps to 9 Mbps	Delayed delivery

You will need an ethernet connection available near the TV that the VUDU device is connected to. If this is not possible, then you will need the VUDU wireless kit (sold separately) in order for the VUDU device to connect to your broadband internet connection.

It doesn't take long to see we have a big problem. The FCC has stated in this NPRM that Competition and Non-Discrimination are key goals.

D.Everyone wants to act like bandwidth utilization by all protocols is similar.

We want IP packets to behave like the traditional TDM networks performed. Many networks are shared and thus the users are sharing time (capacity) of the network. This is similar to speakers of a panel must take turns. The TDM network spoiled us and the early years of IP network's efficiency gains spoiled us. No longer can IP out perform TDM, ATM or SONET to any large degree because some applications are requiring bandwidth utilization similar to constant bit rate, pre-determined channel sizes. Peer to Peer protocols and OTT Video consumes a constant, sustained consumption of bandwidth and of significant speeds. The sharing is over with. How does the FCC codify principles when the technology doesn't fit the desires of all the stakeholders?

The following descriptions of Net Neutrality and the National Broadband Goals are incompatible with each other:

1. Open and Free Internet
2. Non Discrimination to all protocols and applications regardless of the technology platform and infrastructure
3. Affordable Broadband Service to all Americans
4. Capping the USF
5. Promoting Rural Economic Development.

Before codifying principles the FCC and all lawmakers need to fully understand the technology and status of our National Broadband Network readiness, otherwise there will be serious unintended consequences. I gave examples earlier.

Refer to paragraph 4 of the NPRM.

In this paragraph it is stated, **“as a platform for commerce, it does not distinguish between a budding entrepreneur in a dorm room and a Fortune 500 company”**.

This statement isn't entirely true. Please read below the testimony made during:

**Broadband Network Management Practices
En Banc Public Hearing
Harvard Law School, Cambridge, MA - 2/25/08**

http://www.fcc.gov/broadband_network_management/022508/yoo.pdf

Christopher S. Yoo of University of Pennsylvania- “Comcast is not alone in singling out peer-peer file sharing as a primary source of congestion. As the record in this proceeding has shown, colleges, universities, and public systems across the country have chosen to block student use of peer-to-peer file sharing systems”.

I thought the goal was to serve all Americans and Net Neutrality was going to foster this? If we can not practice Net Neutrality principles in our Elite Universities then how can the FCC expect small network providers to comply? The action by these universities strongly suggests there are major differences of how peer to peer file sharing protocols and applications work in comparison to other protocols. Studying this issue is a good place to start before ever considering implementing/codifying principles.

Refer to paragraph 16 in the NPRM:

16. One goal should be customer/user focused and affordable broadband rates, but not to sacrifice affordability & user satisfaction at the benefit of anything goes applications and protocols like P2P, OTT Video. In general here are my Executive summary comments:
 - 16-1 Missing from the goals paragraph 50-55 is no mention that at the end of the game the user must have affordable broadband service. Affordable service is in direct conflict with open, free, transparency, no blocking, no down-grading while at the same time open to bandwidth hog protocols like Bit Torrent P2P and sustained bandwidth utilization applications like over the top video (OTT Video). Which

risks do you want to take – to ignore these issues because of no clear data or experience the ramifications of the truth? I tried to supply facts in this paper. Don't codify until all the facts are in. It will take network engineers (Maybe IETF) to supply proof.

- 16-2 1st thing needs to happen is address the non neutral behavior of protocols like P2P IE: Bit Torrent subject to network management. 2nd there needs to be a national policy addressing copyright infringements. Hold public hearings-something. All protocols should abide by TCP- not avoid anti-congestion mechanisms and no applications should automatically provision user's computers to become a P2P seeder. This violates ISP policies too and the ISP is left dealing with it. The fifth principle needs to apply to all application and protocol providers as well. How do you prevent Google from discriminating geographically? I am in Southern Indiana. Will Google install one of their Distribution Server near PSC's Backbone router or will we have to pay transport to Indianapolis or wherever they choose to place their network hub? See the article "Is Wholesale IPTV/VOD in Google or Yahoo's Future- February 3, 2009. Source: Seekingalpha.com. I can see it now.... Rural America will be and is being discriminated against already because they are a Market Failure Area (MFA) as far as Google is concerned. Also Free Press and other are crying about vertical integration of Comcast but what about Google? They bought You Tube! They also offer voice service!

Concerning non discrimination on the provider level, PSC has a network management tool but the vendor does not develop software that allows PSC to, on a per user basis, only at times of congestion, only on a per protocol basis, rate limit to control traffic congestion. We do not have the staff to develop such software and develop rules and policies for such a device. Before implementing stricter network management rules and codifying principle number 5, the Industry needs to come up with inexpensive hardware and software solution to solve this issue. Comcast can afford it but PSC can't. Who pays for this? How does the FCC make my neighboring Ma and Pop ISP comply and buy such expensive equipment and software? Who pays for the ongoing operation of such network tools, the administering and maintenance? This needs to be an Industry Standard. I suggest again as the NPRM listed later in the packet that maybe organizations like the IETF can help us out. What cost recovery mechanism will be implemented?

- 16-3 This is achievable but must include all MA & Pops – Will the FCC send certified mail to each Ma and Pop ISP? - See #7, In addition, this should apply to all content and application providers as well. Take Bit Torrent for example, how can they be sure the owner of the account knows that once their child downloads and installs Bit Torrent that their access to the Internet could be degraded greatly by the fact their computer becomes a seeder serving other P2P users on the Internet? I personally have talked to doctors, school workers, church ministers, executives and many others who call our office and are amazed that this type of thing is happening to them and on their account. Supply a subpoena and I will prove it.

The common user doesn't understand but yet Bit Torrent and other P2P applications keep destroying the user's broadband pipe performance and hindering them from receiving the speed they are paying for. On top of that they are downloading illegal content.

- 16-4 Reasonable Network Management is a must. There have been many negative comments filed in the past about DPI (deep packet inspection). DPI will be required to fulfill CALEA Packet requirements. Proponents of Net Neutrality are using scare tactics and incorrectly claim service providers are actually using DPI to open and read the content of packets. I disagree that this is happening of any significance. As stated earlier, first, there needs to be commercially available, affordable hardware and software. This could be very expensive for some providers with distributed networks. Maybe some network models need to be developed first?
- 16-5 FCC needs to leave alone. This is an individual case basis with the customer-24/7 call out; Quality of Service is required by the customer in last mile and second mile. Latency guarantees are required in last mile. This can be a Local, Intrastate or Interstate circuit. This service is requested by Enterprise/Business Customers. These customers are requesting prioritizing of their traffic- VOIP having priority over Web traffic, Video priority over email and some requests blocking of all P2P to users on their network. VLANS can serve as separate circuits and may or not be delivered on separate fiber or physical layers. This holds true for the IPTV provider. IPTV is delivered over a separate Virtual LAN (VLAN) than the Internet access. These IPTV VLANS must be managed and they truly are separate circuits. In the future there will be integration at the Set Top Box and maybe the TV itself. Here is where the user decides what they want and on which input of the TV. Currently, in general, network infrastructure does not have the capacity to handle both.

These rules will have to apply to all, not just the last mile providers. As stated earlier, Google probably utilizes managed and special circuits also.

- 16-6 Wireless – proceed with caution. Many early versions of unlicensed fixed wireless like 900MHz and 2.4GHz manufactured around 2003 can only handle a limited frame rate and are very lean on throughput (capacity) -less than 2 Mbps for the 900MHz spectrum. First get rules established and proven for the wire line side and then pursue wireless.

It is kind of a catch 22 for some very rural areas need Wireless now in order to afford to get broadband delivered to their users. Capping the Broadband USF is very unwise for market failure areas (MFAs) that cannot support or pay for a FTTP buildout. These areas need every break possible but when these same breaks are taken advantage of in other rural areas that do have competition we soon develop other MFAs.

16-7 Proceed with caution – First figure out how all ma & pop ISP's are going to be notified – certified mail? Content application owners as well as content distributors must also reveal the same. PSC has a ma/pop competitor which operates a fixed wireless/ISP as large as PSC's. They should be given no unfair advantage. Better do a year of a trial period and evaluate the results before codifying a principle. We are on the eve of OTT Video which will bring on and reveal many issues.

Refer to paragraph 50 in the NPRM:

FCC needs a neutral Internet Engineering Group who can attest to impacts of current and future protocols and applications on the networks.

Keeping service affordable must trump protocol applications that inappropriately consume bandwidth. This fools users and create unnecessary cost across all aspects of the Internet network especially middle mile, 2nd mile & last mile.

I noticed in the presentation given to the FCC on November 18, 2009 there is a slide titled "Potential affordability gap for wireline broadband".

It clearly states this is a preliminary analysis. It says:

Areas with lower income have fewer competitors

Areas with fewer competitors have higher prices

I ask:

What about areas with lower incomes, low density and competition or areas with average incomes, low density with or without competition?

This report is biased in my opinion. They set out to prove that if there is no competition then the prices are higher. What about doing a study that shows the impact of competition in areas that an area's overall market cannot support a second provider and the impact to that incumbent provider because of competition, regardless of why competition has occurred? How would an area like PSC's be affected since the CTA of 569 square miles has an average of 11.15 access lines per square mile? If nothing else run a hypothetical model. I think we could have the reverse of what Malcom Gladwell calls in his book "Tipping Point".

Refer to paragraphs 57-59 in the NPRM:

I take issue with the statement concerning with deep packet inspection (DPI). It may be true that a provider could use it as discussed in the NPRM but really, isn't securing a customer's identity a bigger issue. Think of the thousands of servers storing customer confidential information in English. You don't need DPI to read it just some company to look at the information in the database. The FCC, once again needs the help of trusted

and neutral network engineers to explain the risks. The FCC needs to decide which risk they want to take.

The industry needs to develop commercially available software that can manage networks on a per user basis like I explained before. PSC's network management tool has the API but the vendor does not have as the NPRM describes about Sandvine built in software to meet Net Neutrality Principles. If that is the case it needs to be made widely available and affordable for all network providers including for the Ma and Pops. Let the Sandvine and Cisco's take a lead! Send out a Request of Information (RFI) to key Vendors like Sandvine, Cisco, etc and let them help us solve this end of things. In communicating with our vendor, they have an API that can be programmed to do anything but time and skills are issues for smaller companies when it comes to writing network management code, developing rules and policies (software).

Refer to Paragraph 60 in the NPRM.

- . This issue goes beyond providers. Google could become the primary violator of managed/specialized networks. See "is Wholesale IPTV/VOD in Google or Yahoo's future. <http://seekingalpha.com/article/118105-is-wholesale-iptv-vod-in-google-or-yahoo-s-future?source=reuters>. This from a February 3, 2009 article.

How does the following fit in with pricing disparity questions? :

Thursday, January 08, 2009

Verizon Cuts Peering Costs To CDNs: The Real Story Is More Than Price

Dan Rayburn | Thursday January 8, 2009 | 01:27 PM | [Comments \(7\)](#)



Yesterday, [Verizon announced](#) a new program dubbed the "Verizon Partner Port Program" which gives content owners and CDNs the benefit of a direct connection from their content storage devices to the Verizon Internet backbone network.

http://blog.streamingmedia.com/the_business_of_online_vi/2009/01/verizon-cdn-announcement.html

I don't have a problem with Verizon and I use their products but I must use this to make a point.

How does this type of partner program fit with the definition of the general purpose Internet?

How can rural broadband network providers possibly compete in an area with a provider that can work these types of deals? Again, because of the middle mile cost, smaller network providers cannot compete with such providers because the CDNs are connecting direct to the large network providers core routers and thus where is their middle mile cost? This drives home the point that for rural America to have comparable services at comparable prices,

a robust Broadband USF is critical and it has to include the middle mile or else find a way to offset the middle mile cost.

Refer to paragraph 82 in the NPRM:

There will be more confusion and probably a negative impact on Broadband deployment. Implementing an uncapped broadband USF which includes recovery for the middle mile will have a greater positive impact than codifying these principles. These Net Neutrality issues are mainly driven by fear and self serving interests except for the root causes that I talk about at the beginning of this paper.

To implement these rules on wireless networks without addressing the issues with the P2P protocols, without addressing illegal content and without addressing the huge bandwidth utilization that will be created by Over the Top Video will result in chaos and an exorbitant amount of complaints for the FCC to deal with.

To implement these rules before network providers have commercially available hardware and software at affordable cost and a way to recover the capital investment of ongoing operation, administration and maintenance is totally unfair and will result in more issues again. How does the FCC get all Ma and Pops to comply? Ma and Pops and small rural providers serve where Internet access is needed as much as anywhere? The NPRM mentions Sandvine that can, on a subscriber basis manage connections in a nondiscrimination way, that may be true but PSC has spent over \$40,000 on a network management tool which has an application peripheral interface (API) which allows PSC to write code (software), software that would enable PSC to manage its network on a per subscriber basis, in a non-discrimination way in regards to an application like Bit Torrent, and only at the time of congestion. PSC's vendor does not have commercially available software to do this. PSC has spent hours working with their vendor reps to prove this. PSC cannot afford to write the codes or hire a company to write this software. Result, this must be addressed before rules implement as mentioned before, everyone needs to comply and this will be a huge cost. This again gets back to affordability of broadband service. We can't let P2P run loose downloading illegal content, consume as much bandwidth as it wants and destroy the quality of the average user's Broadband Service.

Refer to paragraph 107 in the NPRM:

P2P traffic is a huge Bandwidth hog and can totally consume a Wireless radio in short order. P2P, including Bit Torrent, does not abide by TCP (Transmission Control Protocol). See George OU testimony FCC Network Management forum 2007. As Dr. Clark states in his written statement at the FCC Mgr Forum, if there are applications or classes of applications that do not respond properly to network congestion then there should be an industry consensus on that, perhaps at a forum where network operators meet such as NANOG, the North American Network Operations Group. I suggest that the

technical folks of the industry, NANOG or IETF come up with Network Management Solution that is neutral to all applications that abide by internationally accepted TCP/IP protocols. These solutions must be affordable for all Rural Broadband Network Providers. In earlier sections I have pointed out reasons that it would be premature to codify the principle now.

Refer to paragraph 111 in the NPRM:

Before implementing rules it would be wise to gather at least samples/models of the cost to deploy hardware and the software (network management polices/rules) in different Network Architecture & design. For PSC we only need one network management tool costing between &40K-\$50K plus we need software (code) development in order to utilize the management box in a way that meets any proposed/implemented reasonable Network management rule. Just because a vendor says their Box can, on a subscriber basis, manage the subscriber services doesn't mean the software has been written for their API to do this. For Network providers that are large and have many non-interconnected facilities then the same Hardware and Software will need to be replicated. The result may be substantial enough to affect a user's service rate. These costs will pale in comparison to the increase of middle mile usage cost as P2P and OTT Video Continues.

Refer to paragraph 113 in the NPRM:

Concerning VOIP, Video Conferencing, IP Video or Telemedicine:

The key is we are talking about, Net Neutrality rules for the "General Purpose Internet". No prioritization of any kind should occur on the network circuits pertaining to the general purpose Internet pipes (circuits). If prioritization has to occur then fees will be in order. I am talking about the last mile.

IP Video is offered via a separate circuit, in PSC's case it's a Virtual LAN (VLAN). This is totally separated from the VLAN that the General Purpose Internet connection is carried on. Both can be carried (integrated) on the same DSL circuit to a customer. A VOIP provider has a freedom to choose how they want to offer their service, over the public Internet or via a managed/specialized service. Telemedicine needs the General Purpose Internet Service and Managed/Specialized Internet access. The QOS, prioritization only applies between the points the circuit is ordered. Service level agreements usually come with the deal.

Refer to paragraph 141 in the NPRM:

Reasonable Network Management (RNM) pertains to the General Purpose Internet portion of National Telecommunication Network as a whole. Reasonable network management takes into consideration the technology and vintage of technology as well as the welfare of all Broadband users' connections on any given segment of the network. RNM should be as neutral as possible meaning neutral to applications and protocols and must be reasonable in cost for a provider to implement and administer. RNM may include across the board rate limiting to protocols that do not adhere to TCP/IP congestion controls. Peer to Peer (P2P) traffic is an example of a protocol which circumvents normal congestion controls. Most reports state that most of the content is

illegal and consumes a huge portion of the available capacity. P2P will allow 100's or even a 1000 sessions/connections to be established on a residential computer and to illegally set up Hosting – thus violating ISP policies while doing it. George Ou's testimony addressed this thoroughly. I know we want to assure "wide open of speech" but let's not mute most in favor of a few or in favor of a rogue protocol.

Ideally reasonable network management would be implemented in such a way that all applications and protocols pass through the General Purpose Internet untouched. Once all Network providers have installed traffic management systems (possibly approved or recommended by a group such as NANOG & IETF) then this could possibly be achieved. There has to be a standard or a set of best practices that all network providers could abide by. How does this get paid for as I mentioned earlier is an important question.

As explained earlier this can be very expensive to implement for a provider with a very distributed network that are not interconnected. Implementing such a network management system on small networks can be cost prohibitive.

No question we need advice from highly technical people (network engineers) such as IETF or from an organization like NANOG like Dr. David D. Clark suggested when a protocol is in question. These organizations can advise us as to any protocols which operate out of the norm which commonly cause excessive network congestion. These organizations can advise us if it is reasonable to think that commercially available reasonable network management software can be developed that would work with APIs (application peripheral interfaces) of Sandvine, Cisco SCE etc. These organizations could advise us of standards that could be established for the industry to abide by. This must happen first before codifying principles.

Copyright issues – This is a National/International disgrace. There needs to be a national education campaign to educate all people about this issue. PSC has received copyright infringements notifications from many walks of life including churches, school administrators, and doctors. P2P applications can and often do provision a user's computer to be used as a seeder unbeknownst to the owner of the account. This violates ISP policy, consumes bandwidth and steals from artist.

Refer to paragraph 144 in the NPRM:

I agree Telecom providers have already addressed the CALEA packet requirement. I don't know how Ma and Pop ISPs can afford or know how to address this. Law Enforcement needs to have a limited resource of engineering of technology to assist very small providers – maybe a national company to fill this need but who pays this? Homeland Security?

Refer to paragraph 150 in the NPRM:

First of all I would advise not addressing managed and specialized services at this time. This is a subject of its own with many complicated variations.

Managed and Specialized services are on an individual case basis and are usually much more expensive.

Usually it is the commercial customer driving the requirements. These services require Service Level Agreements (SLA) which include QOS, maximum allowed latency, restoration time and 24/7 service. PSC has no residential customer requesting such service.

Managed and Specialized services are critical to communities and entities such as Health Care, Government, and Schools. Little economic development will happen with only general purpose Internet access.

Managed and Special services are already a competitive market. These services can be awarded via the traditional tariff Telco or through an ISP, CATV provider using the proprietor infrastructure or combination of both.

Be prepared to tackle the like of Google who too interconnect their distribution servers who are also vertically integrated!

This isn't about not liking Google. I Google a lot. This is about getting as many facts to work with as possible so the FCC can make sound decisions for this Nation-all stakeholders- the American consumer being number one.

Refer to paragraph 154 in the NPRM:

This is a catch 22. First of all wireless for the long term being considered as a platform that will take us to a first place Broadband Rating Internationally is very unlikely. Government for years, including the RUS, has preached economic development. Wireless alone will not get us there. Wireless is a must to have and is fantastic – this cannot be denied -but to serve as a critical infrastructure-no. Wireless cannot even fulfill the backhaul needs of PSC's unlicensed fixed wireless system which serves 2400 wireless broadband customers let alone serve enterprise, healthcare inter-facilities network. Even today large corporations must have Dark Fiber connecting their facilities. Look at I-Light 2! Education Network of America (ENA) in Indiana requires managed/dedicated 50mbps circuits connecting High Schools.

But then what about very rural areas of Montana that cannot afford to bury fiber to customers which may be miles apart? Areas like that must utilize wireless to achieve some kind of a broadband service, at least in the interim. Even a 1Mbps service in an area like that would be greatly helpful and appreciated. So – we can't rule out wireless as a viable platform entirely. Without Broadband USF, rural areas in general, will likely become 3rd world type broadband markets (MFAs).

In rural Southwest Indiana it is rolling terrain and fairly sparse with only 11.15 lines per square mile as reported by PSC. There is no way for unlicensed fix wireless to deliver 100% coverage and be affordable. Affordable and then at the same time allow P2P and OTT video will consume the capacity/throughput of a radio/access point by just a few users.

Refer to paragraph 171 in the NPRM:

I suggest much more study and make this a Phase 2 type of happening. At the same time if wireless is left unleashed of Net Neutrality rules and a small provider like PSC has to compete with the wireless provider who may also be receiving USF dollars then I cry foul.

Wireless is very limited on capacity (throughput), especially unlicensed broadband wireless systems. Let's use the 3.65 GHz WiMAX spectrum for an example with a 5 MHz channel. According to our vendor's specifications, if all customers are modulating at QAM64 3/4 would yield a base station throughput of 12 Megabits. If you believe that OTT Video will likely consume 2 Mbps for SD video then you can see that one base station will not service but a handful of customers if the customers are streaming video at the same time. I think it is logical that once OTT Video becomes common place and users replace their conventional CATV, IPTV or Dish with OTT Video then a significant percentage of the customers will be simultaneously streaming at least 2 Mbps. This is why there will be confusion when we start saying the Internet is general purpose technology but meaning to displace/replace existing infrastructure. General web surfing, downloading a Netflix movie occasionally, or even uploading 20 Meg of photos to Wal-Mart for prints doesn't, in my opinion, pose a significant problem. I consider this general Internet usage. I am talking with network management and capacity in mind not freedom of speech in mind.

It is easy to say this but there will be chaos. Because of trying to appease folks preaching openness, non-discrimination, transparency, and competition, it appears to me the FCC is rushing to regulate platforms which they do not understand technically how they work.

The FCC must be careful not to be instrumental in the slow death of small rural providers for the sake of an application & protocol like Bit Torrent which was deliberately designed to consume the maximum bandwidth without regards to congestion which TCP (Transmission Control Protocol) was designed to help alleviate. See George OU's testimony.

Net Neutrality is a very important topic/issue and I commend the FCC for addressing this issue. I think it was a wise move to ask for comments.

Broadband and Net Neutrality are solvable issues in my opinion but it will take time. Right now is the time to be gathering facts not codifying principles.

I want to thank you Chairman Genachowski, each of the FCC Commissioners and all the FCC staff for the time devoted to this very important national issue.

Thanks for the opportunity to submit my comments.

Respectfully submitted,

Paul Dauby