
Before the
FEDERAL COMMUNICATIONS
COMMISSION WASHINGTON, DC 20554

In the Matter of

GN Docket No. 14-28

Duncan Hare

Petition to:

1. Reconsider the FCC's Cable Modem Order due to Changes in the telecommunications Market and classify Such Service as Telecommunications Services Under Title II of the Telecommunications Act

2. Provide a committee for internetwork traffic management, capacity planning and congestion remediation.

**PETITION TO RECONSIDER THE FCC's CABLE MODEM ORDER
DUE TO CHANGE IN THE TELECOMMUNICATIONS MARKET,
AND CLASSIFY SUCH SERVICES AS TELECOMMUNICATIONS
SERVICES UNDER TITLE II OF THE COMMUNICATIONS ACT
AND TO FORM A COMMITTEE FOR INTERNETWORK TRAFFIC
MANAGEMENT, CAPACITY PLANNING, AND CONGESTION
REMEDICATION.**

Duncan Hare

Citizen

May 5, 2014

SUMMARY

Duncan Hare petitions the Federal Communications Commission to (i) recognize that the enabling of communications within a last-mile terminating access network for any subscribers of an Internet access service provider constitutes a delivery service provided by that Internet access service provider; and (ii) declare such a service to be a telecommunications service subject to Title II of the Communications Act. This action will help preserve the future of technology innovation online, and move towards the goal of universal service. The petition requests the creation of an FCC committee, under FCC jurisdiction, to manage the inter-carrier traffic tariff, capacity planning and congestion elimination for the public good, because we see large-payload users (such as Netflix's paying customers) as contributing greatly to the expense of providing peak capacity, while avoiding their share of the costs of peak capacity provisioning.

The Internet has become the network of choice for many systems that once employed the public switched telephone network (PSTN). Traffic now carried by the Internet increasingly includes: voice, messages, eMail, Web Browsing, consumer-controlled video-on-demand (Netflix Customer base), and other services. These applications are now the business services envisioned when the public switched telephone network was the underlying carrier, and traffic was sent via 56Kbps modem links over a voice channel. The Internet, once the Child of the PSTN, has matured, and now carries more services than the PSTN ever handled. In the foreseeable future, the Internet will be the major transport mechanism, the foundation network for all data and enhanced services, worldwide. It is no longer practical to regulate the Internet as an Enhanced Service – a view which was recently reinforced powerfully by the D.C. Circuit in its decision on the Commission's *Open Internet Order*. The Technology has evolved, and now the regulatory apparatus must also evolve; with a view toward providing universal service in the age of the Internet as the cornerstone of communications in a networked world.

Faced with a multi-sided market as described by the Court of Appeals, the Commission must determine, under the Communications Act and relevant precedent, the appropriate regulatory status of the services network operators provide to subscribers. Application “overlay” or enhanced services all use the same underlying physical function of networked packet routing. It is this networked packet routing structure which we believe forms the foundation of the Internet and which will increasingly become the building block of future Telecommunications, exactly as the regulated narrow bandwidth voice network was the foundation of the Telecommunication system just 20 years ago, and for a hundred years before that.

Classifying the foundation packet switching of the Internet as Title II telecommunications is a forward-looking and necessary action to realize the statutory goals of the Communications Act in the modern era. We note the transport layers of the internet, IP packet switching, is now mature, and not the hotbed of innovation is currently, and will be for the foreseeable future, the services or applications, for example: Google, Facebook, Twitter, Reddit, Tumbler, LinkedIn,

Evolving Technology and Use require some necessary changes to established Commission orders and precedents. This of course, is no surprise to anyone accustomed to adapting to disruptive technologies. As technology evolves, the FCC must adapt, and expand Commission jurisdiction to include the new entities, and the new network's structural elements. Due to decisions by the former telephone companies not to invest in fiber to the curb or fiber to the home in many areas, the Cable Companies now dominate the Internet delivery market. And, with subsequent Commission proceedings to forbear from inapplicable provisions of Title II and to establish clear no-blocking and non-discrimination rules for network use and management, it would not levy an undue burden on network operators, but rather would be tailored to advancing core policy goals previously articulated by the Commission, especially those of universal service.

We urge the Commission to take the proposed steps and establish clearly its authority under the Communications Act to safeguard the Telecommunication Network of the Current and the foreseeable Future.

Recently, Netflix (with its video-on-demand service) has provided an example of disruptive technology, wherein their business model involves transmission of large volumes of traffic across other, unrelated networks, which experience resulting congestion. To these other networks, the congestion is caused by an externality, and they and their customers naturally enough do not desire to pay for infrastructure costs to relieve the externally-caused congestion. The Commission, quite correctly, strove to maintain an open Internet; as a result of a recent court case, the Commission is seeking a method to fairly manage Internet traffic. We would like to suggest a simple structure for this: for large amounts of traffic, which cause congestion on networks not belonging to the traffic originator, the originator should be asked to pay for the traffic to be carried over other networks. There is a balance to be maintained, however, which might be managed by defining traffic thresholds. Small amounts of traffic are included in the subscriptions of end users; the network owner's business model involves providing connectivity, which must include reasonable access to and from the network and those networks connected to it. As the individual business's traffic increases to levels which are large enough to impinge on the network provisioning of other, unrelated networks, the business must be asked to contribute towards the provisioning cost of the networks that it does not own and maintain.

Clearly, Inter-network provisioning needs an impartial mediator; otherwise, our Internet will become increasingly congested, as various levels of network providers try to avoid paying for provisioning costs which are not caused by their customers. We believe this mediation should be held under the Jurisdiction of the FCC, and the costs, if any, for adding network capacity be paid for by those who benefit, not by others. Netflix attempted to offload network planning and provisioning costs onto other companies and the customers of those companies, by demanding

that their high volumes of traffic be carried without payment, despite the congestion caused by their traffic at peak Internet use times, on other, unrelated networks. This congestion affected not only Netflix customers, but also the customers of those network providers who did not choose to use Netflix. Asking unrelated networks and their customers to provision for peak volumes which includes Netflix's traffic is an inequitable demand. In effect, they are being asked to subsidize Netflix's service.

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I. BACKGROUND

Duncan Hare is a very experienced Network Engineer. His experience over a lifetime of employment in the Telecommunication and Computer industries includes Programming at IBM customers, manufacture and test of Carrier equipment (including Analog, Microwave and Digital), Data Communication over analog and digital networks for fortune 500 companies, customers of IBM, a recognized networking specialist at IBM during their introduction of Multi System Networks and a specialist at IBM's European wide Systems Center, Converging multiple corporate networks at a major US Bank, eventually becoming senior manager at Nortel Networks, and then becoming a consultant, whose customers included American Express, IBM, State of Florida, Telus, SouthWestern Bell, Cabletron and Kaiser Permanente.

In the process of this consulting Duncan created a test and middleware product for managing the technology in Call Centers, which was sold to Empirix.

II. INTRODUCTION

The task of the Federal Communications Commission as an independent agency is to interpret and apply statutory goals.

The implementation of these goals is now under question as a result of a combination of the FCC's initial and then-correct decision that the then emerging Internet services were “information services” provided on existing regulated PSTN networks and its now-remanded *Open Internet Order*¹.

We believe the Internet service has evolved to become the foundation of Telecommunications networks of the future, and now should be regulated under Title II of the

¹ *Verizon v. FCC*, No. 11-1355 (D.C. Cir. Jan 14, 2014), slip op. At 4, 17-31 and *Preserving the Open Internet*, GN Docket No. 09-191, WC Docket No. 07-52, Report and Order, 25 FCC Rcd 17905, 17941-51 paras. 62-79 (2010)

Communications Act. The Commission is now exploring how best to restore those essential protections within the bounds of its Congressional authority.²

This petition contends two items:

First, that as the networks have now evolved, the *Cable Modem Order* which regulated Cable Based delivery of Internet service requires revisiting, due to the monopoly power of Cable providers' share of subscriber service. The Commission must therefore determine the appropriate regulatory framework for these services.

Second, network costs and prices should be proportional to the load that the packet stream puts on external networks. In the case of video transmission via packet streams on the Internet, the stress and congestion caused on external networks causes packet loss for all users affected by the congestion. Simply stated, the high payloads of video-on-demand interfere with, or damage, the other users of the Internet.

These video-on-demand high payloads require either that the external networks spend capital upgrading their networks to handle the congestion caused by the video streams, or that they affect all traffic. Video is less susceptible to loss than, for example eMail or Web content, thus other real time services, web browsing for example, may be damaged by the bandwidth demands of the video streams.

At this time, Netflix, fits this description; however, others streaming content suppliers are on the rise (for example, Hulu), and if the unfair interference, and cost of resolving the interference on other people's networks is not resolved, we will experience continuing congestion, because the network providers will never be able supply enough "bandwidth" for free, to handle increasing demand from the content providers.

As a result, we propose volume based pricing, for example tier 1 being everyone else, and tier 2 being high-traffic content suppliers (video-on-demand). Tier 2 suppliers would be required to pay for

² *New Docket Established to Address Open Internet Remand*, DA 14-211, GN Docket No. 14-28, Public Notice (Feb. 19, 2014).

carriage of their traffic over other non-affiliated networks, in order that the affected network providers can make the necessary additions to their plant equipment to relieve the congestion caused by the streaming content providers. Netflix, as the relevant example of disruptive technology, has demonstrated that unless they build their own distribution network, that their traffic will impinge on other networks, causing congestion. The responsibility for the congestion rests with Netflix, not the non-affiliated network(s), and consequently, the resolution of the problem also rests with the content provider, such as Netflix.

Note that we do NOT propose creating tiers based on services, but only on traffic volume. If the tiers were service-based, then ISPs might be tempted to set their own pricing based on whether you could reach Google, or Bing, or DuckDuckGo, discriminating on the basis of service provided by different search engines, for example. This would be immensely destructive to the Internet, and various organizations have written letters and articles warning against service-based tiers.³ Tiers based on traffic volume are grounded in the economic costs for maintaining and expanding a network due to increased traffic load; this is an established practice which recognizes the responsibility of the content provider for the content that they desire to send over someone else's network.

Pricing based on bandwidth has a long history, going back to the old PSTN voice channels and groups of voice channels. It alone can provide incentive for content providers to get their traffic as close to their customers as possible, before paying for carriage over the last mile to their subscribers. The methods that they might choose include creating their own dark fiber networks, and local storage of their most popular content; choosing to use these two methods would minimize their costs for carriage over non-affiliated networks.

There is a compelling interest in non-discriminatory handling of traffic from these services to subscribers, in that there must be equal priority for data sent by these services, with no

³<http://america.aljazeera.com/articles/2014/5/7/fcc-occupy-neutrality.html> and http://cdn1.vox-cdn.com/assets/4422119/letter_to_FCC.pdf

possibility one service may enjoy any priority for their service over others. Any such mechanism would likely provide the foundation for a variety of unfair trade practices (which are generally considered abuses of monopoly power). This does not prevent a data supplier's cost being proportional to the payload they deliver to the carriers. The more volume delivered across the Internet, the more the carrier's costs and thus the more the service provider should pay. We believe that payment should be based on a product of distance travelled through the "foreign" network and the bandwidth demanded. Thus, if a content provider such as Netflix had its own dark fiber network, and only used connectivity to the "last mile" their payment should be much less than if they were impinging on multiple networks, demanding carriage of a real-time packet stream over large distances across those networks. Such a rule would cause content providers to consider the implications of their traffic on other networks, instead of simply assuming that their heavy packet payload should be carried by everyone else for free.

The FCC needs to monitor the effectiveness of the Carriers providing Internet service. By this we mean the carriers should report periodically on their capacity and the instances and durations of congestion that they experience. In cases wherein congestion is experienced repeatedly and for a significant duration, they should be required to increase capacity, possibly by having the cost of the capacity increase paid by others, if the cause of the congestion is from a service such as video-on-demand, which require large amounts of bandwidth. In this role the FCC is acting as an arbitrator if the parties do not reach mutual agreement. We do believe that binding arbitration for corporations, and removing their access to the courts for remediation appears only just given their proclivity to impose such arbitration on the public.

Such reports should be both publicly available and be certified by auditors, under the maxim of "*Quis custodiet ipsos custodes.*"

III. HISTORY AND CHANGE

Telecommunication networks have evolved through many technologies, from analog voice, through digital time division multiplex trunks, to the current packet switched Internet system.

The original traffic was telegraph, then voice, and then data over voice with modems, and now we have evolved to a mostly packet-switched wide bandwidth telecommunication system, which we call the Internet. Each technology was an evolution and migration, with the old co-existing alongside the new for a considerable period, just as analog subscriber voice circuits still exist, there is some use of modems, and fax machines over the old frequency division multiplex network.

There were some common goals of the network. Equal Service for All, Equal Quality, and Universal Access. There was no “preferred quality of telegraph and voice” circuits, nor was there any attempt to provide faster call completion for some at a premium price. Some may have used more “circuits” or “lines,” as with PBXs, because of a desire to receive or originate more calls. All individual calls as far as possible, were of the same quality, and all call completion times were similar, depending on the technology used to switch the calls. The technology was always evolving because it was not possible either financially or technically, to deploy new technology simultaneously over the whole network.

We note in AT&T's submission to the FCC⁴, AT&T conflates activities at OSI layers 3 (network), 4 (transport), 5(session) and 7(application), or in TCP/IP terms, activities in the IP layers (the network and routing layer), the TCP layer (transport and session), and Services (eMail

⁴ <http://www.scribd.com/doc/223147218/May-9-Ex-Parte-Letter>

and other Application or Services), in a badly formed manner, from a network architecture point of view, which to an experienced network professional invalidates large portion of AT&T's arguments.

AT&T's major point that profits and investment do not flow from regulated Telecommunication Carriers seems to ignore AT&T's history of being a regulated monopoly and its history as a preferred investment because of its stability and incredible growth in the 20th Century. When their own history argues against their ideas regarding investment, we think they have a weak argument, at best.

AT&T's packet switch business, the foundation of sections of the Internet, is now mature technology, and not a hotbed of innovation. The current hotbed of innovation is in the applications, or services contained in Layer 7 of the OSI model. This was expected, and demolishes AT&T's claim that any form of regulation will destroy innovation in its Internet business, because there is little innovation in those layers of the Internet. Change in those Layers, OSI model layers 1 through 3, are carefully managed and funded increases in bandwidth.

Returning to the topic of regulatory goals, we note that these goals are the legacy on which net neutrality is based. In today's Internet, equal service translates to equal routing priority for packets, although there are two classes of packets, disposable ones (UDP traffic) where sender and receiver are somewhat insensitive to packet loss, and one with delivery integrity, where the onus is on the sender to ensure complete reception of all packets of data (TCP traffic).

For the purposes of precision and clarity, we define net neutrality as: **Equal Service for all packets in the IP layer (Internet Routing Layer) within a Class of Service.** We note that the phrase "net neutrality" is commonly bandied about, and we suspect the term means different things to different constituencies. Such lack of precision and clarity form the dreams of expensive lawyers, while we believe judges are not the group best suited to provide engineering definitions.

Historically, our communications networks have provided uniformity of service, priced by the capacity required. Network providers were not allowed to provide gradations of service; their function was to provide the best service possible to all, while providing larger volumes of traffic to people who paid for additional telephone lines, or extra data bandwidth. That is the history on which Net Neutrality is based. We need the same structure for rules guiding our new telecommunications network, the packet-switched Internet.

In the old telephone system, every call was guaranteed the same priority in the network. In the new packet-switched Internet, every packet must have the same priority as all other packets. Uniformity of service in the telephone system translates to the same priority of routing for all packets, for all parties. Pricing by capacity means the more packets delivered, the more is paid.

IV. INTERNET PROVIDERS

Herein, we make the case that the FCC has an OBLIGATION to regulate ISPs, just as it regulated the ubiquitous communications service which preceded the Internet: Telephone companies. Really, Internet Service Providers (ISPs) are merely the inheritors of the mantle formerly worn by the phone companies, and like the phone companies, the ISPs tend to be large corporations with much more power and money than the individuals and small businesses who use their services. We will not discuss the relationship between ISPs and large corporations here, because those large corporations are well able to look after themselves, in their business dealings with their ISPs.

The first consideration is the power imbalance between the ISPs and their customers. Small businesses and retail customers are 'price takers' and 'service takers,' because they have few choices for their local ISP, and they are forced to depend on them for the delivery of their communications. They are also dependent on the ISP to deliver services to them in a fair way. If government fails to look out for their interests, there is NO ONE ELSE to whom they can appeal. Monopoly and oligopoly markets are not bastions of fairness; in the absence of regulation, they tend to be bully pulpits where the “*opoly” says to the customer, “If you don't like it, go to ANOTHER ISP.”

The consumer cannot easily move to another ISP in most markets, because there is often little or no competition to the high speed providers of internet connectivity, the Cable Companies. This is one of the situations that government regulation is designed to overcome. In a market with only one service provider, the service provider's position is that of a monopoly supplier.

The regulator should provide a balancing hand, and that balance is provided by declaring the monopoly providers Telecommunications Carriers.

Currently, landline telephone service is dying. Microwave links and T-1 lines are almost things of the past – relics of an earlier age. But data communications has grown enormously. Today, we still have only a relatively few service providers – mostly businesses which were once called “phone companies” and “cable companies,” and which are sometimes still mentioned in those terms. Today, phone companies and cable companies provide both phone and cable services, along with Internet access. Their list of services has expanded, but the number of companies has not grown so much. Government regulation should cover all these services, just as it covered the services of phone companies and cable providers in the 20th century.

Over the past many years, the FCC has forborne regulation of ISPs. This needs to change because the Cable Companies have achieved monopoly status, with a controlling percentage of market share, as documented by their own industry association.

Below, we have included a definition of the term 'telecommunications carrier' provided in CALEA. By this definition, the companies that now provide the bulk of our nation's Internet services certainly qualify as both telecommunications providers and as common carriers. Therefore, the FCC has a legal basis for declaring the ISPs to be common carriers, and for regulating them in the public interest, as they did with the cable companies and the phone companies.

Definition of Telecom Carrier under CALEA 18 USC 2510

(8) The term `telecommunications carrier'--

(A) means a person or entity engaged in the transmission or switching of wire or electronic communications as a common carrier for hire; and

(B) includes--

(i) a person or entity engaged in providing commercial mobile service (as defined in section 332(d) of the Communications Act of 1934 (47 U.S.C. 332(d))); or

(ii) a person or entity engaged in providing wire or electronic communication switching or transmission service to the extent that the Commission finds that such service is a replacement for a substantial portion of the local telephone exchange service and that it is in the public interest to deem such a person or entity to be a telecommunications carrier for purposes of this title; but

(C) does not include--

(i) persons or entities insofar as they are engaged in providing information services; and

(ii) any class or category of telecommunications carriers that the Commission exempts by rule after consultation with the Attorney General.

For Cable provided serve we'd assert Paragraph A as yes, Cable Internet providers meet the criteria specified: "*electronic communications as a common carrier for hire*"

Considering the criteria under Paragraph B, we conclude that Yes, Cable Internet providers meet the criteria specified. Local ISPs, including phone and cable companies, provide Americans with important, broadly-used services, such as eMail, Voice and Messaging services, among others. These services were once exclusively carried by the local telephone exchange, but are all now increasingly carried by the successor to local exchange networks, the Internet. This exactly fits the description in Paragraph B, 1): "*finds that such service is a replacement for a substantial*

portion of the local telephone exchange service and that it is in the public interest to deem such a person or entity to be a telecommunications carrier.” Therefore, the FCC has solid grounds for declaring the Internet, including both ISPs and network providers, to be common carriers.

Paragraph C applies to the services carried by the Internet, such as the services of Google, Netflix, Facebook, and many others. The Cable suppliers are in the business of transporting bits, that is: transmission, and are generally not in the business of providing Internet services. They should not be allowed to try to break the Internet into service layers; the natural dividing point is packet volume. Information density used to be related to bandwidth, in the old analog world. Its corresponding measurement in a packet-switched network is packet volume. Video-on-demand suppliers tend to send a very large volume of packets during the movie or TV show; consequently, most other traffic is orders of magnitude less than theirs, in volume.

If there is competition the FCC does not want to regulate, as was the case with the Internet in the ‘90s and early ‘00s, here's some indication that regulation is now appropriate. Just look at the number of households affected.

The source data are available at: <http://quickfacts.census.gov/qfd/states/00000.html> and <https://www.ncta.com/industry-data>.

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|--|-------------|
| Households, 2008-2012 | 115,226,802 |
| Cable Market share for Internet connections (155,000,000 = 100%) | 45% |
| Fixed line (excluding mobile) Cable Internet Share | 68% |

The best way of thinking about monopolies and oligopolies is not in an absolute term of whether a firm is a “*opoly” or not, but to think of a firm in terms of how much monopoly/oligopoly power it has, i.e. how influential that firm is in determining market price, policy, and quantity.

From the market shares given (68% of high speed internet connections), the cable companies would definitely be able to influence the price. Cable markets do not overlap and cable companies do not compete. Telephone companies have shown little interest in providing fiber to the home or fiber to the curb, so they have a much smaller market share as Internet providers.

Since the cable companies tend to be monopoly suppliers of Internet access, and the phone companies provide only limited competition for the cable companies, it is clear to us that both the cablecos and the telcos should be regulated as common carriers, along with the network providers.

V. SYSTEM MANAGEMENT AND SERVICE LEVEL COMMITMENTS

Our purpose in this section is to specify that Planning, Provisioning and Service Level Commitment needs to be a part of the FCC's domain, as the entity responsible for the overall future and performance of the United States' Telecommunication system.

This set of management disciplines, and their best practices are well described in the Information Technology Infrastructure Library. Other than stating that any large system needs Governance, Management, Measurement, and committed service levels, it is beyond the scope of our petition to describe these disciplines in detail.

The minimum stipulation would be periodic audited reports on actual capacities used and congestion, because such reporting is the transparency need to demonstrate "net neutrality" as it is defined in this petition.

More information is available here: <http://www.ital-officialsite.com/home/home.asp>

VI. CONCLUSION

In this petition, we have requested the Commission to regulate the Internet, from last mile through the network connections, end to end, as a common carrier. This harmonizes with the history of FCC regulation of telephone companies, with an underlying intention to ensure fairness for all, and an equitable basis for regulation. By regulating the Internet as a common carrier, the FCC continues its historical role of bringing equal access, and provides a basis for universal service.

Our second recommendation to the Commission is that it provides a two-tiered tariffed Internet structure, based on traffic volumes. Video-on-demand providers deliver much heavier packet loads than most other forms of traffic, and must pay for carriage since their traffic is likely

to cause congestion at other, unaffiliated network connection points. These heavy-traffic users belong in a second tier, by themselves. Other users, including consumers, belong in tier 1, wherein their Internet use is covered by their monthly subscription.

We believe that these recommendations will provide access for everyone, in a spirit of fairness. Regulating on traffic volumes prevents high-volume services such as Netflix from seeking a free ride on other people's networks, while ensuring that consumers and Internet startups are not impeded from using the Internet.