

Testimony on Network Neutrality at the  
House Telecommunications Subcommittee

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1. Benefits of Network Neutrality

Network neutrality has facilitated businesses innovation “at the edge of the Internet” without seeking approval from network operator(s). The decentralization of the Internet based on network neutrality fueled innovation resulting in big successes such as Google and Skype, as well as a myriad of smaller innovative companies. Network neutrality also increased competition among applications and among services “at the edge of the network” since they did not need to own a network or have a special relationship with a network operator, carrier or Internet Service Provider (ISP) to provide a service.<sup>1</sup>

In summary, network neutrality has contributed very significantly to the fast and vigorous growth of the high technology sector in the United States and the rest of the world.

2. Criteria to Assess the Impact of Network Neutrality

First, I should underline that we should measure the impact of network neutrality on benefits to society of the whole Internet ecosystem, and not just on the ISPs. We should take into account and add the benefits to consumers, the benefits to applications and content providers “at the edge” of the Internet, as well as the benefits to telecom and cable ISPs. Focusing on benefits and costs of only one of three groups (consumers/users, applications and content providers, or ISPs) would be incorrect both from an economic and a public policy point of view.

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<sup>1</sup> See Christiaan Hogendorn, [Spillovers and Network Neutrality](#), Chapter 8 in Gerry Faulhaber, Gary Madden, and Jeffrey Petchey, eds., *Regulation and the Performance of Communication and Information Networks*, Edward Elgar, 2012.

### 3. Losses to Society Arising from Departures from Network Neutrality

Departures from network neutrality are likely not to be in the public interest and to result in a number of detriments to the total benefits of the Internet ecosystem.

Let's consider a key violation of network neutrality, the introduction of paid prioritization by an Internet Service Provider (ISP), such as Verizon. Under prioritization, the ISP would change the priority of information packets and services so information of companies that paid the ISP would arrive to the customers first. For example, in the market for Internet search, if Yahoo paid Verizon for prioritization, Yahoo search results would appear at Verizon's customers before the results of Google and other search engines. Clearly, some customers would not wait for search results of other search engines, thereby giving a significant advantage to Yahoo for which Yahoo would pay Verizon. In this example, it is clear, that violating network neutrality allows Verizon to determine (or very significantly influence) the winner in the Internet search market. In a similar fashion, if network neutrality is abolished, ISPs can also influence the winner in many different services or products delivered through the Internet. And it should be clear that prioritization does not require actually faster delivery. An ISP can generate profits by just degrading the arrival time of information packets that originate from non-paying firms while keeping the arrival timing of the paying firms the same as before the violation of network neutrality.

Paid prioritization would create artificial scarcity which is profitable to residential ISPs but detrimental to the public interest. Paid prioritization would create a "special lane" for the information packets of the paying firms while restricting the lane of the non-payers without expanding total capacity or requiring additional investment. By manipulating the size of the paying firms' lane, the ISP access provider can guarantee a difference in the arrival rates of packets originating from paying and non-paying firms, even if the arrival time for paying firms' packets is not improved over net neutrality. This would create a significant reduction of innovation at the edge of the network.

New firms with small capitalization (and those innovative firms that have not yet achieved significant penetration and revenues) will very likely not be

able to pay the fees of paid prioritization. This will likely lead to a calcification/freezing of industry structure and will significantly reduce innovation and economic growth.

Typically access ISPs also provide their own content and applications, or, more generally, they provide substitutes to the content and applications of independent firms. For example, Netflix's customers may use Comcast to download video from Netflix, while Comcast sells video services delivered through cable TV. Similarly, both telecom and cable TV ISPs provide their own phone services that are also provided by independent VOIP providers such as Vonage. ISPs may favor their own services and degrade transmission of rivals that use their pipes. This is likely to distort competition and reduce the social benefits of the Internet.

Finally, there are political opinions and news diversity concerns if content in newspapers and websites is delayed in comparison with sites and newspapers that pay for prioritization.

#### 4. Investment is Not the Goal of Public Policy

The goal of public policy, such as the network neutrality rules, is to maximize the total public benefit to participants of the Internet ecosystem that includes consumers/users, applications and content providers, and ISPs. Investment by ISPs is one of the variables that may contribute in public benefit. It is not the appropriate measure of the public benefit to the ecosystem. Instead of focusing on ISP investment, we should look carefully at all aspects of the impact of the regulation. As discussed earlier, there are very significant benefits of network neutrality to applications and content providers sector, including investment in that sector, as well as substantial benefits to consumers.

#### 5. The Impact of Network Neutrality on Investment

##### a. Predictions of Economic Models

Economic models give mixed results on the impact of a network neutrality regulation on the incentive of ISPs to invest more. The results depend on the specification of the model in terms of the underlying features of the consumers as well as on the investment technology that ISPs may use for potential network expansion. Thus, in some models and for some parameters,

the ISP wants to invest less under network neutrality, but in other models or even in the same model for other parameters, the ISP wants to invest more under network neutrality.<sup>2</sup> Therefore one cannot claim that network neutrality should result in lower investment by ISPs. It is equally possible that network neutrality will prompt ISPs to invest more.

b. Did the FCC Rules of End of February 2015 Lead ISPs to Invest Less in the First and Second Quarter of 2015?

The proposition that ISPs decreased investment in the first two quarters of 2015 as a result of the passage of the network neutrality rule at the end of February 2015 is very likely incorrect for a number of reasons outlined below.

First, as discussed above, economic models are divided on the incentives of an ISP to invest more or less under network neutrality. The results of the economic model are that it is equally likely that an ISP should invest more as it is that it should invest less under network neutrality.

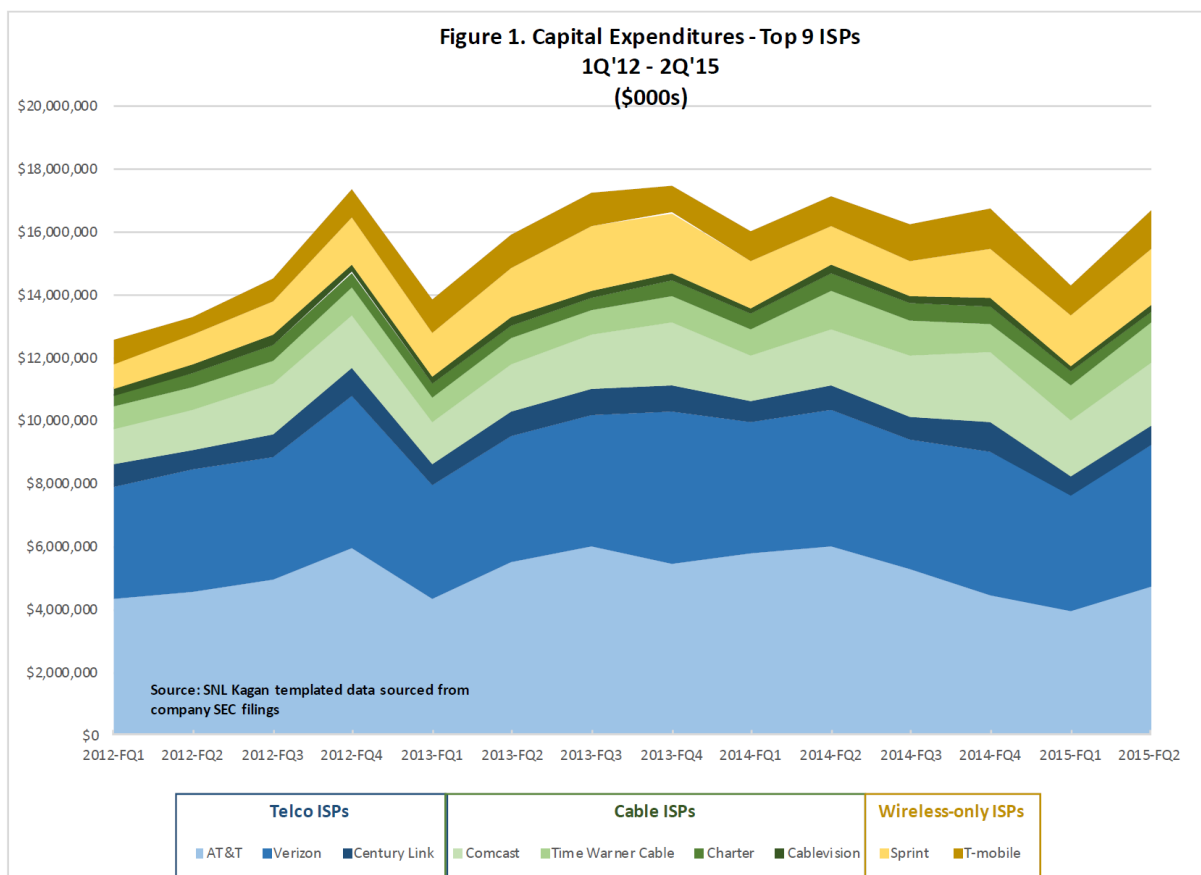
Second, we should keep in mind that how much to invest, on what and when is a complex decision, and companies typically have long term, multiyear, investment plans, that are often communicated to investors of publicly traded companies. These plans may not involve investment

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<sup>2</sup> Different academic papers give opposite directions in the incentive to invest when network neutrality is imposed. J. Gans, “Weak versus Strong Net Neutrality” Rotman School of Management Working Paper No. 2439360 (2014), shows that “strong net neutrality may stimulate content provider investment while the model concludes that there is unlikely to be any negative impact from such regulation on ISP investment.” J.P. Choi and B.C. Kim “Net Neutrality and Investment Incentives.” RAND Journal of Economics, vol. 41 (2010), pp. 446–471 underline “the ISP’s incentive to invest on capacity under a discriminatory network can be smaller than that under a neutral regime where such rent extraction effects do not exist. Contrary to ISPs claims that net neutrality regulations would have a chilling effect on their incentive to invest, we cannot dismiss the possibility of the opposite.” N. Economides and B. Hermalin, “The Economics of Network Neutrality,” RAND Journal of Economics, vol. 43, no. 4, Winter 2012, pp. 602–629, discuss a special case of their general model where under specific conditions, ISPs decrease investment as a result of imposing network neutrality. In the general model of Economides and Hermalin (2012), under alternative specific conditions, investment may also increase as a result of imposing network neutrality.

expansion in every quarter even if the general plan is to expand on the average.

There is evidence of significant fluctuations in total investment by telecom and cable companies over time. Figure 1 shows the capital expenditures of the top nine ISPs over time. We observe very significant fluctuations over time. For example, the data shows a larger reduction in investment in the first quarter of 2013 than in the first quarter of 2015. It would be misleading to attribute these changes to specific regulatory actions.



Careful examination of the data shows that the decline in capital expenditure in 2015 is almost entirely due to a decline in investment of one company, AT&T. AT&T had announced in November 2014 an expected decline in capital expenditure for 2015 due to the completion of the large

investment project, “Project VIP.”<sup>3</sup> Even as far back as 2012, AT&T had announced it expected “to increase its capital intensity to the high end of the mid-teens as a percentage of revenues in the next two years, returning to normal levels in 2015.”<sup>4</sup> Additionally, in its 10-K filing to the SEC, dated 2/20/15, that is before the FCC Order, AT&T notes “We expect our 2015 capital expenditures for our existing businesses to be in the \$18,000 range. Due to our completion of Project VIP, we anticipate lower capital spending in our Wireless and Wireline segments in 2015.” This is an anticipated over 16% decline in investment, before the FCC Order.

Third, the appeals process has not ended, and therefore the actual event on which the change in investment decision is supposedly based is not final.

The network neutrality regulation was decided at the end of February 2015 with implementation starting in June 2015. ISPs have appealed the FCC decision, and the case has not yet been heard at the Appeals Court. Additionally, such highly contested issues often are appealed further and reach the Supreme Court. Therefore, one cannot consider the present regulation as the final word. It would not be prudent for telecom and cable companies to change their long run decisions on investment before the legal process ends. And, as discussed earlier, even if telecom and cable companies were to change their investment decisions immediately, the economics literature does not give them guidance on whether to increase or decrease investment under network neutrality.

Fourth, even if one believed that the ISPs would decrease their investment as a result of the regulation, the period of observation between the time of the passage of the regulation at the end of February 2015 and the end of the second quarter of 2015 is too short to have any meaningful inferences. From an economics point of view, it is incorrect to draw conclusions that the FCC regulation has either an adverse or a positive impact on investment based on one or two quarters observations on investment.

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<sup>3</sup> See AT&T’s announcement on November 7, 2014, [http://about.att.com/story/att\\_to\\_acquire\\_mexico\\_wireless\\_provider\\_iusacell.html](http://about.att.com/story/att_to_acquire_mexico_wireless_provider_iusacell.html)

<sup>4</sup> See AT&T’s announcement of November 7, 2012, <http://www.att.com/gen/press-room?pid=23506&cdvn=news&newsarticleid=35661&mapcode>

Fifth, some claim that regulation increased uncertainty and therefore dissuaded companies from investing. However, I believe that the network neutrality regulation in fact decreased uncertainty by defining the framework of permissible actions. Therefore, if we accept that in principle more uncertainty reduces investment, the passage of the regulation should increase rather than decrease investment.

## 6. Conclusion

Network neutrality has contributed very significantly to the fast and vigorous growth of the high technology sector. The impact of network neutrality should be assessed on the whole ecosystem, not just on ISPs and not just on ISPs investment. I outlined a number of reasons why we should not be concerned about short term investment patterns. It seems very unlikely that these investment patterns are a result of the passage of the network neutrality rules.