

REDACTED – FOR PUBLIC INSPECTION

February 2, 2015

Via ECFS

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: *In the Matter of Applications of Comcast Corp., Time Warner Cable Inc., Charter Communications, Inc. and SpinCo for Consent to Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57

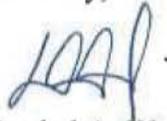
Dear Ms. Dortch:

Pursuant to the Second Amended Modified Joint Protective Order in the above-referenced proceeding,¹ Cogent Communications Group, Inc. is filing with the Secretary's office the attached letter and exhibits containing Highly Confidential Cogent network performance data.

The Highly Confidential version of this filing is also being provided to Commission staff, and will be made available for inspection pursuant to the terms of the Joint Protective Order.

Please contact me at (202) 895-7589 should you have any questions.

Sincerely,



Hershel A. Wancjer
Counsel for Cogent Communications Group, Inc.

¹ *In the Matter of Applications of Comcast Corp., Time Warner Cable Inc., Charter Communications, Inc. and SpinCo for Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57, Second Amended Modified Joint Protective Order, DA 14-1639 (Nov. 12, 2014).

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Re: Applications of Comcast Corp., Time Warner Cable Inc., Charter Communications, Inc., and SpinCo for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-57

Dear Ms. Dortch:

On November 14, 2014, Hank Kilmer, Cogent Communications Group, Inc.'s ("Cogent") Vice President of IP Engineering, Robert Beury, Cogent's Chief Legal Officer, and Robert Cooper and Hershel Wancjer of Boies, Schiller & Flexner LLP, outside counsel to Cogent, met with various Commission staff to discuss issues pertinent to Comcast Corporation's ("Comcast") proposed acquisition of Time Warner Cable, Inc. ("TWC").¹ Since that time, there have been numerous filings in the Comcast/TWC docket, including a series of reply comments filed on December 23, 2014, that directly or indirectly address issues that were raised in Cogent's November 14 meeting with Commission staff. Accordingly, Cogent is submitting this letter to provide additional information that bears upon those issues.

First, as reflected in the record, the Applicants have been involved in interconnection disputes involving, most prominently, Netflix. While much has been written and said on this topic, it is important to underscore that those interconnection disputes—and the resulting degradation of consumers' broadband Internet service—have nothing to do with network capacity. Both last-mile ISPs (like Comcast) and transit providers (like Cogent) have sufficient capacity on their respective sides of interconnection points to accept and deliver the increased amount of bandwidth-intensive content consumers are demanding.² Utilization figures for

¹ See Cogent Commc'ns Grp., Inc., November 18, 2014 *Ex Parte* Submission, GN Docket No. 14-57 ("Cogent November 2014 *Ex Parte*") (attached hereto as Exhibit A).

² With respect to Comcast's network, once Netflix agreed to pay for a direct connection with Comcast, high-quality service to Comcast subscribers streaming movies from Netflix was restored. Comments of Netflix, Inc., GN Docket Nos. 14-28 and 10-127 (filed July 15, 2014), at 2. With respect to Cogent's network, Cogent regularly upgrades capacity on its network in order to avoid any sustained packet loss or congestion. See Declaration of Henry (Hank) Kilmer, Vice President, IP Engineering, Cogent Commc'ns Grp., Inc., MB Docket No. 14-57 (filed Aug. 25, 2014) ¶ 7 ("Any sustained packet loss experienced by Cogent's customers can be attributed to congested interconnection points with our peering partners, which is outside of Cogent's sole control.") ("Kilmer Decl."). See also A Measurement

Cogent's network, as well as data showing congestion at peering points, further confirm these facts and illustrate how certain last-mile ISPs have actively thwarted Cogent's and other transit providers' attempts to deliver edge provider content requested and paid for by those ISPs' own subscribers.

The chart attached hereto at Exhibit B shows, on a weekly basis from March 2007 through mid-January 2015, capacity on Cogent's backbone network in North America and the utilization of that capacity. The chart includes data for the period January 2013 through January 2014, during which the congestion at Cogent's interconnection points with several last-mile ISPs (including Comcast and TWC) was at its peak.³ The data confirm that, for at least the last eight years, capacity on Cogent's network has expanded significantly, while the average weekly utilization of that capacity has never risen above {{[REDACTED]}}.⁴ In fact, during most weeks over that time period Cogent could have more than {{[REDACTED]}} the amount of traffic on its network without reaching capacity. Accordingly, the notion that any of the congestion at issue can be attributed to over-utilization of Cogent's network is demonstrably false.

By contrast, and as presented in the Declaration of Dr. Joseph Farrell,⁵ the graphs reproduced here at Exhibit C show the extent to which Cogent's interconnection points with Comcast and TWC surpassed 70% utilization (the point at which ISPs have historically upgraded their interconnections with other networks) and 90% utilization (the point at which packet loss at interconnection points intensifies).⁶ The data show a rapid and sustained increase in congestion

Lab Consortium Technical Report, *ISP Interconnection and its Impact on Consumer Internet Performance*, http://www.measurementlab.net/static/observatory/M-Lab_Interconnection_Study_US.pdf (October 28, 2014), at 9 ("M-Lab Report") (recent study "indicates that Cogent had sufficient capacity in at least some portion of their network and rules out any across-the-board problems with Cogent's network as the cause of degradation observed for" Comcast and TWC). Other ISP, transit, and edge provider networks (as well as CDNs) also have sufficient capacity. See Comments of Cogent Commc'ns Grp., Inc., GN Docket No. 14-28 (filed Sept. 15, 2014) at n.9 (citing evidence that Verizon, Level 3, and Netflix possess sufficient network capacity).

³ Declaration of Joseph Farrell, DPhil, Cogent Commc'ns Grp., Inc., MB Docket No. 14-57 (filed Aug. 25, 2014) ("Farrell Decl.") ¶¶ 136-141; Kilmer Decl. ¶¶ 61-68.

⁴ In {{[REDACTED]}}, Cogent also began tracking traffic and utilization using the industry standard 95th Percentile Measurement Method ("95/5 method"). See Exhibit B. See also Kilmer Decl. ¶¶ 21—22 (explaining the 95/5 method). Using that metric, since then the average weekly utilization of capacity on Cogent's network has not risen above {{[REDACTED]}}. See Exhibit B.

⁵ Farrell Decl. ¶ 137, Figures 11 and 13.

⁶ Kilmer Decl. ¶¶ 16, 20 ("When a connection [between two interconnecting networks] reaches about 70% of that connection's capacity, the two networks generally add additional capacity (i.e., additional ports and cross-connects)."); Declaration of Ken Florance, Vice President of Content Delivery, Netflix, Inc., MB Docket No. 14-57 (filed Aug. 25, 2014), ¶ 60 ("Florance Decl.") (explaining that, historically, "a regular practice" of last-mile ISPs was to augment their interconnections when transit or edge provider ports running into their networks "started to regularly go above 70% capacity utilization."); Declaration of Constantine Dovrolis, Ph.D., Professor at the School of Computer Science of the Georgia Institute of Technology, MB Docket No. 14-57 (filed September 23, 2014), Section 3.2

at interconnection points following Cogent's 2012 agreement to deliver Netflix content requested and paid for by Comcast subscribers, followed by a sharp drop in congestion in March 2014 after Netflix' agreement to pay Comcast for a direct connection to its network. The result of this congestion was dropped packets, including for streaming video and VoIP data, both of which are especially sensitive to packet loss and represent content that competes directly with video or voice services offered by Comcast and TWC.

A straightforward and inexpensive solution to the congestion depicted in the data would have been for Comcast and TWC to, consistent with industry practice, upgrade their congested interconnection ports with Cogent. Instead, the Applicants allowed their respective ports to congest, and remain congested during peak usage hours for "many" months.⁷ Notably, the refusal to augment capacity did not violate the *Open Internet* rules both Comcast and TWC have pledged to abide by in connection with this transaction. Those pledges only apply to traffic inside the Applicants' respective networks and, therefore, do not reach practices relating to interconnection with other networks. Thus, if the transaction were consummated with the Applicants' voluntary commitments in force, Comcast/TWC would retain the ability to do indirectly (*e.g.*, by keeping interconnection points congested) that which they have foresworn doing directly.⁸

The evidence of ample capacity throughout transit and last-mile ISP networks and congestion at traffic exchange points isolates where and how the degradation at issue is occurring. It also highlights the manner by which last-mile ISPs like Comcast and TWC have used a technical problem of their own making—congestion at interconnection points—as a lever to force edge and/or transit providers to pay for access to their broadband subscribers. Put differently, the congestion and the impaired consumer broadband experience it causes is not a capacity problem or a technical problem. Rather, it is solely the product of Comcast's and TWC's business decisions not to upgrade their interconnection facilities to adjust to rapidly evolving consumer preferences for an expanded array of online content and applications.

Second, it bears emphasis that the Applicants' refusal to remedy congestion at their interconnection points with Cogent, coupled with demands that Cogent pay an access toll to reach their subscribers, is a departure from these companies' prior course of dealing with Cogent. "[H]istorically, large networks like Comcast and Cogent have never paid one another for the exchange of peering traffic."⁹ For most of its tenure, Cogent enjoyed a relatively amicable

("Typically, if the utilization of a link during peak-usage time periods is more than 70%, the link can experience congestion episodes in which traffic is delayed or even dropped.").

⁷ Kilmer Decl. ¶ 67.

⁸ As Cogent has previously noted, it believes that Comcast's refusal to sufficiently upgrade interconnection facilities violates the *Comcast/NBCU* consent decree. *See* Kilmer Decl., Exhibits 1 and 2 (June 2013 exchange of letters between Robert Beury and Arthur R. Block (Comcast's Senior Vice President & General Counsel)).

⁹ *See* Dave Schaeffer, Chairman and Chief Executive Officer, Cogent Communications Group, Inc., Written Statement before the United States House of Representatives, Subcommittee on Regulatory Reform, Commercial and Antitrust Law, Hearing on: "Competition in the Video and Broadband Markets:

relationship with Comcast, as the companies worked cooperatively to provision adequate interconnection facilities which resulted in a high-quality user experience for both of their customers.¹⁰ For much of that time, “[a]s Comcast subscribers demanded more content from Cogent’s customers, Comcast would add capacity to the interconnection points with Cogent to handle that increased traffic.”¹¹ Cogent had a similar experience with TWC. This pattern and practice was not surprising given that (1) augmenting capacity at an interconnection facility is “rarely expensive or tricky,”¹² and (2) Cogent already interconnected with Comcast and TWC at multiple locations dispersed throughout the continental United States, so that the Applicants could simply add capacity at existing interconnection sites rather than establishing interconnections at new facilities (alternatives that, if necessary, Cogent certainly would have worked with Comcast and TWC to implement).

As has been described in other submissions in this docket and elsewhere, this cooperative relationship deteriorated when Cogent began delivering Netflix content requested by last-mile ISP subscribers. In response to consumer requests, Netflix sent large amounts of data over Cogent’s network to provide subscribers with a consistently high-quality viewing experience. Rather than accommodate their customers’ preferences, the Applicants (and other large, vertically-integrated last-mile ISPs) departed abruptly from their historical port-augmentation practices by (1) using pretextual traffic ratio requirements to demand additional consideration from Cogent and (2) permitting their interconnection points with Cogent to become congested.¹³ By systematically refusing to augment capacity at interconnection points, Comcast and TWC each effectively blocked their own subscribers from accessing lawful Internet content they want and for which they have already paid. That precedent is especially concerning because a merged entity “would possess even more power to extract payments from well-capitalized and

the Proposed Merger of Comcast and Time Warner Cable,” at 6 (May 8, 2014) (emphasis in original) (“Schaeffer Written Testimony”), available at http://judiciary.house.gov/_cache/files/d89e8174-d014-4ade-8a00-58c5b9350dd4/schaeffer-testimony.pdf (last visited February 2, 2015).

¹⁰ Cogent November 2014 *Ex Parte* at 1.

¹¹ Schaeffer Written Testimony at 5.

¹² M-Lab Report at 4; *see also* Kilmer Decl. ¶ 21 (explaining that the cost for a cross-connect—which interconnecting networks usually split—is typically \$200/month, and the capital cost of adding a port card is typically less than \$10,000, and borne by the network(s) adding the card); Florance Decl. ¶ 46 (explaining that “adding port capacity cost less than \$10,000—a cost which is typically amortized over three to five years by [the last-mile ISP].”); Mark Taylor, *Verizon’s Accidental Mea Culpa*, Beyond Bandwidth: Level 3 Communications Blog, <http://blog.level3.com/global-connectivity/verizons-accidental-mea-culpa/> (July 17, 2014) (estimating that each new 10 Gbps port card costs “just a few thousand dollars”).

¹³ *See* M-Lab Report at 4 (observing “sustained performance degradation experienced by customers of Access ISPs AT&T, **Comcast**, Centurylink, **Time Warner Cable**, and Verizon when their traffic passed over interconnections with transit ISPs” **Cogent**, L3 and XO, and concluding that “congestion and under-provisioning were causal factors in the observed degradation symptoms”) (emphasis added); Kilmer Decl. ¶¶ 61-68 (detailing Comcast’s refusal to implement sufficient and timely upgrades to connections with Cogent).

established companies like Netflix, and continue to demand the same from Cogent and other backbone providers.”¹⁴

Third, any effort to justify this changed behavior based on so-called traffic imbalances is disingenuous. As Cogent has explained, traffic ratios do not actually present a technical problem.¹⁵ Rather, they are nothing more than a pretext used by ISPs to extract payments or recover costs associated with delivering the network services they have sold to their customers. This tactic has been used before. For example, ratios were used in the mid-1990’s as ISPs began to differentiate their offerings (some specializing in “dial-up” services, others focusing on “business” services). As pricing for dial-up services commoditized rapidly, the associated costs did not. Accordingly, ratios were relied upon then as a cost recovery mechanism. As Mr. Kilmer noted to Commission staff in November, companies such as BBN Planet openly discussed using ratios as negotiating leverage to at least partially recover the high costs of delivering dial-up service.

Moreover, the use of traffic ratios is not standard industry practice, and certainly not in the context of negotiating with cable broadband providers.¹⁶ As Mr. Kilmer has explained, “[S]ome ISPs attempt to impose a traffic ratio requirement. But that is not a standard industry practice today. Many ISPs have no such requirement, and those that do are simply the ones that find it advantageous, from their own perspective, to do so.”¹⁷

Fourth, Comcast and TWC were in a position to leverage congestion to their advantage (with or without reliance on traffic ratios) because the bottleneck control the Applicants exert

¹⁴ Schaeffer Written Testimony at 9.

¹⁵ Cogent November 2014 *Ex Parte* at 3-4.

¹⁶ Kilmer Decl. ¶¶ 56-59.

¹⁷ Supplemental Declaration of Henry (Hank) Kilmer, Vice President, IP Engineering, Cogent Commc’ns Grp., Inc., MB Docket No. 14-57 (filed Dec. 23, 2014) ¶ 3 (“Kilmer Supp’l Decl.”). It is important to distinguish traffic ratios in the context of interconnecting networks from various fee structures that a network may employ to charge its own customers. For example, some Cogent customers have billing arrangements by which they pay a flat fee for a connection to the Internet with a certain maximum throughput (*e.g.*, 10 Gbps upload and download). Other customers pay based on the maximum rate at which data is transmitted over a given period of time, upload or download (*i.e.*, burst rate billing). In other words, Cogent’s charges are based on the rate of transmission or reception of data, not the ratio of the two. These billing arrangements, or variations on them, are in Cogent’s understanding commonplace in the industry for networks that serve customers with high-bandwidth needs. More important for present purposes, they reflect the paradigm under which the Internet has always operated—each network bills its own customers under whatever model it deems appropriate based upon, among other things, the economics of its network and the competitive environment in which it does business. The terms of network interconnection are influenced by the overall value that each network brings to the relationship, not the direction that bits of data flow between the networks. That makes sense because the costs imposed on a network are a function of overall utilization, not the direction that traffic flows. And it makes particular sense for residential ISPs, who sell their consumers broadband services predicated on the assumption (and reality) that download usage will far exceed upload usage.

over access to their subscribers allows them to secure settlement-free peering arrangements from Cogent for which they otherwise would not qualify. The type of interconnection agreement that Cogent enters into with another network is, typically, a function of the other network's size and geographic reach.¹⁸ More specifically, Cogent typically evaluates putative peering partners according to whether the other network: (a) can connect to Cogent in at least nine physical locations in the United States and six physical locations in Europe; (b) can demonstrate at least 40 Gbps of connection capacity at each of the foregoing fifteen physical locations; (c) can demonstrate that it has sufficient traffic to utilize at least 30% of the aggregate capacity of the connections (*e.g.*, if aggregate capacity is 40 Gbps x 15 = 600 Gbps, a putative peering partner would need to demonstrate that it can utilize at least 180 Gbps (30% x 600 Gbps); (d) has a network operations center¹⁹ and other back office support; and (e) agrees to announce all routes equally (*i.e.*, the peering partner may not favor any particular traffic that is headed to a particular destination; all traffic must be treated the same.). Neither Comcast nor TWC meets these criteria.

Cogent itself serves over 180 metropolitan markets in North America, Europe and Japan, and is consistently ranked as one of the top five Internet networks in the world.²⁰ The breadth of this connectivity enables Cogent's customers "to reach the entire Internet and other customers, consumers, viewers and the like across the globe."²¹ As a result, Cogent exchanges traffic on a settlement-free basis with peer networks in thirty-eight different countries. It also sells transit services to other ISPs (among other customers) who do not have a sufficiently robust network to interconnect with Cogent on a settlement-free basis. Given its size, Cogent does not purchase transit services or paid peering to reach any portion of the Internet, nor does it sell paid peering.

By contrast, neither Comcast nor TWC can provide the network infrastructure and support typically associated with ISPs that qualify for settlement-free peering.²² For example, it appears that both Comcast and TWC purchase at least some level of transit.²³ And, as Mr. Kilmer has explained, even though Comcast is the largest broadband provider in the United States, by various industry standards its network is substantially smaller than Cogent's:²⁴

¹⁸ Cogent November 2014 *Ex Parte* at 5 (describing Cogent's general criteria for settlement-free peering).

¹⁹ A "network operations center" is a location or locations from which the peering partner can monitor their network and, if necessary, exercise control over the network in the event problems arise.

²⁰ Kilmer Decl. ¶¶ 4-5.

²¹ Schaeffer Written Testimony at 4.

²² Kilmer Decl. ¶ 43.

²³ *Id.* ¶ 42.

²⁴ *Id.* ¶ 44.

Metric	Cogent	Comcast
Traffic	100.4 petabytes/day	17.25 petabytes/day
Bit Miles	271 zettabytes/day	5 zettabytes/day
Routes (IPv4)	47,800	4,300
IP Address	10.56% of Internet	2.65% of Internet

Consistent with their respective sizes and the level of connectivity to the Internet they each offer, Comcast once purchased transit from Cogent. The two companies only began peering on a settlement-free basis after Comcast, leveraging its control over access to millions of broadband subscribers, successfully pressured Cogent to do so. Even today, Comcast continues to purchase transit from Tata, but does not allow Tata to announce Cogent’s routes. Cogent already peers with Tata. Accordingly, if Comcast allowed Cogent’s routes to be announced by Tata, congestion between Cogent and Comcast would be relieved, since the relevant traffic would travel from Cogent to Tata to Comcast.

While Cogent’s settlement-free arrangements typically are the product of arm’s-length commercial negotiations that take place in a competitive market, the same cannot be said of its settlement-free peering arrangements with Comcast and TWC. Comcast’s and TWC’s networks differ in crucial respects from those operated by companies such as Cogent or Level 3. In particular, they both serve “a large number of subscribers with relatively small connections.”²⁵ Furthermore, the gatekeeper control both networks exert over access to their millions of broadband subscribers allow them to extract terms and conditions (e.g., payment of a terminating access fee by Netflix or settlement-free peering with Cogent) that one would not expect to prevail in a competitive market. Such conduct (and the bargaining leverage it confers) only promises to intensify if this transaction is consummated, and the substantial market power already possessed by each firm, is combined.²⁶

Fifth, contrary to the Applicants’ efforts, the adverse competitive and public interest implications of their exercise of market power cannot be explained away by purporting to assign some significance to the number of interconnection points provisioned by Comcast and TWC. Specifically, Dr. Israel’s attempt to control for the “quality” of interconnecting networks when analyzing bargaining leverage—by using the number of interconnection points at which ISPs provide services—is flawed. Dr. Israel concludes that “observed price differences [in interconnection terms] are explained by quality differences across ISPs and that, once such quality differences are controlled for, an ISP’s size (measured as its number of broadband customers) has no significant effect on interconnection prices.”²⁷ In assessing ISP “quality,” Dr. Israel asserts that “the number of peering facilities an ISP has reflects the degree of connectivity

²⁵ *Id.* ¶ 45.

²⁶ Farrell Decl. ¶¶ 147-77; Supplemental Declaration of Joseph Farrell, DPhil, Cogent Commc’ns Grp., Inc., MB Docket No. 14-57 (filed Dec.23, 2014) ¶¶ 51-67 (“Farrell Supp’l Decl.”).

²⁷ Mark A. Israel, *Economic Analysis of the Effect of the Comcast-TWC Transaction on Broadband: Reply to Commenters*, MB Docket No. 14-57 (filed Sept. 23, 2014) ¶ 162 (“Israel Reply Decl.”).

the ISP’s network has with the broader Internet, an important measure of the quality of an ISP’s interconnection services.”²⁸

In Cogent’s view, Dr. Israel’s analysis is, at a minimum, incomplete.²⁹ To the extent that “the number of *private* peering facilities [utilized by Dr. Israel] is relevant to measuring network quality then . . . the number of *public* peering facilities is also relevant.”³⁰ Moreover, merely increasing the number of peering facilities will eventually yield diminishing returns in the form of reduced cost savings and efficiency. To that end, the geographic dispersion of an ISP’s peering facilities—which Dr. Israel ignores—is a more instructive indicator of network “quality.” As Mr. Kilmer has explained, “all else being equal, interconnecting at a greater number of cities will yield lower costs and more efficient utilization of a network than interconnecting at fewer cities.”³¹

At the end of the day, perhaps it is not possible to come up with an objective measure of network quality on which all observers will agree. However, arriving at such a metric is not necessary to assess the adverse public interest impact of the proposed transaction. What is necessary is to understand the salient facts and their implications, namely the Applicants’ success in obtaining settlement-free peering terms from Cogent for which they would otherwise not qualify, and then their willingness and ability to manipulate the resulting interconnections—and harm their own customers in the process—to extract a terminating access fee from one of the Internet’s most innovative and sought-after sources of content. That raw exercise of market power, and what it foreshadows for the conduct one can expect from a post-merger entity, is a source of serious public interest concern.

Sixth, in evaluating public interest concerns, it is important that the Commission look forward, not just to the recent past. Among other things, the Commission needs to evaluate what unabated congestion-creating tactics by the Applicants could mean for innovative edge providers and consumers alike. Cogent is an integral component of the Internet ecosystem that provides valuable services to edge providers.³² It does so in a transit market that is characterized by intense competition, multi-homing and declining prices. However, if left unchecked, the ability of last-mile ISPs to throttle content that poses a direct threat to their own proprietary offerings may discourage backbone providers like Cogent from selling transit to edge providers that encroach on business areas in which the last-mile ISPs have a vested interest. This includes

²⁸ *Id.* ¶ 163.

²⁹ Dr. Farrell also provides his own critique of Dr. Israel’s analysis. Farrell Supp’l Decl. ¶¶ 58-67.

³⁰ Kilmer Supp’l Decl. ¶ 8 (emphasis in original).

³¹ *Id.*

³² See Schaeffer Written Testimony at 6 (“Unlike Cogent, Comcast is not providing Netflix with transit services. Comcast cannot carry traffic internationally like Cogent can, and Comcast cannot connect Netflix to every other network that comprises the Internet like Cogent can. For these reasons, and contrary to media accounts, Cogent is not an expendable ‘middle-man’ who is being cut out by [] direct connection arrangements [like the one between Netflix and Comcast].”).

large edge providers like Netflix and Amazon, but also includes nascent broadband businesses like security monitoring services. If such interconnection abuse causes some transit providers to focus on other revenue streams or pushes them out of the transit market altogether, fewer options will exist for edge providers to reach consumers. And whatever options remain are likely to cost more, thereby raising the costs to edge providers that offer services and applications that compete with Comcast's and TWC's legacy voice and video businesses.

Moreover, if this happens, consumers will ultimately feel the effect of Applicants' exercise of market power: "Comcast's [and TWC's] strategy is to get everyone to pay them, either through paid peering with content providers like Netflix, paid peering with backbone providers like Cogent, or both. When providers simply have no choice but to pay, these costs will necessarily be passed on to consumers."³³ That outcome cannot be reconciled with the public interest.

Please direct any questions regarding this correspondence to my attention.

Sincerely,



Robert M. Cooper

³³ *Id.* at 7-8.

Exhibit A

November 18, 2014

VIA ELECTRONIC FILING

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

Re: Applications of Comcast Corp., Time Warner Cable Inc., Charter Communications, Inc., and SpinCo for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-57

Dear Ms. Dortch:

On November 14, 2014, Hank Kilmer, Cogent Communications Group, Inc.'s ("Cogent") Vice President of IP Engineering, Robert Beury, Cogent's Chief Legal Officer, and Robert Cooper and Hershel Wancjer of Boies, Schiller & Flexner LLP, outside counsel to Cogent, met with the Commission staff copied below. During the session, Messrs. Kilmer and Beury addressed issues and answered questions concerning Cogent's dealings with Comcast Corporation ("Comcast") and Time Warner Cable, Inc. ("TWC"), Internet traffic ratios, network management practices, and competition for backbone/transit services in the United States. More generally, they discussed the serious competitive and public interest concerns raised by the proposed Comcast-TWC combination.

A. Cogent's Dealings with Comcast and TWC

Cogent historically has had relatively amicable relationships with both Comcast and TWC, under which Cogent and those firms have exchanged Internet traffic on a settlement-free basis for several years. Until relatively recently, both Comcast and TWC, upon request, routinely augmented capacity of their interconnection links with Cogent. Informal, ad hoc discussions concerning augmentations would occur around the time the links between the networks reached 70% utilization, the point at which ISPs throughout the industry typically upgrade their interconnections with other networks to avoid service problems.¹ This pattern and practice changed abruptly after Cogent began providing transit service to Netflix, which poses a

¹ See Declaration of Henry (Hank) Kilmer, Vice President, IP Engineering, Cogent Commc'ns Grp., Inc., MB Docket No. 14-57 (filed Aug. 25, 2014) ¶ 16 ("Kilmer Decl."). See also Declaration of Constantine Dovrolis, Ph.D., Professor at the School of Computer Science of the Georgia Institute of Technology, MB Docket No. 14-57 (filed September 23, 2014), Section 3.2 ("Typically, if the utilization of a link during peak-usage time periods is more than 70%, the link can experience congestion episodes in which traffic is delayed or even dropped.").

direct competitive threat to both Comcast's and TWC's proprietary MVPD and on-demand video offerings.²

As has been well-documented, the refusals of Comcast and TWC to upgrade their interconnections with Cogent yielded degraded service to Cogent's transit customers and, importantly, to Comcast's and TWC's own broadband subscribers.³ Notably, Cogent did not experience similar congestion issues with other large broadband ISPs that added sufficient capacity to their interconnections with Cogent, even though they "experienced percentage increases in traffic from Cogent that were similar to the large consumer ISPs."⁴

Messrs. Kilmer and Beury also addressed certain assertions made in this proceeding by Kevin McElearney, Comcast's Senior Vice President of Network Engineering. For example, Mr. McElearney claims that "Cogent could have solved its [congestion-related] problems, without paying Comcast a dime" if it had simply worked with its edge provider customers (e.g., Netflix) to distribute traffic "among the various routes available" to those edge providers, "rather than insisting that all of [the traffic] stay on any particular provider's route."⁵

As Mr. Kilmer explained (echoing many other commenters in this proceeding), it makes no difference how an edge or transit provider routes the content requested and paid for by Comcast's subscribers to Comcast's last-mile network, because every path or combination of paths must ultimately interconnect with Comcast. The only way to reach Comcast's subscribers is through Comcast. The same, of course, holds true for TWC. Accordingly, congestion at

² See Declaration of Joseph Farrell, DPhil, Cogent Commc'ns Grp., Inc., Federal Communications Commission MB Docket No. 14-57 (filed Aug. 25, 2014) ¶¶ 136-141 ("Farrell Decl.").

³ See A Measurement Lab Consortium Technical Report, *ISP Interconnection and its Impact on Consumer Internet Performance*, http://www.measurementlab.net/static/observatory/M-Lab_Interconnection_Study_US.pdf (October 28, 2014), at 4 ("M-Labs Report") ("[W]e observed sustained performance degradation experienced by customers of Access ISPs AT&T, **Comcast**, Centurylink, **Time Warner Cable**, and Verizon when their traffic passed over interconnections with transit ISPs" **Cogent**, L3 and XO.) (emphasis added); Kilmer Decl. ¶¶ 61-68 (detailing the impact Comcast's refusal to augment port capacity at interconnection points with Cogent had on Cogent and Comcast customers). The M-Labs Report also noted that (a) "congestion and under-provisioning were causal factors in the observed degradation symptoms[.]" and (b) the study "indicates that Cogent had sufficient capacity in at least some portion of their network and rules out any across-the-board problems with Cogent's network as the cause of degradation observed for" Comcast and TWC. M-Labs Report at 4, 9.

⁴ Farrell Decl. ¶ 137 (discussing Charter and Cox). See also M-Labs Report at 9 (explaining that, at the same time there was congestion at Cogent's interconnection points with Comcast, TWC and Verizon at a measurement point in New York City, "Access ISP Cablevision uniformly experienced good performance when connecting to this same Cogent-hosted measurement point[.]").

⁵ Declaration of Kevin McElearney, Senior Vice President, Network Engineering, Comcast Cable, MB Docket No. 14-57 (filed Sept. 23, 2014), ¶ 52 ("McElearney Decl.").

interconnection points is not the result of inefficient routing. Rather, it is a result of Comcast's refusal to relieve congestion absent the payment of a terminating access fee.

Indeed, under Mr. McElearney's formulation, the only way for Cogent to address congestion at its interconnection points with Comcast—short of capitulating to Comcast's demands for payment to access its subscribers—would have been to terminate its relationship with Netflix, which would then need to seek transit from a competing backbone provider. Had that happened, Netflix' next choice of transit provider could have expected similar results. Ultimately, while Cogent was unwilling to have Comcast dictate with whom it could do business, Comcast (and later, TWC) achieved its goal, in that the congestion-creating strategy forced Netflix to find another option. That option, as is well known, amounted to Netflix paying an access fee to Comcast for a direct, uncongested path into the network. Put differently, by leveraging its market power and absolute control over access to its millions of customers, Comcast (and later, TWC) was able to extract a fee to reach those consumers. Not only is this inconsistent with the traditional settlement-free exchange of traffic among networks but, more ominously, it foreshadows what a post-merger entity with control over access to vastly more consumers can be expected to do in the future.

Mr. McElearney also maintains that, during a 2012 joint Cogent/Comcast capacity review, "Cogent informed Comcast that it did not foresee needing any additional capacity for the coming year."⁶ Comcast provides no evidence to substantiate this assertion, and Cogent has no recollection or record of such a discussion. Indeed, Mr. Kilmer emphasized that it is not a position that Cogent would ever take in negotiations with a peer, and added that, in all his time in the industry—which dates back to his work with UUNET, one of the first commercial Internet service providers—he has never heard an ISP of any kind preemptively disavow that it might need additional capacity for the following year.⁷

B. Traffic Ratios

Mr. Kilmer explained that traffic ratios across the industry—including those between Cogent and Comcast or TWC—have *never* been "in balance" or, for that matter, an impediment to the delivery of traffic (regardless of the volume of traffic being exchanged).⁸ For example, in

⁶ McElearney Decl. ¶ 40.

⁷ Moreover, the suggestion in the record that Comcast somehow "accommodated" Cogent's requests for additional capacity by "adding 50 Gigabits of incremental capacity in the first few months of 2013" is also disingenuous. *See* Kilmer Decl., Exhibit 2 (June 20, 2013 letter from Arthur R. Block (Comcast) to Robert N. Beury, Jr. (Cogent)). As Mr. Kilmer explained, at approximately the same time Comcast added 50 GBs of capacity, it also removed 40 GBs of capacity, resulting in the net addition of only 10 GBs of capacity. In any event, the upgrades did nothing to address the volume of bandwidth-intensive content being requested by Comcast's own subscribers. *See* Farrell Decl., Figures 11 and 13.

⁸ As Mr. Kilmer added, historical traffic growth rates have not changed much in the last twenty years. Indeed, on a percentage basis, the annual growth rates in traffic were actually higher in the 1990s than they are today. Thus, there should be nothing noteworthy about recent growth rates when edge or transit providers and ISPs are both selling to and acquiring additional customers on a regular basis, with

the late 1990s, the advent of online video games greatly increased the amount of traffic flowing between networks. Accordingly, at that time ratios between transit providers and last-mile ISPs were also out of balance. However, imbalanced ratios did not pose an issue back then, perhaps because video games did not directly threaten the vertically-integrated offerings of residential ISPs. Regardless, as a growing and more diverse set of competitors continue to offer ISP end-users new and more creative broadband products and services that compete directly with Comcast and/or TWC businesses (*e.g.*, HBO's recently announced streaming services, or alarm monitoring services provided by companies like ADT), residential ISPs will have even more incentives to degrade the delivery of such content. At a minimum, the degradation of such content will be an obvious mechanism by which ISPs like Comcast and/or TWC can raise their rivals' costs. And, as illustrated by recent events involving Netflix, the Applicants have the ability to match their incentives.

Mr. Kilmer also noted that, to engineers, ratios do not represent a metric of value, nor do imbalanced ratios present a technical problem. The bottom line is that if a provider offers a service to its customers—as Comcast and TWC do when they sell access to the entire Internet at advertised speeds—they must follow through on those promises. That is why both transit providers and ISPs, who regularly invest millions, or *billions*, of dollars to upgrade their networks,⁹ have not claimed they lack the capacity to accept and/or deliver the increased amount of bandwidth-intensive content end users are currently demanding.¹⁰ Once a transit provider or ISP provisions adequate capacity to serve the needs of its customers (*e.g.*, edge providers for Cogent or end-users for Comcast or TWC), it cannot and should not be expected to subsidize corresponding upgrades on the other side of an interconnection point. Moreover, once two

adequate capacity to exchange the resulting traffic. All of that additional content is being paid for on both sides of the interconnection points (content providers paying transit providers for delivery of traffic to ISP subscribers, and end-users paying their ISPs for access to all lawful content). Moreover, as Mr. Kilmer explained, since the addition of capacity is neither expensive nor complicated, the addition of new customer bases should not result in or require drawn out pre-emptive discussions concerning capacity upgrades. *See also* M-Labs Report at 3 (explaining that the process of interconnecting two networks at an IXP is “rarely expensive or tricky”).

⁹ Kilmer Decl. ¶ 8 (stating that, as the volume of Internet traffic carried by Cogent's network has increased 716% over the past five years—from approximately 2,226,229 TBytes to 18,155,339 TBytes per year—“Cogent has accommodated that increase with capital expenditures averaging \$48 million per year.”); *Opposition to Petitions to Deny and Response to Comments of Comcast Corp. and Time Warner Cable Inc.*, MB Docket No. 14-57 (filed Sep. 23, 2014), at 37 (“Comcast has invested billions of dollars to upgrade its network to deploy DOCSIS 3.0 and transition its systems to all-digital.”).

¹⁰ Indeed, if Comcast lacked sufficient capacity within its own network, then Netflix performance would not have improved so soon after Netflix signed its direct connection deal with Comcast. Moreover, the suggestion by Mr. McElearney that Cogent sold more capacity than its network can handle (*see* McElearney Decl. ¶ 52) is baseless. As Mr. Kilmer has explained, Cogent's network is not close to operating at full capacity. This is because Cogent regularly upgrades network capacity in order to avoid *any* sustained packet loss or congestion. *See* Kilmer Decl. ¶ 7 (“Any sustained packet loss experienced by Cogent's customers can be attributed to congested interconnection points with our peering partners, which is outside of Cogent's sole control.”). *See also* M-Labs Report at 9.

networks agree to interconnect, each should ensure that it maintains adequate interconnection to facilitate the flow of traffic between them.

Finally, Messrs. Kilmer and Beury generally explained that Cogent evaluates requests from other networks to peer on a settlement-free basis according to a number of criteria, including (a) the size of the requesting network; (b) the requesting network's geographic reach and the number of interconnection points it maintains; (c) the anticipated amount of traffic to be exchanged; and (d) expectations about the proper maintenance of interconnection facilities.¹¹ While Cogent does not believe that so-called "traffic ratios" are an appropriate criterion for deciding whether to agree to settlement-free peering in the context of backbone-to-backbone negotiations, such ratios are even less logical in the context of negotiating with cable broadband providers.¹² To the extent Cogent has deviated from its settlement-free criteria, it has been to agree to settlement-free peering arrangements with cable broadband networks, like Comcast and TWC, neither of which meet these criteria.¹³ It has done so because each of these entities possesses and exercises sufficient market power to obtain interconnection terms and conditions for which they do not, as a general proposition, qualify. Such market power derives from their bottleneck control over their residential broadband subscribers. Allowing Comcast and TWC to combine will only exacerbate this problem.

C. Network Management

Mr. Kilmer described how congestion affects bandwidth-intensive content (*e.g.*, streaming video) more than other types of content (*e.g.*, email), and observed that the content most susceptible to congestion competes directly with Comcast's own proprietary content. As a result, Comcast's congestion strategy potentially harms *all* Comcast subscribers and Cogent customers. To that end, Mr. Kilmer generally described how Comcast subscribers attempting to telecommute from home have experienced significant difficulties in connecting to their employer's servers, where their employer was a Cogent Internet access customer.

Indeed, beginning in November 2013, employees of midsize investment consultancy NEPC, a business that purchases Internet access and inter-city transit services from Cogent, began experiencing difficulty accessing NEPC servers. By January 2014,

[r]emote access had become untenable. Calls were dropping right and left. Files were freezing and not opening for minutes at a time. ... Employees who had been used to having state-of-the-art access to their work materials from home or on the road started working

¹¹ Kilmer Decl. ¶ 16.

¹² Kilmer Decl. ¶¶ 56-59. Indeed, Mr. Kilmer also noted that traffic ratios between Cogent and Comcast had never been "in balance."

¹³ Kilmer Decl. ¶¶ 42-45.

in the middle of the night on the off chance that connectivity would be better.¹⁴

A number of the employees impacted were Comcast ISP subscribers.¹⁵ This is just one example of how, “in their attempts to charge Netflix for access to their subscribers, Comcast and some other networks were recklessly affecting Internet connectivity for businesses like NEPC.”¹⁶

While the direct connection agreement between Comcast and Netflix alleviated some of the congestion and resultant degradation described above, this was only because Netflix agreed to pay an access fee for direct connection to Comcast, “thus reducing the Netflix traffic carried by Cogent bound for Comcast customers.”¹⁷ It did not, however, solve the problem entirely. As a result, the disparate impact such conduct had on certain of its business customers forced Cogent to implement a congestion-mitigation strategy whereby it prioritized the “quality of service” (QoS) to a sub-set of its business customers. The implementation of this strategy was unprecedented in Cogent’s history, and was only undertaken as a last resort to improve connections for customers whose Internet access had been compromised by the refusal of certain ISPs (including Comcast and TWC) to alleviate congestion at interconnection points with Cogent. Moreover, unlike Comcast and TWC, Cogent has carried out this congestion-mitigation technique in an open and transparent fashion.

D. Competition for Backbone/Transit Services in the United States

In response to a question concerning the backbone providers against whom Cogent competes on a regular basis for the provision of transit services to high-bandwidth customers in the United States, Messrs. Kilmer and Beury indicated that Cogent’s primary competitors typically include some or all of the following: Level 3 Communications, Tata Communications, TeliaSonera, XO Communications, and NTT Communications. Secondary competitors include Sprint, PCCW, Telecom Italia, GTT and Zayo.¹⁸

* * * *

As Cogent described in its Petition to Deny and accompanying declarations—and will further address in a forthcoming reply in support of that Petition—the Comcast-TWC transaction poses a grave threat to the future delivery of Internet content in the United States. This is

¹⁴ See Susan Crawford, *Jammed: The Cliff and the Slope*, Medium, <https://medium.com/backchannel/jammed-e474fc4925e4> (October 30, 2014).

¹⁵ *Id.* at 14.

¹⁶ *Id.* at 2.

¹⁷ Farrell Decl. ¶ 138.

¹⁸ For certain customers, Cogent also competes for business against CDNs such as Limelight Networks and Akamai.

especially true with respect to content or applications that compete with the Applicants' proprietary video businesses. Comcast's and TWC's deliberate measures to create congestion at interconnection points with Cogent and others offers a blueprint for the ways in which a merged, and substantially more powerful, entity will be able to exercise its market power to advantage itself and harm its existing and emerging online competitors. That course of conduct, and its implications for the future, is the central public interest issue the Commission must evaluate in the context of the transaction.

Please direct any questions regarding this correspondence to my attention.

Sincerely,



Robert M. Cooper

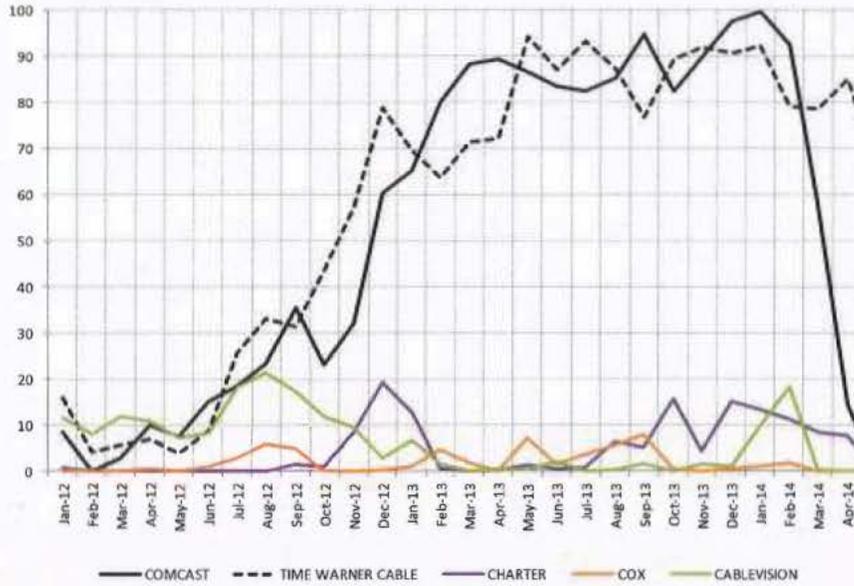
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Hillary DeNigro
Bill Dever
Lisa Gelb
Marcia Glauberman
Shane Greenstein
Scott Jordan
Jonathan Levy
Betsy McIntyre
Alison Neplokh
Jeffrey Neumann
Will Reed
Bill Rogerson
Johanna Thomas
Brenda D. Villanueva
Matt Warner

Exhibit B

REDACTED – FOR PUBLIC INSPECTION

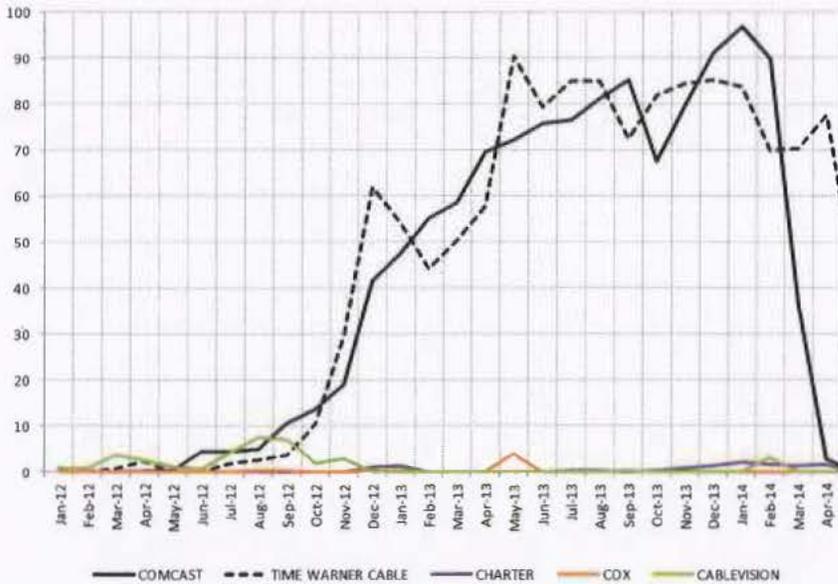
Exhibit C

Percentage of the prime time period when Cogent interconnection ports with selected cable companies are used at more than 70% port capacity



Source: Bates White calculations based on Cogent data.

Percentage of the prime time period when Cogent interconnection ports with selected cable companies are used at more than 90% port capacity



Source: Bates White calculations based on Cogent data