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Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

GN Docket No. 14-28: In the Matter of Protecting and Promoting the Open Internet

Dear Ms. Dortch:

Recently, Timothy Wu, a Columbia Law School professor and vocal advocate of net neutrality, authored a blog posting regarding a dispute earlier this year between Comcast and Netflix.^{*} The controversy grew out of a continuing increase in the streaming of high-definition videos by Netflix customers who are also Comcast subscribers. The higher volume was congesting the connections into Comcast's network used by Netflix's as traffic carrier, causing deterioration in the download and streaming speeds experienced by those Netflix customers. Netflix wanted Comcast to fix the issue without charge, while Comcast thought that Netflix should pay for Comcast's contribution to a solution. The two parties reached a deal that reportedly involves Netflix paying Comcast an unknown amount for some form of more direct route into Comcast's network.

Professor Wu was highly critical of the settlement, characterizing it as "extortion" by Comcast made possible by its alleged monopoly power. He called for an extension of the net neutrality rules to interconnection and for regulators to stop Comcast's acquisition of Time Warner Cable, another ISP. While focusing primarily on Comcast, Professor Wu also makes accusations against cable ISPs generally.

In our opinion, the blog posting is propaganda, rather than scholarship, and its accusations against Comcast and the broader cable industry are without foundation or merit. Given Professor Wu's standing and reputation, however, his conclusions and recommendations may be given more credence than they deserve, including by the Commission as it considers the comments filed in this proceeding. To address the possibility that his blog piece, or its essential arguments, will be submitted in this docket, we have attached to this letter a detailed rebuttal of those arguments.

We respectfully submit that the Commission should resist the calls by Netflix, Professor Wu and others to extend burdensome regulations to the interconnection level. The proponents of that extension simply have not made the case that there is a need for that intervention into a market that has worked very well for many years.

Very truly yours,

^{*} T. Wu, "Comcast versus the Open Internet," New Yorker Elements Blog, Feb. 24, 2014, <http://www.newyorker.com/online/blogs/elements/2014/02/comcast-versus-the-free-internet.html>.

ATTACK OF THE ROTTEN ANALOGY

Introduction.

Decades before there was an Internet, Albert Einstein said that “a wireline telegraph is a kind of very, very long cat. You pull his tail in New York and his head is meowing in Los Angeles.”¹ That analogy also works for the Internet because it can be thought of as nothing more than a highly-evolved telegraph system. But given that the Internet’s utility depends on two-way communication, to make Einstein’s analogy a closer fit you have to note that the cat’s brain in Los Angeles not only produces the meow, but also causes the cat’s tail to reflexively jerk away from the offending hand in New York.

Of course, there could be no tail to pull or meow to be heard if nature had not invested billions of years in the evolution of the domestic cat from the earliest life forms. Moreover, once a fully evolved cat exists, the tail pull will produce a reaction only if a lot happens within the cat’s body that we do not observe, including the transmission of signals through the trunk and backbone fibers that make up the central nervous system. Naturally, care and feeding is needed if that nervous system is to develop and continue to function optimally as a kitten grows into a cat and lives out its allotted time.

Similarly, broadband access by Americans to all that the Internet has to offer is possible only because businesses have invested hundreds of billions of dollars in the construction of interconnected communications networks, and continue to spend more billions annually for their expansion and maintenance. As in the case of the cat’s meow heard after a tail pull, listening to the YouTube video of a chorus of cats meowing the Christmas carol *Silent Night* after pressing some keys on your laptop requires two-way transmissions across multiple interconnected trunk and backbone networks and other processes that are opaque to ordinary Web surfers.²

While far from fabulous, the comparison of the Internet to a cat is not totally off-base, either—which only goes to show how easy it is to find analogies for the Internet’s basic functionality. It is much harder to come up with a decent analogy for some of the Internet’s hidden workings, as Timothy Wu, a Columbia Law School professor, recently tried to do in a blog posting.³

The subject of the blog piece was the very public dispute between Comcast, a large cable company and Internet service provider (ISP), and Netflix, a leading provider of on-demand streaming media. The controversy seems to have grown out of a continuing increase in the Internet traffic routed through Comcast’s network because of the streaming of high-definition videos by Netflix customers who are also Comcast subscribers. The higher volume was

¹ <http://www.goodreads.com/quotes/72227-you-see-wire-telegraph-is-a-kind-of-a-very>. Einstein was actually trying to explain wireless communications systems, and after giving the cat analogy for wireline telegraph, he said: “And radio operates exactly the same way: you send signals here, they receive them there. The only difference is that there is no cat.”

² The video by the three “Jingle Cats” can be viewed at <http://www.youtube.com/watch?v=cHI8M1K2LXs>.

³ T. Wu, “Comcast versus the Open Internet,” New Yorker Elements Blog, Feb. 24, 2014, <http://www.newyorker.com/online/blogs/elements/2014/02/comcast-versus-the-free-internet.html>.

congesting the connections into Comcast's network used by Cogent, the third party preferred by Netflix as its traffic carrier, causing deterioration in the download and streaming speeds experienced by those Netflix customers.

Apparently, Netflix wanted Comcast to either increase the capacity of Cogent's connections or—better yet, from its perspective—allow Netflix to by-pass Cogent altogether by directly connecting Netflix servers to its switches. Although Comcast was willing to accommodate Netflix in some fashion, problems arose because it wanted to be paid for providing the additional bandwidth or a more direct connection, while Netflix thought that there should be no charge. After much sound and fury, a deal was reached that reportedly involves Netflix paying Comcast an unknown amount for some form of more direct route into Comcast's network.

There is a vocal constituency that does not like or trust ISPs. While we do not have hard data, ISP bashing may account for even more Internet traffic than the streaming of Netflix videos. At the very least, it keeps a lot of bloggers busy. Of course, Professor Wu and Susan Crawford, a Cardozo Law School professor, have made their bones by sniping at cable ISPs. The details of the Netflix/Comcast settlement are not public, but ignorance did not stop members of that community from expressing outrage, including Professor Wu. In his blog posting, he interprets the settlement as proof that Comcast is an unregulated, unprincipled and unrestrained monopoly that gouges its customers for "exorbitant fees," cannot be counted among the ISPs who "want a good experience for their customers," "extorts" money from popular Web companies who want to use its network, is engaged in a "racket" rather than a legitimate business and is a "menace to the rest of the Internet economy."

Netflix, on the other hand, comes across in the posting as an innocent victim who was motivated throughout the entire nasty episode with the brutish Comcast not by its own selfish business interests, but solely by the altruistic desire to make the lives of those it serves just a little bit better. Unfortunately, so Professor Wu's fable goes, Netflix went out of its way to make sure that Comcast's legitimate interests were protected—even going so far as to offer it a magical "free box" that miraculously "solves their mutual problem of getting high-quality video streams with minimal slowdowns." In the end, though, it was forced to bow to Comcast's greed, ruthlessness and unbridled power, according to the Professor. His blog post concluded by calling for an extension of net neutrality rules to interconnection and for regulators to stop Comcast's acquisition of Time Warner Cable, another ISP.

The picture that the blog piece paints of a dark world in which garage innovators, Web application service providers and other heroes are fighting an epic battle to defend their claimed entitlement to free or nearly free bandwidth against the forces of evil led by Darth Brian suggests that the Professor, or those who influence him, may have spent a little too much time on the Xbox while growing up. More significantly, the Professor's case against Comcast seems to be based on some critical errors and omissions.

Professor Wu's blog posting begins with an analogy involving a popular restaurant postulated to be the only one in town serving tomato dishes. Diners love the dishes, but the restaurant suffers from frequent tomato shortages, causing complaints and lost patronage. To improve reliability of deliveries, the tomato supplier offers, at its own cost, to build a storage facility near the restaurant. According to the Professor:

In a competitive market, the restaurant would gladly accept this offer, fearing that its uneven tomato supply will cause it to lose customers. But, if the restaurant industry resembled today's broadband-Internet market, the restaurant would be the only place in town that served tomato dishes. Facing no competition, it might try to extort extra payments from the tomato supplier, knowing that without its business the supplier would go under.

Professor Wu opined that this sort of "backward logic" was inherent in the deal reached by Comcast and Netflix.

Professor Wu is no Einstein, but he has a reputation for being very smart and very knowledgeable about the Internet. In fact, he is widely credited with inventing the term "net neutrality," which is a wonderfully apt catch phrase, although it does have its problems as a regulatory policy. Unfortunately, the analogy he came up with for the Comcast/Netflix skirmish does not measure up by a long shot.

The analogy breaks down in a number of ways, including the unrealistic assumption that the restaurant is the only one in town that serves tomato-based items.⁴ Even if it were, it is unlikely that the chef would buy so many tomatoes as to have the power to cause the supplier to "go under," particularly given the fact that the supplier would have other actual and potential customers besides the restaurant, such as grocery stores, schools and businesses with cafeterias, not to mention other restaurants in nearby towns. Another restaurant in town, with the supplier's support and encouragement, could easily begin to offer tomato-based dishes, reducing the chef's leverage. Certainly, it is unrealistic to think that the supplier would build the facility without a contractual commitment from the restaurant to buy enough from the supplier to justify the necessary construction and maintenance costs.

As noted, Professor Wu argues that in a competitive market, a restaurant concerned about "uneven supply" of a basic input for its business would "gladly accept" an offer by the supplier to build a storage facility for free; however, in a market where the restaurant is a monopsonist, it will instead "extort extra payments." That makes absolutely no sense. The "extra payments" will not solve the restaurant's supply problem, and so it will welcome the offer to build a storage facility, regardless of whether the market is competitive or not. Moreover, since it is the restaurant that pays the supplier, Professor Wu's reference to "extra" payments that the restaurant would "extort" is a mystery. If he means that the restaurant accounts for such a large part of the sales that it can force a reduction in the wholesale price it pays supplier, then the restaurant possesses that market power whether or not a storage facility is built and it is not clear why it would refrain from asserting that power until receiving the offer to build.

These and similar flaws are distracting defects in the design of Professor Wu's analogy that detract from its persuasive force, but they do not necessarily destroy its utility as support for his policy position. The fatal weakness is that the restaurant/supplier and Comcast/Netflix situations are dissimilar when it comes to the variables most relevant to the Professor's argument. Here are a few of the key differences:

⁴ The comparison seems internally inconsistent when it postulates that the restaurant enjoys a monopoly over tomato dishes, but fears losing its tomato-loving customers.

- The restaurant buys tomatoes from the supplier and resells them to the restaurant's patrons. The tomato supplier does not have a direct relationship with the ultimate consumers or get paid by them. By contrast, Comcast (the equivalent of the restaurant in the analogy) does not buy streaming media from Netflix (the supplier's analog) or resell it to viewers. Instead, viewers have accounts with Netflix, place their orders with Netflix and pay Netflix directly. Comcast does not receive any of the money paid by viewers for their streaming media subscriptions.
- As the restaurant sells more tomato-based dishes, both it and the supplier make money. By contrast, neither Comcast nor Netflix earns more when existing Netflix subscribers stream more videos because Netflix charges a fixed subscription price regardless of volume and Comcast does not get a share of that money. If Netflix signs up a new customer who is a Comcast subscriber, it collects new monthly subscription revenues, but Comcast does not earn more. In fact, Comcast may be worse off in both cases because its costs increase even though its revenues do not.
- The restaurant has a monopoly in the relevant market, unlike Comcast which competes with at least one other broadband provider in most areas. Moreover, as discussed below, Netflix has always had an alternative to direct connection to the Comcast network in order to improve the quality of the streaming experience of its customers who are Comcast subscribers, and so Comcast did not have a monopolist's power to force Netflix to accede to its demands.

These dissimilarities mean that Professor Wu's construction is a false analogy and does not support his arguments.⁵ Rotten tomatoes can at least be thrown at one's ideological enemies, but false analogies are completely worthless (apart from those so bad that they have entertainment value⁶).

Daniel Lyons, another law professor,⁷ has observed that "Internet policy is hard to examine by analogy."⁸ Nonetheless, at the risk of falling on our face like we think Professor Wu did, we offer a different analogy. Before presenting it, though, we examine in some detail the facts behind the Netflix/Comcast battle, so that it is easier to see why the alternative analogy is better.⁹

⁵ When the compared objects lack any meaningful similarities, the analogy breaks down at inception and is a "false analogy. An example found on several Websites is this: "Employees are like nails. Just as nails must be hit in the head in order to make them work, so must employees."

⁶ See, for example, <https://writingenglish.wordpress.com/2006/09/12/the-25-funniest-analogies-collected-by-high-school-english-teachers/>.

⁷ He is an Assistant Professor of Law at Boston College Law School and a Member of the Free State Foundation's Board of Academic Advisors. The Free State Foundation describes itself as "an independent, nonpartisan free market-oriented think tank."

⁸ D. Lyons, *Peering Into The Comcast-Netflix Deal*, Perspectives from Free State Foundation Scholars 9, no.11 (2014).

⁹ The description of the background of the dispute is based on information from private sources and Web sources such as S. Ramachandran, *Netflix to Pay Comcast for Smoother Streaming*, The Wall Street Journal, Feb.

The Genesis of the Netflix/Comcast Dispute

While it would be cool if the Internet really were a continent-spanning cat, it is something a lot more mundane: interconnected transmission networks that enable a bunch of machines to communicate with each other using a common “protocol.” It is, as we all know, the means by which individuals and entities use the World Wide Web to share data, engage in e-commerce and do a host of other things, such as comparing the prices of tomatoes at local grocery stores.¹⁰

In the U.S., the major interconnected networks that are part of the Internet are owned by commercial enterprises that have spent billions to build or acquire them, primarily using funds supplied by lenders and investors who want to earn a return on their money. In order to pay their costs of capital and expenses and, hopefully, generate a profit, the networks engage in the ISP business, selling access to the Internet and transmission capacity (bandwidth) on their networks to folks who do not own a network. In general, the buyers are households, businesses or others that want to access the Web and Websites that want to reach households, businesses and other audiences. ISPs also make bandwidth available to businesses, universities, government entities or other customers who want to transport large amounts of data between locations through data pipelines that are not connected to the public Internet. In short, the basic business of an ISP is selling Internet access and bandwidth, just as the primary business of law schools is selling legal educations.

Each ISP has direct links between its network and its customers’ computers and servers, but no ISP has links to every Internet point in the world. In order to enable its customers to reach points not directly connected to its network and vice versa, an ISP has to create interconnections with other ISPs.

This infrastructure means that if you are Netflix, you need to establish connections between your servers and your subscribers’ computers in order to stream media to them. Each subscriber has a direct link solely with its own ISP, and so Netflix can reach a particular subscriber only if it secures an interconnection with his or her specific ISP. Because Netflix’s U.S. subscribers are dispersed throughout the country and use different ISPs, Netflix must have connections with all of those ISPs. Those connections have to be sufficient to allow Netflix to pass through to each ISP’s network or “transit” the volume of traffic generated by its customers’ media downloading and streaming.

So, how does Netflix go about getting a connection with the network of an ISP like Comcast that carries with it sufficient bandwidth to meet its business needs? It has several options. First, Netflix could load copies of its media library onto a server and directly connect it

23, 2014, <http://online.wsj.com/news/articles/SB100014240527023048347-04579401071892041790>; D. Rayburn, *Inside the Netflix/Comcast Deal and What the Media is Getting Very Wrong* streamingmediablog.com, Feb. 23, 2014, <http://blog.streamingmedia.com/2014/02/media-botching-coverage-netflix-comcast-deal-getting-basics-wrong.html>; D. Lyons, *Peering Into The Comcast-Netflix Deal*, Perspectives from Free State Foundation Scholars 9, no.11 (2014); and J. Brodtkin, *Netflix is paying Comcast for direct connection to network*, Ars Technica, Feb. 23, 2014, <http://arstechnica.com/business/2014/02/netflix-is-paying-comcast-for-direct-connection-to-network-wsj-reports/>.

¹⁰ Visit, for example, <http://www.comparegroceryprices.org/>.

to Comcast's network at a Comcast-controlled collocation site. The desire of Netflix to do precisely that was at the heart of its dispute with Comcast.

Second, there are companies that offer "content delivery network" or "CDN" services to streaming video providers and already have servers collocated with Comcast's equipment, such as Akamai and Level 3. Netflix could contract with one or more of those companies to include its content on those servers.

Third, Comcast offers what it calls "Wholesale Dedicated IP Transit,"¹¹ which allows large "distributed content providers" like Netflix to buy dedicated "ports" into Comcast's network in order to reach Comcast's Internet subscribers. Ports are available in two "sizes" that differ in the amount of traffic allowed to be transited through them. This is not a unique offering by Comcast—many ISPs sell dedicated IP transit capacity, although prices and terms may vary.

Finally, Netflix could contract with one or more of the existing third-party transit providers that already have ports into Comcast's network. This option is generally cheaper than either CDN service or Comcast's dedicated transit service.

Netflix at one time used third-party CDN providers to deliver all or substantially all of its streaming content to its customers. At some point, it made the decision to shift a large part of its traffic to third-party IP transit providers, including traffic destined for subscribers of Comcast and the other major ISPs. Netflix buys transit from several established companies, including Cogent and Level 3. The terms of its contracts are not public, but it is likely that each provider commits to transit up to a specified maximum amount of traffic for a price that is fixed or varies with traffic volume. Fortunately, we do not need to know the precise terms in order to understand what happened between Netflix and Comcast.

The ultimate source of their disagreement was Netflix's business model, which Daniel Klein of *The Motley Fool* has described as "selling \$20 bills for \$19 and attempting to make up the difference on volume."¹² It charges a fixed subscription price, \$7.99 a month, for the right to unlimited streaming of its media library. Its costs, which include content acquisition, production and delivery, employee, marketing and other expenses, have been increasing. Netflix has, for a while, been under pressure to increase its revenues and decrease its costs.

Some observers believe that the desire to save money was the reason that Netflix switched most of its traffic from CDN service providers like Akami and Limelight to cheaper transit service companies like Cogent. That move was a voluntary decision, and neither Comcast nor any other ISP forced Netflix to make the change.

Once it made the decision to rely mainly on third-party transit, Netflix had a range of choices because there are at least a dozen competitive providers offering different prices, service options and service level commitments. More importantly, they also differ in the number of ports that each has into a given ISP's network. Akami, for example, reportedly connects to Comcast's

¹¹ See <http://www.comcast.com/dedicatedinternet/?SCRedirect=true>.

¹² D. Klein, *Why a Netflix Price Increase Inevitable*, *The Motley Fool*, Mar. 10, 2014, <http://www.fool.com/investing/general/2014/03/10/why-a-netflix-price-increase-is-inevitable.aspx>.

network through ten ports, while Cogent may have as few as two, but Akami is more expensive than Cogent. In any event, it appears that Netflix had the ability to route traffic intended for Comcast's network through several different providers, some with a few and some with a lot of ports connected to Comcast's network.

Ports for transiting traffic have a fixed amount of capacity—an analogy that works well is to think of ports as pipes with different diameters. If a port is already handling the maximum amount of traffic it can transit, then any additional traffic sent to the port will cause it to become congested. Internet users to whom the traffic is directed will see a slowdown in their streaming, download and refresh speeds. Some of the providers Netflix could have used to transit traffic to Comcast did not have, individually, enough ports to transit all of Netflix's Comcast-bound traffic during peak periods. Some of the providers did have enough on their own and all of them collectively had more than enough. Netflix's costs of transit varied among the different carriers.

While switching from CDN services to transit providers probably saved Netflix money, it knew that it could save much, much more if it eliminated the need for middlemen altogether by creating a direct CDN relationship with ISPs, as long as the ISPs did not ask for compensation for allowing collocation. Last year, it began a push to secure those relationships through a program it called "Open Connect." It has had some success, but we do not know the terms of the Open Connect deals that it has struck.

Also starting last year, customers of several ISPs, including Comcast, began to experience continuing declines in the speeds at which they could download or stream Netflix media during peak hours. Netflix asked Comcast to participate in its Open Connect program as a solution, but Comcast balked. At some point, the situation became public and after exchanges of accusations and denials by both parties, a settlement was reached. Although the terms are confidential, it is believed that the deal involves Netflix paying Comcast for the right to create some form of connection that avoids the need for transit providers. Some accounts of the deal state that Comcast did agree to collocation of Netflix servers at Comcast facilities; however, *The Wall Street Journal* reported that "Comcast will connect to Netflix's servers at data centers operated by other companies" rather than inside Comcast's own facilities.¹³

Some supporters of Netflix and enemies of ISPs suggested that Comcast had intentionally engineered the drop in speed in order to pressure Netflix to pay it for assuring quality delivery of its content. Others alleged that even if the slowdown was not intentional, Comcast took unfair advantage of the situation by refusing to increase the bandwidth available to Netflix's transit providers unless it received extortionate payments or Netflix paid for a direct connection.

Other sources, which we think are more credible, say that those charges are not true, and that ultimate responsibility resides with Netflix. Netflix's available transit providers collectively (and, in some cases, individually) seem to have had more than enough ports and bandwidth to transit peak-period traffic without a drop in speed. However, Cogent, one of those providers, did not have enough by itself. Netflix continued to transit traffic through Cogent even after its ports were saturated, causing a transmission backup experienced by Comcast subscribers as slower downloads and streaming. Netflix could have restored speeds by spreading out its traffic among

¹³ S. Ramachandran, *Netflix to Pay Comcast for Smoother Streaming*, *The Wall Street Journal*, Feb. 23, 2014, <http://online.wsj.com/news/articles/SB100014240527023048347-04579401071892041790>

multiple transit providers. Indeed, distributed content providers that generate a lot of traffic often arrange for backup capacity to safeguard against congestion during peak periods.

The decision not to reroute traffic in order to utilize available backup capacity seems to have been a voluntary one by Netflix. It did not need permission from or action by Comcast in order to send traffic to Akami or another carrier instead of Cogent, and Comcast does not seem to have attempted to take advantage of the situation by blocking that option in order to extort money from Netflix.

While rerouting traffic was a real-time solution, Netflix had other options to restore speeds for its Comcast customers. It could have resumed using CDN service providers to a greater degree or contracted with Comcast for dedicated transit service. If, for whatever reason, it preferred Cogent to other carriers, another option would have been for Cogent to buy more bandwidth from Comcast on its standard terms. Presumably, Cogent was unwilling to do that because the extra cost would make its transit arrangement with Netflix unprofitable, and Netflix was unwilling to renegotiate its contract with Cogent to cover Cogent's increased costs.¹⁴

So why would Netflix, of its own volition, fail to redirect the traffic that Cogent could not handle during peak hours to another transit provider or pursue other available solutions? We do not know the answer with certainty. One possible answer is that Netflix acted as it did purely for economic reasons. Recall that Netflix is under pressure to improve its financial performance and is trying to reduce its expenses dramatically. Cogent, the theory goes, is Netflix's lowest-cost transit provider, and so Netflix avoided shifting traffic to other providers, relying more on CDN providers or buying dedicated access because all of those options would cost more.

On the surface, that might appear to be penny wise and pound foolish, since a slowdown in speeds could cost Netflix considerable good will among existing customers, make it harder to attract new customers and lead some customers to cancel their subscriptions. For that reason, some have suggested that the decision to keep overloading Cogent's ports was a strategic move by Netflix. By vocally blaming the situation on Comcast's refusal to agree to Open Connect, Netflix could maintain the loyalty of its customers and shift their ire to Comcast, resulting in pressure for Comcast to agree to Open Connect on Netflix's terms. At the same time, blaming Comcast would improve the prospects for success in the efforts of Netflix and certain transit providers to convince the Federal Communications Commission, which is in the process of adopting new net neutrality rules, that it should extend those rules to interconnection in ways that would benefit Netflix's bottom line.

¹⁴ Both Cogent and Netflix claimed that Comcast was at fault for refusing to increase the capacity of Cogent's connection without charge. Comcast, however, explained that its policy is to charge for traffic that an ISP transited to its network in excess of the amount that Comcast transited to that ISP, and Cogent was sending far more traffic to Comcast than vice versa. Comcast's published "peering" policy states that to be eligible for a so-called "settlement-free" exchange of traffic, an ISP "must maintain a traffic scale between its network and Comcast that enables a general balance of inbound versus outbound traffic." <http://Comcast.com/peering>. Some form of that policy is followed by virtually every ISP in the country, and so Comcast's position was neither sinister nor extortionate. It appears that Cogent "is frequently involved in peering disputes." T. Underwood, *Wrestling With the Zombie: Sprint Depeers Cogent, Internet Partitioned*, Oct. 31, 2008, <http://www.renesys.com/2008/10/wrestling-with-the-zombie-spri/>.

We need not pass on the merits of speculation like this. Instead, we will simply note that Netflix, for whatever reason, seems not to have taken advantage of available options to protect its customers from slowdowns, and it appears that Comcast did not block use of those alternatives or seek to exploit the situation by preventing their use unless it was paid money to which it was not otherwise entitled.

A Better Analogy

So, with that background in mind, we can offer our alternative to Professor Wu's analogy. It begins by supposing that there is a for-profit company that makes healthy snacks. The snacks are some of the offerings available for purchase in vending machines installed at various locations on Columbia University's campus by an unrelated company. The snack company pays the vending machine company a fee to place its snacks in the machines and could get additional slots from other companies with the right to put products in the machines or by buying them directly from the vending machine owner. Columbia charges rent for each vending machine, which the owner has to pay because Columbia controls access to its students while on campus.

The snack company is under pressure to improve its financial performance and comes up with a plan to reduce its costs and supplement its revenues. It approaches Columbia and proposes to replace the vending machines already on campus with the snack company's own machines. Under its proposal, it would not charge Columbia, but it would also not pay Columbia anything.

We can readily see the advantages of this to the snack company. While it has to pay the capital cost of acquiring vending machines and the operating costs of keeping them stocked and in working order, it will capture the entire revenues from sales and avoid having to pay the existing vending machine concessionaire. It is much harder to see why Columbia would agree to the proposal. It would no longer collect rent and gain no offsetting benefit for itself or its students, who already have reliable access to the snacks. To the extent that students would like to buy more of the snack company's products, the snack company has the ability to get more slots in the existing machines.

While still not perfect, this analogy seems far better than Professor Wu's because it is more comparable to what appears to have actually transpired between Netflix and Comcast.¹⁵ As is true of Columbia's students who could buy the snacks from the machines in place, there already was an opportunity for Comcast's subscribers to enjoy reliable, high-speed downloads and streaming of Netflix videos—all Netflix had to do was route its traffic more intelligently. Consequently, as in the case of the snack company's proposal, there was no appreciable additional benefit to Comcast's subscribers to be gained if Comcast joined the Open Connect program. On the other hand, by collocating its servers with Comcast's switches, Netflix would get to keep for itself the money it pays CDN and transit providers, just like the snack company would be able to retain all, rather than only a share, of the money students paid for its snacks if Columbia accepted its offer. The benefit to the snack company, however, came at the price to

¹⁵ Unlike tomatoes, analogies can approach but never achieve perfection because, in a perfect analogy, the two objects compared would be identical rather than merely analogous. An example of an exceptionally elegant, almost perfect analogy for making the writer's point is this one by Elizabeth Gilbert: "As smoking is to the lungs, so is resentment to the soul; even one puff is bad for you."

Columbia of giving up the rental revenues it collected from the vending machine company, just as the benefit to Netflix would require Comcast to lose the fees it collected from CDN and transit providers for Netflix's traffic.

So, in light of the very different picture of what happened that results from our more accurate analogy, can we expect Professor Wu to withdraw his criticisms of Comcast and calls for government intervention that were based on his tomato-restaurant analogy? That seems unlikely. So, because we do not expect him to be dismissing his case, it is worthwhile to examine some of his points to see if they have merit even if his analogy fails—as it surely does.

Cable ISPs Are Not Price-Gouging Monopolists.

In his blog posting, there are a number of places where Professor Wu paints the cable industry with a broad brush. As noted earlier, one claim he makes is that “cable operators are free to charge exorbitant fees for their services.” Indeed, he seems to go so far as to characterize those fees as “monopoly prices.” This charge that cable ISPs are actual or virtual monopolies lies at the heart of the criticisms of the industry levied by Professor Wu, Professor Crawford and others of like mind. Without it, their case for government intervention in the industry would be much weaker.

Just before levying his accusation that all “cable operators” overcharge, Professor Wu expresses his approval of the decision by some, such as Cablevision, to participate in the Open Connect program without, or so he assumes, collecting any money from Netflix. Their behavior, though, does not fit with his narrative about how cable ISPs possess vast market power that they will inevitably abuse unless put on a leash by the government, and so he has to distinguish them from Comcast in some way. He does so by claiming that they “face actual competition and seem to want a good experience for their customers” while “Comcast is different” because it “has real market power based on its lack of real competition” and because of its “control over access to millions of customers.”

Now, the ISPs that have signed on to Open Connect include the top cable companies other than Comcast and a few others that apparently are still in active discussions about getting with the program. So, Professor Wu clearly is saying that the top cable ISPs other than Comcast face actual competition and are “different” from Comcast, which has monopoly power. In that case, how can it also be true that all of them are “free” to charge monopoly prices, as Professor Wu alleges just a few sentences later?

If we ignore that internal inconsistency or just plain sloppiness, Professor Wu's message seems to be that there is only one cable ISP that is a monopoly—Comcast. That fact knocks the legs out from under the agenda of those like Professor Crawford who argue that because all of the cable ISPs are virtual monopolies, protecting consumers and the public interest require the government to either overbuild them or regulate them as heavily as it did electric and telephone companies during the heyday of public utility regulation. It also seems to fatally or severely weaken calls by Professor Wu for strong net neutrality rules that apply to ISPs across the board and to extend those rules to the interconnection level.

Second, Professor Wu has failed to make the case that Comcast really is different from his good guys who allowed Netflix to have its way. The only distinction he cites is his claim that

the ISPs who have signed Open Connect deals with Netscape “face actual competition” while Comcast “lack[s] real competition” and has a “termination monopoly” because it is the gatekeeper for access to the millions of customers whose only connection to the Internet is through Comcast. Of course, Comcast faces competition from at least one telephone company offering broadband in virtually all of its markets and also competes with overbuilders like RCN and WOW, municipal utilities and Google Fiber in some of its markets. The competition is quite vigorous, and some of its competitors, like Verizon, Google Fiber and EPB in Chattanooga, charge less than Comcast for service levels that offer the same or higher speeds. Moreover, Google Fiber has demonstrated that there are no insurmountable barriers to entry into the residential ISP business.

These are inconvenient facts in the pursuit of the Professor’s agenda, and so he tries to make them go away by drawing a supposed distinction between “actual” or “real” competition and the kind of competition that Comcast experiences, although he does not explain the difference. In reality, there is none. Cablevision, Suddenlink and other cable ISPs that are Open Connect participants compete with the same types of broadband providers as Comcast and, in many cases, with the very same companies. For example, Cablevision, which Professor Wu singles out as one of the good guys, competes with some of the same companies as Comcast in certain of its markets—Verizon, for example. Indeed, overall, Cablevision may face less competition than Comcast because, to our knowledge, it does not compete with overbuilders, municipal cable systems or Google Fiber, as does Comcast.

As we remarked above, the Professor tries to bolster his claim that Comcast has monopoly power by saying that it enjoys a “termination monopoly” because of “its control over access to millions of customers.” This certainly sounds ominous, and at first blush it may appear that the Professor is on to something. On closer examination, however, this turns out to be no more than what he calls it himself—jargon. All it means is that Comcast’s Internet subscribers, just like almost all other broadband users in pretty much the entire world, do not have redundant Internet connections. The reason is that it makes no sense for consumers to pay for a second connection when a single one serves our needs. Thus, if Comcast actually does enjoy a “termination monopoly” over its subscribers, then so do all the other ISPs, some of which also have “millions of customers. It is not clear why Comcast’s possession of “control over access” to its subscribers gives it the power to extort Netflix or other Web businesses, but the possession of the same kind of control over customers by Cablevision or another ISP in the Open Connect program does not give it that power.

Of course, the fact that Professor Wu’s position on which ISPs have or do not have monopoly pricing power has some inconsistencies and other flaws does not necessarily mean that he is wrong when he says that at least some cable ISPs overcharge for their services. If we explore that accusation in detail, though, it turns out to be without merit.

Professor Wu does not explain the basis for his conclusion that “cable operators” overcharge or provide any statistics to demonstrate his allegation. As is true of most of his indictments of the industry in the blog posting, he levies the charge without giving or citing any supporting evidence.

As far as we know, there is no such evidence. Indeed, we are not aware of any generally accepted standard for determining the “right” or “fair” price for Internet access, an iPad or

Kindle, a license for Windows 8, a legal education at Columbia or any of the thousands of other goods and services that companies sell. Of course, if sellers publish their prices, we can figure out whether or not the price that one company charges is in line with those charged by others in the same market. For example, we know that Columbia Law School's annual tuition was the second highest in the country for the 2012-2013 school year at \$52,902,¹⁶ compared to the average of \$40,500 for private and \$23,600 for public law schools.¹⁷ By contrast, Comcast's prices for its residential Internet access service are certainly competitive in most markets, and its peering policies are consistent with those of other ISPs that have been standard practice within the industry for many years.¹⁸

Of course, these comparisons tell us nothing about quality. Columbia is the fourth highest ranked law school in the country, and perhaps it costs more in large part because it provides a better legal education. They also do not speak to relative costs. Maybe Columbia has higher costs than the average law school because of its location on the upper West side of Manhattan or because it spends more on resources for students than other schools.

On the other hand, if we found that Columbia, in fact, had lower costs than most other law schools and that its profit margin from tuition revenues was significantly higher than the vast majority of law schools, then we might have some justification for saying that it overcharges. It is possible, in other words, that Professor Wu bases his accusation on his belief that cable companies' margins for their Internet businesses are excessive and out of whack with those in other industries. That, in fact, is a charge that is often levied by critics of cable ISPs, most notably Professor Crawford.

For years, in Web posting after Web posting, Op-ed after Op-ed, Professor Crawford has berated cable companies for earning "obscene" profits from their residential Internet access business. To support that allegation, she usually cites nothing more than an estimate that cable ISPs earn a "95% gross profit margin", attributing her information to Craig Moffett, a cable industry analyst.¹⁹ In a 2013 article commenting on former FCC Chairman Genachowski's Gigabit Challenge, she again referred to the 95% figure. This time, however, she dropped the word "gross," so that her claim became one that cable companies are enjoying a 95% profit margin on their Internet access service, which is a much different thing from a 95% gross profit margin.

Gross profit is the amount of revenues from sales of a product or service in excess of the direct costs of producing that product or providing that service, and gross profit margin

¹⁶ A. Rogers, *The 20 Most Expensive Law Schools In America*, Business Insider, Jul. 4, 2012, <http://www.businessinsider.com/the-20-most-expensive-law-schools-in-america-2012-7?op=1>.

¹⁷ E. Bronner, *Law Schools' Applications Fall as Costs Rise and Jobs Are Cut*, The New York Times, Jan. 30, 2013, http://www.nytimes.com/2013/01/31/education/law-schools-applications-fall-as-costs-rise-and-jobs-are-cut.html?_r=0.

¹⁸ See Letter, dated January 13, 2011, from Ian Dillner, Vice President, Federal Regulatory Affairs, Verizon, to Marlene H. Dortch, Secretary, FCC, MB Docket. No. 09-191.

¹⁹ Some cable critics claim that the number is 97%--again citing Mr. Moffett as a source. See, e.g., D. Talbot, *Google Fiber's Ripple Effect*, MIT Technology Review, Apr. 26, 2013, <http://www.technologyreview.com/news/514176/google-fibers-ripple-effect/>. Mr. Talbot, like Ms. Crawford in some of her publications, fails to distinguish gross profit margin from net profit margin.

represents the proportion of each dollar of revenue that the company retains after paying those direct costs. Gross margins can vary dramatically from one industry to another depending on the business. For example, software companies will generally have a much higher gross margin than a manufacturing firm because manufacturing requires the firm to purchase materials to make its products, while software development usually requires the purchase of fewer inputs. The direct costs of a cable ISP's business consist primarily of the costs of buying bandwidth for transport of data transmissions to and from its subscribers.

Gross profit, however, is not money that stockholders can put in their pockets. The enterprise has many other, indirect costs of doing business that are not deducted in calculating gross profit. For example, if a company's gross margin for the most recent quarter was 65%, it would retain \$0.65 from each dollar of revenue generated, but that money would have to be applied to pay selling, general and administrative expenses, interest expense and other indirect costs. A cable ISP's direct costs of providing Internet access service are dwarfed by the firm's indirect costs of operating its ISP business, such as the expense of compensation and benefits for engineers, IT staff and other employees, the costs of operating call centers and maintaining fleets of vehicles to take orders and respond to customer service requests and paying interest on money borrowed for the capital expenditures needed to build, expand and maintain its network. Only whatever is left of the dollar after taking care of those costs, which is the enterprise's net profit, would be available for dividends to shareholders.

Gross profit margins and net profit margins vary widely from one industry to another. For the telecommunications industry, gross profit margins averaged 86.51% in 2010. Because of the industry's high overhead, most of that gross profit was applied to cover indirect expenses, resulting in average net profit margin of only 10.99%.²⁰ According to one source, the average profit margin for publicly traded telephone and cable companies in this country is "among the lowest in the world."²¹

If we look specifically at the two largest cable companies, it is obvious that they are hardly earning "obscene" profits. During the 2009-2012 period, Comcast's average gross profit margin was 59.74%²² and TWC's was 52.12%.²³ Average net profit margins were 10.17% for Comcast²⁴ and 5.99% for TWC.²⁵ By comparison, during the same period, Apple's five year average gross profit margin was 43.87%, and its average net profit margin was 26.67%.²⁶

²⁰ <http://smallbusiness.chron.com/reasonable-profit-margin-17989.html>.

²¹ W. Rinehart, *Comcast-Time Warner Cable: An Overview of the Relevant Markets*, American Action Forum, Feb. 19, 2014, <http://americanactionforum.org/insights/comcast-time-warner-cable-an-overview-of-the-relevant-markets>.

²² <http://financials.morningstar.com/ratios/r.html?t=CMCSA>.

²³ <http://financials.morningstar.com/ratios/r.html?t=TWC>.

²⁴ <http://financials.morningstar.com/ratios/r.html?t=CMCSA>.

²⁵ <http://financials.morningstar.com/ratios/r.html?t=TWC>.

²⁶ <http://financials.morningstar.com/ratios/r.html?t=AAPL®ion=usa&culture=en-US&ownerCountry=USA>.

Google's figures were 62.61% for gross profit and 27.57% for net profit.²⁷ For Netflix, the averages were 35.38% for gross profit and 6.94% for net profit.

Remember that it is net profit, not gross profit, which measures how much a company and its owners make from the business. Although cable companies have higher gross margins than companies like Apple and Google, the indirect expenses that they must pay out of gross profits are higher—so much higher, in fact, that their net profit margins wind up being significantly smaller than those of Apple and Google, despite their starting with higher gross profit margins. We have never once, however, read anything by Professor Crawford suggesting that Google's or Apple's margins are "obscene," as she has said of cable ISP margins.

Moreover, the gross margins of cable companies are not very much different from those of the municipal utilities that are the darlings of Professor Crawford and those who share her views. Comcast's standard, undiscounted rate for its 105 Mbps service in Chattanooga ranges from \$59.99 to \$76.95 per month, depending on the exact area where the customer is located and the other services to which the customer subscribes. Of course, promotional offers mean that the actual price may be significantly lower, which is probably true since Comcast's average revenues per subscriber are, in fact, below its published rates. If, however, we simply assume that the rate card prices apply and also assume that those prices represent a 95% gross profit, then Comcast's direct costs represent 5% of the monthly price, or \$3.00 to \$3.84. The Internet access service offered by the municipal utility in Chattanooga, which Professor Crawford holds up as an exemplar of the benefits of government provided broadband, charges \$57.99 a month for 100 Mbps service. If we assume that the utility's direct costs are about the same as Comcast's—and the logic of Professor Crawford's love affair with municipal networks dictates that it must be comparable—then the utility's gross profit margin is from 93.4% to 94.8%, which is practically indistinguishable from Comcast's alleged gross margin. Yet, in Professor Crawford's world, the municipal network is an angel and the privately owned network is evil incarnate.

In short, the size of the gross profit margin of cable ISPs does not prove that they are price gouging.²⁸

Another way to assess Professor Wu's charge that cable ISPs overcharge is to look at return on investment because a supra-competitive rate of return implies supra-competitive pricing. For this purpose, we can compare four leading ISPs, AT&T, Comcast, Time Warner Cable and Verizon, to four companies that play prominent roles in the Internet ecosystem, Apple, Facebook, Google and Microsoft, using the amounts of their balance sheet entries for property, plant and equipment and intangibles as a surrogate for invested capital:

²⁷ <http://financials.morningstar.com/ratios/r.html?t=GOOG>.

²⁸ See, generally, M. Starr & W. Rinehart, *Does cable really have a 97% profit margin?*, The Daily Caller, Feb. 5, 2013, <http://dailycaller.com/2013/02/15/does-cable-really-have-a-97-profit-margin/>.

	INTERNET/TECH COMPANIES					WIRELINE DISTRIBUTORS				
	AAPL	FB	GOOG	MSFT	Total	AT&T	Comcast	TWC	Verizon	Total
Equity Value	\$ 465	\$ 150	\$ 366	\$ 325	\$1,307	\$ 184	\$ 127	\$ 37	\$ 208	\$ 557
Net Cash(Debt)	\$ 142	\$ 11	\$ 55	\$ 90	\$ 299	\$ (68)	\$ (39)	\$ (24)	\$ (36)	\$ (167)
% of Equity Value	30%	7%	15%	28%	23%	NA	NA	NA	NA	NA
Total Revenues	\$ 174	\$ 8	\$ 60	\$ 83	\$ 325	\$ 129	\$ 65	\$ 22	\$ 121	\$ 336
Operating Income (OI)	\$ 49	\$ 3	\$ 14	\$ 28	\$ 94	\$ 30	\$ 14	\$ 5	\$ 32	\$ 81
OI Margin	28%	36%	23%	34%	29%	24%	21%	21%	27%	24%
NII	\$ 20	\$ 4	\$ 23	\$ 15	\$ 60	\$ 173	\$ 107	\$ 42	\$171	\$ 492
OI/NII	251%	74%	62%	193%	155%	18%	13%	11%	19%	16%

- Notes: (1) All dollar figures are in billions of dollars.
(2) Equity Values based on closing stock price on 4/1/2014.
(3) Balance sheet data is as of, and income statement data is for the year ended, 12/31/2013.
(4) NII, or Net Infrastructure Investment, is balance sheet Property, Plant & Equipment plus Intangible Assets (including patents and franchise rights).

As the table reveals, ISPs are earning lower rates of return, accumulating far less cash and experiencing market values far below those of the comparison companies. If ISPs are overcharging, then we need to come up with a new term to describe what the comparison companies are doing.

All of this suggests that Professor's Wu's allegation of monopoly pricing or overcharging by cable operators is simply not true.

*What Do ISP Have In Common With Tomato Growers, Restaurants and Law Schools?*²⁹

Professor Wu argues in his blog posting that Comcast should have allowed Netflix to co-locate its servers within Comcast's network free of charge. In our country, individuals, businesses, institutions and government entities rarely allow unrelated enterprises to use their property for free, particularly if the usage is for purposes of earning a profit. The only reason the Professor offers for expecting Comcast to behave differently is the fact that its residential subscribers would benefit through elimination of the slowdowns experienced because Netflix kept sending traffic to saturated ports. According to him, Comcast could secure that benefit for next to nothing. Netflix, he says, offered it servers for free and there would be no other appreciable costs for Comcast because he thinks that "once a cable company's infrastructure is in place, it costs it almost nothing to provide actual service."

We need to keep in mind that Netflix has an even greater interest than Comcast in improving the streaming experience of its customers. Moreover, as noted, Netflix already had it within its power to improve speeds for Comcast subscribers by making better choices in transiting its traffic, but it chose not to do so. So, precisely why Professor Wu thinks that Comcast should care more and do more than Netflix is not clear. In all fairness, he should be criticizing Netflix for ignoring the best interests of its customers, not Comcast. Nonetheless, if co-location really does not cost Comcast anything or very much, then why shouldn't it do Netflix a favor and save it transit fees? Not only would that be a nice thing to do, but it might reduce the size of its subscription price increase that everyone thinks is inevitable.

²⁹ Hint: How many times in the past year have you gotten free tomatoes, dinners and law degrees?

One reason Comcast might not want to do the favor is suggested by the Columbia Business School's "No Free Lunch" seminar program that is intended to give the Columbia community access to Business School faculty research.³⁰ The title of the seminar series refers to the economic axiom that nothing is free, and even things without a direct charge to you have a cost that has to be borne by somebody, either you indirectly or someone else. That principle is fully applicable to the "free" Netflix servers. Installing them would not actually be without expense to Comcast because of another concept from economic theory: "opportunity cost," which is a term that refers to the fact that if you take one path, you forego any benefit you may have realized by taking another.

If Comcast did the favor for Netflix, then it would give up the fees that it received from Netflix's transit and CDN providers before the direct connection with Netflix was created. That is a real economic loss suffered by Comcast. Of course, Comcast creates budgets and sets the prices for its services based on its actual and projected revenues. If it no longer collected the fees from Netflix's CDN service and transit providers, then it would have to make up that shortfall somehow, such as by raising the prices it charges to its residential subscribers or other customers. So, Netflix benefits, but Comcast or its customers pay the price.

Another flaw in the Professor's argument is that it is not true that an ISP's cost to provide service once it has built its network is "almost nothing." He does not explain the basis for that conclusion. We note, however, that there has been a lot of buzz surrounding the notion that the marginal cost of digital products is zero; that is, once you produce a movie for Web distribution, the cost of delivering one more copy to a viewer are negligible. Some, notably Jeremy Rifkin, have gone so far as to say that technological and other changes now occurring are going to produce, within a couple of decades, a society in which all or most goods and services have zero marginal cost. That, he predicts, will lead to the demise of capitalism and its replacement with a collaborative economy in which nearly all things are free. (Besides killing capitalism, these developments will, we regret to say, also bring an end to the No Free Lunch seminars. There actually will be free lunches and, when everything stops being what economists call "economic goods," there will be no need for economic theory or even business schools.)

The notion that digital goods and services have no or very low marginal costs may have influenced Professor Wu's thinking. If so, where it all becomes more than a little fuzzy is in dealing with the not-insignificant problem of paying for the factories, power plants and other things needed to produce all of the zero-cost products. All we can say is that when the second and subsequent units produced by an auto factory become free or nearly so, the price tag on the first unit will be a doozy.

Like constructing an auto factory, building a network takes an awful lot of capital, and the banks and investors who supply it insist on eventually recouping it and also realizing a return on their investments. Moreover, it costs money to maintain networks and expand them in order to keep pace with increasing usage. ISPs spend billions of dollars every year for those purposes. Directly connecting its servers with Comcast's switches dramatically lowers the amount of bandwidth that Netflix has to buy, but does not reduce the amount of bandwidth that Comcast

³⁰ <http://www8.gsb.columbia.edu/financialstudies/outreach/nofreelunch>.

needs within its own network to deliver streaming media and video downloads to its subscribers who are Netflix customers.

According to Sandvine, Netflix accounts for over 31% of the downstream data transmissions in North America,³¹ and both the absolute amount of traffic it generates and its percentage of total traffic have been growing rapidly. When it switches to 4k resolution, the bandwidth needed to stream Netflix's media to an ISP's subscribers will increase even more dramatically. Rather than costing "almost nothing," expanding networks to match the growth in bandwidth usage because of edge provider services costs a lot of money. In fact, we feel safe in predicting that the amount that ISPs spend keeping pace with growing bandwidth use already far exceeds the transit costs Netflix will save through its Open Connect program.

Another point worth making about the Professor's argument is that ISPs are hardly the only enterprises that have a zero or nearly-zero marginal cost for an incremental unit of output. Consider, for example, Columbia Law School. Once you construct a law school and acquire accoutrements like faculty and a library, the marginal cost of providing a legal education is low; yet, the school charges one of the highest tuitions in the country and does not give free legal educations to those who can afford to pay. Another example is Netflix. Once you acquire a media library, the marginal cost of providing service to an incremental subscriber is at or approaches zero; yet, the subscription fee it charges is not close to zero.

We do not see Professor Wu suggesting that Columbia or Netflix should give away legal educations or streaming media rights, which are their bread-and-butter products; yet, he believes that Comcast should give away bandwidth. Remarkably, that is a common attitude among the ISP-bashers, who include a fair number of Internet free riders—businesses that think they should have unlimited use of high capacity networks without sharing in the costs of building or operating them—as well as free surfers—Internet users who think that access should be free or nearly so.

That, of course, is unrealistic and unfair. Like Columbia Law School, Netflix and every business you can think of, Comcast has to recover the costs of building the infrastructure needed to produce the product or service it sells and generate a return for its sources of capital, and so it can hardly afford to give bandwidth away for free to Netflix or others.

Besides economic principles, the concept of fairness is another way of evaluating Professor Wu's assertion that Comcast was wrong to refuse to allow co-location without charge. When an action needs to be taken by one of two people and each of them is saying it should be the other guy, those of us on the outside often decide what is fair by considering four factors: What have other people done in similar situations? Who has the most at stake? What are the relative benefits and costs? How have the two parties behaved—do we have a good guy and a bad guy?

³¹ A. Chowdhry, *Netflix And YouTube Account For Over 50% Of Peak Fixed Network Data in North America*, Forbes, Nov. 11, 2013, <http://www.forbes.com/sites/amitchowdhry/2013/11/11/netflix-and-youtube-accounts-for-over-50-of-peak-fixed-network-data-in-north-america/>.

With regard to the first consideration, Professor Wu makes much of the fact that other ISPs have allowed Netflix to connect its servers to their switches. While the Professor implies that they do not charge Netflix, the terms of those deals have not been made public and we simply do not know if that is true. If it is true, we do not know whether Netflix is providing some form of consideration other than cash. It is rumored that Netflix has sometimes resorted to hardball tactics in trying to persuade ISPs to sign on to Open Connect. For example, it is reported that Netflix initially threatened to withhold an HD-upgrade from the customers of ISPs that refused to use Open Connect. It seems to have abandoned that tactic, but resorted to another one intended to leverage the fact that some ISPs deploy TiVo DVRs to their cable television customers. TiVo has a license from Netflix that allows it to include a Netflix app in all of the DVRs it manufactures. TiVo is authorized to activate the app in DVRs it sells in retail stores, but is prohibited from activating it in DVRs that it sells to cable systems without Netflix's express consent. The rumors are that Netflix has conditioned activation for the cable television customers of ISPs and their affiliates upon the ISP's agreement to participate in the Open Connect program. Of course, Professor Wu's claim that Cablevision and other participants face "real" competition and are relatively powerless means that they are especially vulnerable to this kind of tactic.

Finally, we note that a great many ISPs, including Comcast, have successfully concluded deals with YouTube, another generator of a high volume of Internet traffic, without controversy. Professor Wu says that the fact that other ISPs have concluded agreements with Netflix without being paid means that Comcast can legitimately be blamed for not reaching a similar accommodation. By that logic, the fact that Comcast and other ISPs have gotten deals done with YouTube indicates maybe it is Netflix that is at fault. In any event, given the lack of reliable information about the terms of other ISPs' arrangements with Netflix or the genesis of those arrangements, asking what others have done is of little utility in our fairness analysis.

As for whom has more at stake, Professor Wu makes the point that Comcast should care about the quality of the streaming of Netflix media experienced by its residential subscribers who are also Netflix customers. But so should Netflix, which actually should care more because its entire business is based solely on that streaming, while Comcast provides its customers who are Netflix subscribers with more than just the ability to stream Netflix media and also has many customers who are not Netflix subscribers. All of this suggests that Netflix has the greatest and most direct stake in keeping its customers happy.

With regard to the question of the relative benefits to be gained from co-location, once again Netflix has more skin in the game than Comcast. As we have seen, Netflix saves a lot of money and Comcast loses an equivalent amount if transit middlemen are eliminated. Moreover, we have mentioned that it costs a lot of money to expand Comcast's network to keep pace with the growing bandwidth needs of Netflix's business. The fact that both parties have an interest in securing a high-quality experience for Comcast's subscribers who value Netflix means that fairness dictates that the two companies share the costs of network upgrades in order to keep pace with the demand generated by Netflix customers. Netflix, it seems, should bear the lion's share because it has a greater and more direct stake in meeting its customers' demand. Netflix's proposal, on the other hand, would have Comcast bear all of the costs.

The final consideration is the behavior of the two parties in the situation at hand. If one of the actors has behaved badly, we tend to skew our conclusions about fairness against him. By implication, Professor Wu accuses Comcast of not wanting a good experience for its customers,

but it seems more accurate to levy that charge against Netflix because it let the slowdown in speeds continue and worsen even though it had the ability to fix the problem. There is no evidence that Comcast sought to prevent Netflix from using other ports available to it or to extort additional payments for their use. Instead of acting to make things better for its customers, Netflix is reported to have exacerbated the problem by flooding already saturated ports with more traffic. So, if there was a “bad guy” in the situation, it would appear to be Netflix, not Comcast.

Conclusion

It seems clear to us that Professor Wu’s charge that Comcast’s behavior toward Netflix demonstrates that it is engaged in a “racket,” rather than a legitimate business, and is a “menace to the rest of the Internet economy” does not survive close scrutiny. It is, instead, just one more piece of evidence of a well-established rule of the Internet: If it involves the Internet and is or can plausibly be characterized as bad, then someone will say it is the cable ISPs’ fault and further proof that they need to be heavily regulated.

The publications of Professors Wu and Crawford that attack cable ISPs read like medieval morality plays in which the characters are personifications of good and evil, with garage innovators, edge providers and device makers usually being angels and ISPs being the devil incarnate. The reality is that they are all pretty much the same. If cable ISPs are monopolists (which they are not), then so are the established edge providers and other successful for-profit companies engaged in a business of one kind or another related to the Internet. It is safe to say that while garage innovators are not yet monopolists, they are spending all that time cooped up next to the family sedan because they dream of being the next Bill Gates, Steve Jobs or Mark Zuckerberg.

ISPs are just like every other company engaged in commerce, “e” or otherwise. They sell something with the goal of making money. Apple, Dell, Samsung and Microsoft sell devices computers, tablets and smartphones that allow us to connect to the Internet and surf the Web. Those devices have operating software that makes them work. In the case of a Dell laptop, Microsoft owns the operating software and licenses it for a fee to Dell, who includes it (with a markup) in its laptop price. Apple and Goggle own the two principle operating systems for smartphones, and you pay a license fee when you buy a phone—that is true even when you get the phone for “free” by signing a contract for a data plan, as those who conduct the No Free Lunch seminars would tell you. Use of application software for the iPad, iPod, iPhone, Kindle Fire or Galaxy S5 requires you to pay or is “free.” If free, rest assured that someone is paying the developer’s costs and a return on its investment, even if it is not you. Of course, Google and Apple have termination monopolies over users of the phones that rely on their operating systems and a degree of control over whether and how app providers can access them that would make any ISP envious.

If you use one of these devices to surf the Web, you will find a bunch of Websites that offer a host of information, products and services. Some of them charge you directly if you want what they have to offer. Amazon, the iTunes store and The New York Times Website are examples. In some cases, you pay for each item you buy and in other cases you pay a recurring fee that allows you unlimited or a fixed amount of usage. Even stuff you can access on a

Website without direct payment is not free. Someone pays. If it is an advertiser, then it recovers its advertising costs through the price we all pay for its products or services.

Apple, Facebook, Google, Microsoft, Netflix and YouTube are hardly altruistic, not-for-profit institutions. They are, instead, hard-headed, profit-motivated, highly capitalistic businesses who we assume would love to corner their markets, want to expand horizontally and vertically and have as their primary goal making their founders, principal investors and top executives rich or even richer. The means they employ in the pursuit of their self-interest are no better, and perhaps worse, than those used by Comcast and the ISPs.³² In general, these companies face little or no meaningful competition for their core products or services. Yet, they are admired and praised by many of the very same individuals who hate and excoriate cable ISPs. It is curious that some of those who see their ISP as an uncaring, rapacious, price-gouging monopolist think nothing of camping out overnight in front of a store for the privilege of paying hundreds of dollars for the latest and greatest tablet or smartphone manufactured in low-wage countries by a multinational powerhouse that enjoys a profit margin and return on investment that ISPs can only dream about and hoards its cash overseas to avoid paying taxes in the U.S.

The supposed threat to the openness, economics and ecosystem of the Internet represented by ISPs is entirely theoretical, with one possible exception many years ago. With respect to the Netflix situation specifically, there are over a dozen independent ISPs and transit and CDN service providers with existing ports into Comcast's network that an edge provider can use to reach Comcast's subscribers. Comcast's administration of those entry points appears to be automated, standardized and entirely routine. We are not aware of a single instance in the entire history of the universe when Comcast tried to prevent an edge provider from using one of those ports in accordance with standard, published policies. Contrary to the claims of some, Comcast's treatment of Netflix was not the first time—Netflix had access to multiple ports and Comcast did not try to interfere with their use; instead, the controversy arose because Netflix chose not to use its available options and wanted a free connection to Comcast's network that it did not qualify for under Comcast's published peering policies and that would entail opportunity costs for Comcast.

It is fair to say that in the real world, rather than the video-game-like world filled with evil ISP monsters in which many of the industry critics seem to dwell, more actual and would-be participants in the Web and application economies have encountered roadblocks and extra costs because of the power and practices of established Web companies, the owners of popular content

³² See, e.g., P. Elmer-DeWitt, *How Apple became a monopsonist*. CNNMoney, Jul. 5, 2013, <http://tech.fortune.cnn.com/2011/07/05/how-apple-became-a-monopsonist/> (Apple has secured "exclusive supply chain of advanced technology" and is a monopsonist that "can control an entire market."); C. Miller & M. Helft, *Apple Moves to Tighten Control of App Store*, The New York Times, www.nytimes.com/2011/02/01/technology/01apple.html?_r=0 (reporting that Apple told app developers that "they could no longer sell e-books within their apps unless the transactions went through Apple" so that it collects a 30% commission); D. Chartier, *iOS users need control over default apps for core tasks*, May 22, 2013, <http://davidchartier.com/ios-users-need-control-over-default-apps-for-core-tasks/> (Apple does not allow users of its devices to use alternatives to Apple-selected apps for core tasks); M. Wohlsen, *Why Netflix Wants to Keep Binge-Watching All to Itself*, Wired, Mar. 26, 2014, <http://www.wired.com/2014/03/netflix-wants-keep-binge-watching/> (reporting Netflix threatening to reduce fees it pays to studios if they make complete current seasons of TV series available to Netflix competitors); See also M. Ames, *The Techtopus: How Silicon Valley's most celebrated CEOs conspired to drive down 100,000 tech engineers' wages*, PanodDaily, Jan. 23, 2014, <http://pando.com/2014/01/23/the-techtopus-how-silicon-valleys-most-celebrated-ceos-conspired-to-drive-down-100000-tech-engineers-wages/>.

and the owners of the two principal smartphone operating systems than because of the actions of any one ISP or all ISPs combined. Yet, those entities are strangely immune from criticism, while ISPs are loathed, feared and regulated

Another reality is that all ISPs are being forced to respond to the seemingly insatiable consumer demand for bandwidth-intensive services. Bandwidth usage continues to grow every year, with video and entertainment services accounting for an increasing share on both fixed and mobile platforms. In addition, increased use of mobile wireless devices has strained the spectrum of cellular networks and led them to rely on wireline links for backhaul and "offload" wireless traffic to ISPs' wireline infrastructures. Various sources report that anywhere from 50% to 70% of all mobile phone data usage occurs over WiFi, rather than mobile networks, and the amount of offloaded traffic continues to grow.

The growth in demand will continue and accelerate, forcing wireline infrastructure owners to make ever greater expenditures to upgrade their networks. While Mr. Rifkin's dream of a new order in which nothing costs anything may be coming, in today's economic system, network owners are unable to provide or upgrade their services without cost. Their only alternatives for recovering those costs are passing them through to one or both of two groups: (1) network customers and (2) the entities whose products and services create high demand—the cell phone companies and edge providers.

The net neutrality rules in place before being struck down by a court prohibited ISPs from adopting the second alternative at the top-level of the Internet, but Professors Wu and Crawford, as well as edge providers and others with an economic stake in the outcome, are pushing for their revival and, using the Netflix/Comcast experience as an excuse, their extension to network interconnection. Ironically, the net neutrality rules, which supposedly were motivated by the desire to help consumers, ensure that the only choice for ISPs seeking to recover their costs of network upgrades is to charge consumers. An extension of the net neutrality rules to the level where network interconnection occurs will only increase consumers' burdens. Edge providers will receive a huge benefit that will be paid for by consumers.

Of course, if ISPs charge consumers more across the board, relatively light users will subsidize Netflix customers and other heavy bandwidth users. Tiering and similar forms of usage-based pricing have generated strong resistance among some customers and led to calls for a government ban—in many cases by the very same people who also want the government to limit the ability of ISPs to allocate costs to those who profit the most from increased bandwidth consumption. If, because of competitive realities or government regulations, ISPs are prevented from fully recovering their costs, the ability of broadband providers to raise the capital necessary to fund network upgrades may be diminished, and investment in current and future competitive alternatives for broadband access may be reduced or deterred.

For all of these reasons, it is hard to understand why it is not fair, as well as economically efficient and pro-consumer, for ISPs to be able to ask Netflix and other companies that are driving and profiting from increased bandwidth consumption to share in the costs of building the capacity needed to keep pace. A government policy that forces consumers and broadband providers to subsidize edge providers—even those that are far richer and more powerful than most ISPs—is anti-competition, anti-market, anti-investment and anti-consumer.

We can conclude by noting that Professor Wu's analogy and the strident, exaggerated and over-the-top warnings by the usual cast of ISP critics about the disaster that will supposedly result from the Netflix/Comcast settlement brings to mind the 1978 horror film spoof, *Attack of the Killer Tomatoes*, in which sentient and mobile tomatoes begin killing humans. At one point, as part of an ad agency's effort "to convince the little housewife out there that the tomato that ate the family pet is not dangerous," the agency runs a commercial reminding the audience that "[l]ast year, more people were killed by automobile accidents, heart attacks, lung cancer, and natural causes combined than by any one tomato."

Most of the Web publications by cable ISP critics are advocacy, not scholarship. That can be true even when the author is a professor of other intellectual. The author's goal is, in a sense, the flip side of that of the marketing firm in the movie: to convince the government official or opinion leader out there that cable ISPs are dangerous, despite the fact that they cannot produce any evidence that they actually are out there "choking," "throttling," "blocking," "gouging" and "extorting." In pursuing that goal, many of the critics display the same cavalier attitude toward the truth and the facts as PR and advertising firms. We would be wise to approach their writings with a healthy degree of skepticism.

Above all else, we should keep in mind that while the tomatoes in the movie killed people, contrary to the over-the-top rhetoric of the ISP critics, not a single garage innovator or edge provider has seen its dreams of Internet riches die at the hands of an ISP.