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July 11, 2011

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Global Crossing Limited and Level 3 Communications, Inc., Application for Consent to Transfer Control of Authority to Provide Global Facilities-Based and Global Resale International Telecommunications Services and of Domestic Common Carrier Transmission Lines, Pursuant to Section 214 of the Communications Act, as Amended	)	IB Docket No. 11-78
	)	
Level 3 Communications, Inc., Petition for Declaratory Ruling Under Section 310(b)(4) Of the Communications Act of 1934, as Amended	)	

DECLARATION OF RANDOLPH NICKLAS

1. My name is Randolph Nicklas. I am the Chief Technology Officer (CTO) for XO Communications, LLC (XO). My business address is 13865 Sunrise Valley Drive, Herndon, VA 20171.

2. As CTO, I am responsible for the technology and design of the company's voice, data and transport network platforms. I also advise the company on the overall design and technical aspects of XO's commercial and wholesale voice, data and IP-based services. I have been employed at XO since 1999, previously as Vice President of Engineering, where I was responsible for the design, implementation, and sustaining engineering of XO's transport, voice and data network platforms. Before joining XO, I held engineering and technical management positions at Intelsat, Cisco, and MCI. I have practiced as an engineer for 26 years and have been involved in the telecommunications industry since 1991. I hold a Bachelors of Science and a

Masters of Science in Applied Mathematics and a Masters of Science in Physics, all from the Georgia Institute of Technology.

3. XO is a leading nationwide provider of advanced broadband communications services and solutions for businesses, enterprises, government, carriers and service providers. Its customers include more than half of the Fortune 500, in addition to leading cable companies, carriers, content providers and mobile network operators. Utilizing its unique combination of high-capacity nationwide and metro networks and broadband wireless capabilities, XO offers customers a broad range of managed voice, data and IP services with proven performance, scalability and value in more than 75 metropolitan markets across the United States. XO has more than 1.1 million miles of total route fiber and more than 3,100 on-net fiber lit buildings. XO owns 16,000 fiber route miles of transmission facilities in the U.S. XO does not own any transmission facilities outside of the U.S., although it offers global connectivity through leased facilities and capacity, including non-U.S. capacity it leases from Level 3 Communications, Inc. (Level 3) and Global Crossing Limited (Global Crossing).

4. XO is a Tier 1 Internet Backbone Peer. It has peering node locations in 10 markets in the United States, 4 in Europe, and 1 in Asia. XO plans to extend its leased network footprint in Europe and expand into Asia as business conditions warrant.

5. The Internet can be viewed as a confederation of service provider networks that exchange traffic voluntarily and where connectivity changes over time. These service provider networks range from educational institutions to Internet service providers to national governments and large scale multi-service telecommunications service providers. The one attribute that each of these network participants in the Internet have in common is that they each control their own network. Because of this, each one is called an autonomous system (AS).

These autonomous systems then make agreements with each other in an effort to interconnect and exchange traffic in accordance with each AS's goals. It is important to note that there is no central organizing authority – companies come and go, agreements get made and are broken, and almost none of these activities require the imprimatur of an authority other than the entities making the connection agreements. While there are organizations that attempt to coordinate network activity, they generally restrict themselves to handing out blocks of IP addresses and autonomous system numbers to the AS's that require them.

6. The AS graph is a representation of which networks connect to each other, which makes it a technical, economic and political graph of the Internet. The AS graph shows how traffic could potentially flow. If there is a de-peering event and traffic stops, the AS graph would show a loss of connectivity for the sub-tending AS's that are single-homed. To be single-homed is to have only one service provider that provides connectivity to the Internet.

7. At the top of the Internet AS graph, providing global connectivity for all AS's, are the Tier I Internet backbone providers (IBPs), which rely exclusively on peering for exchanging traffic and do not purchase transit. They alone, even today, ensure that all routes are covered efficiently. As such, there is no substitute for them. As noted earlier, XO is a Tier 1 provider. So too are Level 3 and Global Crossing.

8. If a Tier 1 network provider does not have a peering arrangement with another Tier 1 network provider, the customers of these network providers will be unable to communicate with each other (unless they pay to transit through other providers). In the absence of a complete set of peering arrangements, customers of these network providers will be unable to communicate if they are connected to only one Internet service provider (single-homed). A customer that is multi-homed to a Tier 1 network provider that does not peer with another Tier 1

network provider will be able to communicate with the customers of the destination Tier 1 provider since the multi-homed customer is connected to another Internet service provider (assuming that such provider has either a transit or a peering relationship with the destination Tier 1 provider).

9. Entry into the Tier 1 Internet backbone market is difficult, if not impossible. To operate as a peer, an IBP must demonstrate comparable traffic throughput, flows and geographic scope, none of which is easy to obtain. Further, existing Tier 1 IBPs are not interested in offering settlement-free interconnection to would be Tier 1 IBPs, and there is no incentive for them to do so.

10. Level 3 and Global Crossing are the two largest Tier 1 IBPs in the world. They carry more traffic on the Internet backbone that is "on-net" than any of the other Tier 1 IBPs, and they have more unique routes. Level 3 and Global Crossing also are the two largest global transit providers. The disparity in the amount of traffic carried over the Level 3 and Global Crossing networks overall compared to other networks is significant. The disparity in the U.S. is greater than it is in the rest of world.

11. A decade ago, Level 3 did not engage in or instigate de-peering events. It was only after Level 3 grew sufficiently and became disproportionately larger than virtually all other Tier 1 IBPs that it started initiating de-peering events.

12. XO peered settlement-free with Level 3 from 2001 until 2005. In September 2005, Level 3 approached XO and demanded payment for carrying XO's traffic. Level 3 never explained the reasons for their demand for payment, relying instead on a termination for convenience clause in the bilateral settlement-free traffic exchange agreement then in effect. I note that when XO and Level 3 commenced peering in 2001, XO and Level 3

were comparable in terms of network extent, cross-sectional bandwidth, and number of customers. However, between 2001 and September 2005, Level 3 acquired various other Internet backbone providers. As such, by September 2005, the Level 3 Internet backbone had grown significantly when compared to the growth of the XO Internet backbone, in terms of customers and originated address space.

13. In response to Level 3's request to unilaterally terminate the XO-Level 3 settlement-free peering agreement, XO and Level 3 held a series of phone conferences and e-mail exchanges on the topic of traffic exchange. Throughout these discussions, XO maintained its position that the peering exchange agreement in place was and would continue to be mutually beneficial to both XO and Level 3 and their respective customer bases. Level 3 was never able to describe their reasons for changing from settlement-free traffic exchange to a situation where XO would either disconnect from Level 3 or XO would pay Level 3 their stipulated rate to maintain the direct exchange of traffic between major IBPs that is essential to the functioning of the Internet and of mutual benefit to both parties. Despite XO's repeated efforts to resolve the matter in an amiable fashion, Level 3 broke off the peering link and ceased peering with XO on September 27, 2005 at midnight. XO never received a final notice of peering termination, and maintained throughout the period of discussion that Level 3's actions were egregiously unwarranted. Upon termination of connectivity to Level 3, approximately 15% of XO's off-net Internet traffic was impaired, and hundreds of customer trouble tickets were opened by XO customer care. Because of the criticality of XO's Internet service to its customers, XO yielded after several hours of de-peering to Level 3's unilateral demand for payment for the direct exchange of customer traffic (paid peering). Level 3 finally reestablished the peering links at 6:30 am the next morning, restoring full Internet service between XO and Level 3. By Level 3's

own admission, approximately a dozen Internet Service Providers were de-peered by Level 3 in 2005.

14. In de-peering XO, Level 3 wreaked havoc on the business and operations of many of XO's customers. Level 3's unilateral actions disconnected these customers, totaling more than 30,000 in September 2005 from a significant portion of the Internet – the portion of the Internet served by Level 3 – for 6.5 hours. The types of customers impacted, or who would have been impacted if the XO-Level 3 disconnection had continued, include school systems, agencies of the federal government such as the EPA, financial Services companies such as Comstock, and tens of thousands of small to medium businesses employing more than one hundred thousand Americans across a myriad of industries. For all of these customers, connection to the Internet is critical to the success of their operations.

15. Level 3 has shown XO that if it has a size or market share advantage over XO, it will not hesitate to hold XO's customers hostage to pressure XO into paying for peering, partial-transit, or full-transit. The merger of Level 3 and Global Crossing will create a global Tier 1 provider with substantially greater market share than other IBPs. As such, Level 3 will have a much greater incentive to once again de-peer XO to extract additional payments and to end XO's current settlement-free peering relationship with Global Crossing, to the detriment of XO's current and potential customers. As in 2006, XO's customer base includes many government customers and commercial customers in critical industries, including but not limited to: Mt. Sinai School of Medicine, Kootenai Medical Center, Intermountain Health Care, Detroit Medical Center, Cedars-Sinai Health Systems, Grady Memorial Hospital, California Transplant Donor Network, Radiological Society of America, Methodist Hospital of Memphis, and other major healthcare corporations; the US Postal Service, the Port of Long Beach, the Port of Los

Angeles, California Department of Transportation, the State of Utah, the State of Delaware, the City of Marietta, GA, and other government agencies; the Philadelphia Public School System, St. Louis University, University of Memphis, Loyola University of Chicago, Fordham University, and many other educational organizations; XM Satellite, Gannet Co., The Seattle Times, Disney Online, HBO, Turner Broadcasting, and other media and entertainment corporations; Caribou Coffee Company, Autozone, Abercrombie & Fitch, McDonalds and other retail chains; Cbeyond, T-Mobile, Verizon Wireless, Alaska Communications, and many other communications service providers; Wells Rural Electric Company, Southern California Edison, Bristol Virginia Utilities, and other utility corporations; and The Church of Jesus Christ of Latter Day Saints and many other religious organizations. As was the case in 2005, a Level 3/Global Crossing de-peering of XO will impact tens of thousands of Internet attached business and hundreds of thousands of Americans.

16. In my view, a combined Level 3-Global Crossing threatens more than just XO. If permitted to merge, the combined Level 3-Global Crossing will be the largest Tier 1 carrier in the world and disproportionately so. Level 3 will have an incentive to de-peer every other Tier 1 network provider.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my information and belief.

Executed on 11th July, 2011

/S/_____

Randolph Nicklas

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
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Global Crossing Limited and Level 3 Communications, Inc., Application for Consent to Transfer Control of Authority to Provide Global Facilities-Based and Global Resale International Telecommunications Services and of Domestic Common Carrier Transmission Lines, Pursuant to Section 214 of the Communications Act, as Amended	)	IB Docket No. 11-78
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DECLARATION OF MARCELLUS NIXON

1. My name is Marcellus Nixon. I am the Director of IP Network Planning at XO Communications, LLC. (XO). My business address is 13865 Sunrise Valley Drive, Herndon, VA 20171.

2. I have been employed at XO since 2002, initially as an IP Network Engineer. I have been in my current position as Director of IP Network Planning since 2008. My career with IP networks began in the US Army. I have also held networking positions with the NASD and internet MCI. I hold a Bachelor of Interdisciplinary Studies from the University of Virginia.

3. In my current position, I am responsible for all strategic aspects of IP network planning, and I am the peering coordinator for XO. In that capacity, I manage relationships with other Tier 1 and lower tier Internet Backbone Providers (IBPs), including

determining where peering occurs, evaluating network architecture needs such as capacity requirements, routing requirements, and the impact of technological changes on the peering arrangement. I also am responsible for negotiating interconnection (peering) agreements. To date, I have negotiated on behalf of XO forty-seven (47) peering agreements.

4. XO operates an extensive intercity and metropolitan network across the U.S. and owns 16,000 fiber route miles of transmission facilities. Part of XO's intercity facilities is from a joint build with Level 3 that began in 1998. XO does not own any transmission facilities outside of the U.S., although it has connectivity in locations in Europe and Asia. To the extent that XO leases fiber, such leases are short-term (*i.e.*, one year or less). XO does not enter into any IRU agreements for its Internet backbone network.

5. The core of the XO IP network is a mesh of multiple 10 Gigabit per second (Gbps) circuits, connecting XO points of presence (POPs) and peering nodes globally. The XO IP backbone runs across its own intercity fiber facilities in the U.S. The XO IP network and market connections run end-to-end across XO owned and leased facilities. As a fully-peered, facilities-based backbone provider in the U.S., XO has substantial private peering arrangements in ten metropolitan areas where it exchanges traffic at speeds of up to 10 Gbps. XO has multiple and geographically redundant dedicated connections to other Tier 1 Internet backbones.

6. XO currently offers Dedicated Internet Access (DIA) and wholesale and enterprise transit connections in 75 markets in the United States, 4 markets in Europe and 1 market in Asia. The XO core node locations are: Seattle, Fremont, Los Angeles, Denver, Chicago, Dallas, Atlanta, Miami, Washington, DC and New York. The XO peering node

locations are: Seattle, Palo Alto, San Jose, Los Angeles, Denver, Chicago, Dallas, Atlanta, Miami, New York, London, Amsterdam, Frankfurt, Madrid and Hong Kong.

7. XO has a robust Internet backbone business, interconnecting its IP network with other Internet backbone providers on a settlement-free basis when such interconnection provides mutual benefit to customers of both providers. XO also provides access to its Internet backbone network through transit agreements with smaller Internet backbone networks, large ISPs, content delivery networks (CDNs), and the IP networks of large enterprise customers, such as financial institutions. For the exchange of higher volumes of traffic, XO interconnects its IP network with most other networks directly at Internet exchange points or carrier hotels instead of its POPs.

8. XO's Internet backbone business continues to be a significant growth business for the company. Revenues from XO's Internet backbone business have doubled over the same period last year. Traffic exchanged over XO's Internet backbone network has, on average, been doubling annually since 2007.

9. The Tier 1 Internet backbone market is a distinct market, where Internet global reach and connectivity are essential. A Tier 1 Internet backbone network is one that reaches every other network on the Internet without transiting through another network. In addition, a Tier 1 provider does not pay settlements to another provider except in rare instances. Peering relationships are governed via peering or settlement-free interconnection policies. To operate as a peer, IBP's must fulfill conditions regarding infrastructure and routing requirements. Among the most important requirements are comparable traffic volumes, ratios and geographic scope. If Tier 1 IBPs discontinue peering with each other, single-homed customers of each network will not be able to reach the customers of other network. This situation is only remedied

by the IPBs reaching a new peering agreement that is either settlement-free or settlement-based or entering into a transit agreement.

10. Entry into the Tier 1 Internet backbone market is difficult. First, it requires a would-be Tier 1 IBP to build its own network infrastructure with global connectivity, which is capital intensive. Further, most Tier 1 settlement-free peering arrangements require global coverage. In addition, the would-be Tier 1 IBP has to sign-up customers with enormous amounts of traffic to reach a traffic throughput comparable to that of current Tier 1 IBPs.

11. Although no single authority defines tiers of networks, based on the criteria provided above, the current Tier 1 providers include Level 3, Global Crossing, NTT Communications, Sprint, TiNet, Qwest, AT&T, Verizon, Cogent, Tata Communications, TeliaSonera, and XO.

12. Level 3 and Global Crossing are the two largest Tier 1 IBPs. They carry more traffic on the Internet backbone that is "on-net" than any of the other Tier I IBPs, and they have more unique routes. They also compete intensely with each other and other IBPs for customers.

13. Level 3 owns and operates an extensive region-to-region Internet backbone network that connects the major metropolitan areas in the United States. Level 3 also has one of the most dense metropolitan Internet backbone networks in the United States and Europe. Level 3 has the most unique routing in the United States, providing one network for VoIP and another for Internet access. Since 2003, Level 3 has grown both organically and by acquiring financially distressed networks, including Genuity, WilTel, Progress Telecom, Broadwing, Savvis Content Delivery and Servecast. These acquisitions have given Level 3 access to many valuable assets, including metro and long haul fiber and large blocks of IPv4

address space. The IPv4 space allows Level 3 to make large allocations of unique addresses which provides it an advantage in the exchange of Internet traffic.

14. Global Crossing has significant geographic scale, with access to over 100,000 global route miles. Like Level 3, Global Crossing has grown both organically and by acquiring network assets, including IMPSAT Fiber Networks, Fibernet, and Frontier. Also like Level 3, these acquisitions have enabled Global Crossing to obtain many valuable assets, including long haul fiber in the U.S., South America, and large blocks of IPv4 address space. These addresses provide the same benefit as Level 3's allocation.

15. Each of the Tier 1 IBPs identified above, with the notable exception of Level 3, has made its peering policy either publicly available or has shared it upon request. Although XO has repeatedly requested it, Level 3 has not provided its settlement-free peering policy. To the best of my knowledge, Level 3 has not made its peering policy generally available to other Tier 1 IBPs. Instead, Level 3's peering policy is implemented on an "ad hoc" basis, making it difficult to understand and meet the requirements to peer with Level 3. This lack of transparency also leads to requirements changing without notice and being imposed arbitrarily. In addition, unlike other Tier 1 IBPs and contrary to industry practice, Level 3 has not identified an established peering coordinator to handle peering requests and arrangements.

16. In the last 5 years, the Internet backbone market has changed considerably, primarily due to the growth and evolution of CDNs. CDNs are used to rapidly and cost-effectively deliver a variety of content – predominantly video – to numerous end points, whether the end points are, for example, web browsers, mobile devices, or set-top boxes. Most CDNs utilize Tier 1 IBPs to carry their traffic even in major metropolitan areas and between regional networks.

17. There also has been an increase in traffic exchange with and among secondary tier IBPs and by direct peering among ISPs. However, despite the increased amount of traffic exchanged via secondary and direct peering and the use of CDNs, Tier 1 IBPs are required and necessary to enable traffic to be exchanged with other Internet backbone networks and their customers throughout the world.

18. In the last 5 years, because it is so difficult to enter the Tier 1 backbone business, there has not been much change in the firms that are top Tier 1 players. Entities only have been able to become Tier 1 players through consolidation. In addition, there has not been much change in the rankings by size of these top Tier 1 firms.

19. There are two firms that are often mentioned as potential Tier 1 providers: Google and Comcast. Google is building a lower tier backbone network. But Google's network is not used to serve Google's customers. Instead, Google uses its network for web acceleration – for caching content that will frequently be requested by a high number of Internet users at many locations. Comcast has publicly stated that it is on its way to becoming a Tier 1 IBP. But, Comcast's network is primarily regional, and it lacks international peering nodes.

20. The single most important consideration for a potential transit customer of a Tier 1 IBP is gaining a complete understanding of the number and types of customers and peers that already are connected to the IBP's backbone network. To a potential customer, if an IBP has a large number of "brand name" customers, it is an indicator that the network has sufficient capability, can ensure quality, and will provide high-performance.

21. A growing group of transit customers, including financial entities and VoIP providers, requires low latency. This means an IBP must have substantial capacity and high-performance capabilities. It also means that these customers prefer having their traffic

routed entirely over a single network or having at most a single point where traffic is exchanged with another network.

22. Because of competition in the Tier 1 Internet backbone market, the prices for Internet transit services have dropped significantly over the last five years.

23. An IBP can dominate the Tier 1 IBP market if it controls a disproportionate amount of Tier 1 traffic, especially traffic exchanged with unique customers. When this occurs, transit and content providers who are not customers of the dominant IBP find that if they want to ensure high-quality and high-performance transmissions they need to become customers of the dominant IBP. In essence, this process feeds itself until the market tips entirely in favor of the dominant IBP. This will result in the dominant IBP dictating the relationship with other IBPs, resulting in them paying (or paying higher prices) for peering, and with non-customer transit and content providers, also resulting in them paying higher prices. Additionally, as competition in the IBP market decreases, there will be less innovation, which has been a key driver of higher performance networks and lower priced services.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my information and belief.

Executed on 8 July, 2011

Marcellus Nixon

REDACTED – FOR PUBLIC INSPECTION

COMPETITIVE EFFECTS OF THE PROPOSED LEVEL 3 COMMUNICATIONS-GLOBAL CROSSING LIMITED TRANSACTION*

July 11, 2011

by

William P. Rogerson**

* Prepared for XO Communications, LLC.

** Professor of Economics, Northwestern University. FCC Chief Economist, 1998-99.

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1. INTRODUCTION AND SUMMARY

The proposed acquisition of Global Crossing Limited (Global Crossing) by Level 3 Communications, Inc. (Level 3) will combine the resources, assets, and customer bases of two of the largest - and by most measures the two largest - Tier 1 Internet backbone providers (IBPs)[1] in the world. In its analysis of past transactions in this market, such as the WorldCom/MCI transaction,[2] the Commission has recognized that horizontal combinations in this market pose an extra risk to competition compared to horizontal combinations in most markets because of the network effects in this market created by the fact that users of the Internet value being connected to all other users of the Internet. IBPs must interconnect with one another in order to provide their customers (i.e., ISPs, content providers) with access to all other customers.[3] If an individual IBP

[1] Tier 1 Internet backbone providers operate global networks that carry Internet traffic, interconnect with one another at numerous locations around the globe and generally interconnect with one another on a settlement-free basis. The "customers" of Tier 1 backbones are primarily ISPs and content providers. There are also some smaller backbones with more limited networks called Tier 2 or Tier 3 backbones. These smaller backbones are not important for the purposes of this study and, unless otherwise indicated, I will use the term "IBP" to refer to Tier 1 Internet backbone providers.

[2] *See* the comments of XO Communications, LLC (XO) which this study is attached to for a review of previous cases considered by the Commission and its conclusions. *See Comments of XO Communications, LLC, In the Matter of Global Crossing Limited and Level 3 Communications, Inc., Application for Consent to Transfer Control of Authority to Provide Global Facilities-Based And Global Resale International Telecommunications Services and of Domestic Common Carrier Transmission Lines, Pursuant to Section 214 of the Communications Act as Amended, ("XO Comments"),* IB Docket No. 11-78, July 11, 2011, Section D1.

[3] Interconnection between two IBPs is usually referred to as "peering." In a peering relationship each IBP agrees to accept all traffic from the other IBP that terminates with its own customers. While most interconnection between the IBPs currently occurs on a settlement free basis, there are limited exceptions. A customer of an IBP is generally referred to as purchasing "transit" from the IBP.

provider becomes too large relative to other providers, it may have the incentive to either degrade interconnection[4] and/or charge other IBPs for interconnection, with the result that the market may tip to the dominant provider. Thus mergers that create a single IBP that is disproportionately large or dominant relative to other IBPs create a particular risk to competition. Antitrust agencies in both the United States and Europe have also recognized this issue and acted upon it.[5] Finally, this issue has also been noted and discussed in the academic economics literature.[6]

In the this study I use publicly available data from Renesys[7] (a provider of Internet-related data) and private data made available to me by XO Communications, LLC (XO) to present three different calculations of the effect of the proposed transaction on economically relevant measures of market concentration, firm size and economic dominance. All three calculations support the same conclusion. Namely the effect of the transaction will be to create a dominant firm that is

[4] Note that "degrading interconnection" may take the form of an IBP taking affirmative actions to lower the quality of interconnection below its existing level but may also take the form of an IBP refusing to participate in or discouraging cooperative industry ventures designed to improve the quality of interconnection between IBPs.

[5] *See XO Comments*, Section D1 for a review of previous cases considered by the DOJ and European antitrust authorities and their conclusions.

[6] *See*, for example, Paul Milgrom, Bridger Mitchell and Padmanabban Srinagesh (2000), "Competitive Effects of Internet Peering Policies," in *The Internet UpHeaval*, edited by Ingo Vogelsang and Benjamin Compaine, Cambridge: MIT Press, 175-195; Jacques Cremer, Patrick Rey, and Jean Tirole (2000), "Connectivity in the Commercial Internet," *The Journal of Industrial Economics*, 48(4), 433-472; and Stanley Besen, Paul Milgrom, Bridger Mitchell, and Padmanabhan Srinagesh (2001), "Advances in Routing Technologies and Internet Peering Agreements," *American Economic Review Papers and Proceedings*, 91(2), 292-296.

[7] *See* www.renesys.com.

disproportionately large relative to other firms in the market and will thus create a danger of tipping. This reduction in competition between IBPs will result in higher prices and reduced innovation.

The study is organized as follows. Section 2 uses two different methods to calculate the effect of the transaction on market shares of traffic. Section 3 calculates the effect of the transaction on the share of Internet addresses served by various providers. Finally, Section 4 draws a brief conclusion.

2. THE EFFECT OF THE TRANSACTION ON SHARES OF TRAFFIC

A. Introduction

A problem with assessing the competitive effects of transactions between IBPs, which the Commission itself has noted in its analysis of previous transactions,[8] is that industry data on traffic flows or revenues that could be used to calculate market shares is closely guarded and is generally not publicly available. In this section I will present two different methods of estimating market shares of traffic and the effect of the transaction on these shares using two different data sources. The first method is based on using publicly available data on the share of Internet addresses served by various IBPs. The second method is based on using private data from XO on the amount of traffic it exchanges with various IBPs. As will be seen, the two different methods yield very

[8] "As a preliminary matter, we note that no complete and reliable data sources are available to measure relative shares of Internet backbone providers." *See Memorandum Opinion and Order, In the Matter of Verizon Communications Inc., and MCI Inc. Applications for* Approval *of Transfer of Control*, WC Docket No. 05-75, October 31, 2005, at para. 123.

similar qualitative results. Namely, the transaction will combine the two largest IBPs in the industry and result in a provider that is significantly and disproportionately larger than any other provider in the industry.

B. Method #1: Using Renesys Data on Share of Internet Addresses Served

While data of traffic flows and revenue is generally not available, data on the Internet addresses or routes served by different ISPs must necessarily be publicly available from the routing tables that IBPs use to determine where to send traffic. Renesys is a provider of Internet-related data and information that collects this data and makes it publicly available.[9] This data can be used to estimate market shares of traffic.

A simple example can be used to explain the method. Suppose that there are only two IBPs. Suppose that IBP #1 serves 80% of all Internet addresses and IBP #2 serves 40% of all Internet addresses. (Note that the shares will generally sum to more that 100% since some customers multi-home. In this example, the shares sum to 120%.) These can be converted to market shares that sum to 100% by calculating each of the above shares as a percentage of the total that they sum to. This yields market shares as follows.

[9] The specific data used in this study was provided by Renesys in blog entries on the Level 3/Global Crossing transaction and Qwest/Savvis transaction. *See* Renesys Blog, www.renesys.com/blog/, "Level Crossing," April 14, 2011 and "Quavis: The Battle for Second," April 29, 2011. Renesys provides a more comprehensive and detailed discussion of its methodology for calculating shares of Internet addresses served at www.renesys.com/tech/presentations/pdf/monog2.pdf.

Market share of IBP #1	=	80 x 100%/120
	=	66.7%
Market share of IBP #2	=	40 x 100%/120
	=	33.3%

The shares calculated in this manner will be reasonable approximations of each firm's market share of traffic if each firm's traffic is relatively proportional to the number of Internet addresses it serves.

Table 1 presents the Renesys data on shares of Internet addresses served for the top 10 IBPs and the estimated market shares of traffic calculated based on this data calculated as described above. The first column of Table 1 provides the name of each IBP. The second column provides the Renesys data on the share of Internet addresses served by each IBP. Note that theses shares sum to 200%. Therefore market shares of traffic are calculated by dividing the Renesys shares by 2. The third column of Table 1 presents these results.

According to the results in Table 1, Level 3 and Global Crossing are the two largest IBPs with, respectively, 20% and 15% of the market. Therefore the merged firm would have a market share of 35% which is three times the share of the next largest firm. Today, prior to the transaction, the largest firm is only 1.33 times as large as the next largest firm. Therefore the effect of the transaction will be to create a new firm that is disproportionately larger than all other firms, which in turn creates a danger of tipping in this market.

The effect of the transaction on the HHI index would be to increase it from 1175 to 1579 for an increase of 404. The DOJ/FTC Horizontal Merger Guidelines define a market with an HHI of between 1500 and 2500 to be moderately concentrated and state the following:

> "Mergers resulting in moderately concentrated markets that involve an increase in the HHI of more than 100 points potentially raise significant competitive concerns and often warrant scrutiny."[10]

Thus based on these market shares, the Level 3/Global Crossing transaction belongs to the group of transactions that "raise competitive concerns and often warrant scrutiny." The thresholds that trigger concern are meant for typical markets that do not necessarily exhibit network effects. The fact that there are significant network effects in this market of course increases the competitive risk posed by any increase in concentration.

C. Method #2: Using XO Data on Traffic Exchange with Other IBPs

XO provided me with data on the amount of traffic it exchanges with other IBPs.[11] This data provides an alternate method for estimating market shares of traffic for each IBP.

Once again a simple example can be used to explain the method. Suppose that there are only two IBPs. Suppose that the traffic exchanged with IBP #1 is 150 Gbps and the traffic

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[10] *See* U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, August 19, 2010 at 19, available at www.ftc.gov/os/2010/08/100819hmg.pdf.

[11] For each IBP, XO provided me with data for a recent month on the amount of the traffic flowing into XO from the IBP and the amount of traffic flowing out of XO to the IBP. Traffic was measured according to the 95th percentile of capacity usage, measured in Gbps (gigabits per second), which is the industry-standard measure of traffic flow. For each IBP, I summed the in and out traffic flows to calculate the total traffic exchanged.

exchanged with IBP #2 is 50 Gbps. These can be converted to market shares that sum to 100% by calculating each of the above amounts as a percentage of the total to which they sum. This yields market shares as follows.

Market share of IBP #1	=	150 x 100%/200
	=	75%
Market share of IBP #2	=	50 x 100%/200
	=	25%

The shares calculated in this manner will be reasonable approximations of each firm's market share of traffic if each firm's total traffic is relatively proportional to the amount of traffic it exchanges with XO.

Table 2 presents the results of this calculation for the top ten IBPs that XO exchanges traffic with, listed from largest to smallest. Note even though XO is filing share data pursuant to confidentiality protections of the FCC's rules, XO is not filing the underlying data on traffic flows between XO and each IBP and the names of the IBPs other than Level 3 and Global Crossing because presentation of this additional data is not necessary for me to demonstrate that market shares calculated according to this alternate method yield the same qualitative conclusion as market shares calculated according to the first method. Namely, Level 3 and Global Crossing are the two largest providers in the market and the transaction will create a new provider that is disproportionately larger than any other provider in the market.

According to the results in Table 2, Level 3 and Global Crossing are the two largest IBPs with, respectively, [START CONFIDENTIAL****END CONFIDENTIAL] %f the market. Therefore the merged firm would have a market share of [START CONFIDENTIAL****END CONFIDENTIAL] which is [START CONFIDENTIAL****END CONFIDENTIAL] times the share of the next largest firm. Today, prior to the transaction, the largest firm is only [START CONFIDENTIAL****END CONFIDENTIAL] times as large as the next largest firm. Therefore the effect of the transaction will be to create a new firm that is disproportionately larger than all other firms, which in turn creates a danger of tipping in this market. Furthermore, the HHI increases from [START CONFIDENTIAL****END CONFIDENTIAL] for an increase of [START CONFIDENTIAL****END CONFIDENTIAL] points. Therefore, as explained above, the transaction falls into the group of transactions that "raise competitive concerns and often warrant scrutiny" according to the DOJ/FTC Horizontal Merger Guidelines.

D. Conclusion

Two very different methods of estimating market shares based on very different types of data yield striking similar qualitative conclusions about the competitive effects of the Level 3/Global Crossing transaction. Namely, Level 3 and Global Crossing are the two largest firms in the market with market shares of respectively of [START CONFIDENTIAL****END CONFIDENTIAL]-20% and 15-[START CONFIDENTIAL****END CONFIDENTIAL] %. The merged firm will have a market share of [START CONFIDENTIAL****END CONFIDENTIAL]-35% and be [START CONFIDENTIAL****END CONFIDENTIAL]-3 times as large as the next largest firm. Therefore the effect of the transaction will be to create a new firm that is disproportionately larger than all other firms, which in turn creates a danger of tipping.

Furthermore, based on changes in the HHI index, the transaction falls into the group of transactions that "raise competitive concerns and often warrant scrutiny" according the DOJ/FTC Horizontal Merger Guidelines, and these concerns should be heightened yet further by the presence of significant network effects in this market.

The fact that two such different methods of estimating market shares based on very different types of data yield such similar qualitative conclusions leads me place a high level of confidence in the veracity of these qualitative conclusions.

3. THE EFFECT OF THE TRANSACTION ON SHARE OF INTERNET ADDRESSES SERVED

A recent development in the Internet marketplace is the growing importance of applications such as streaming video, VOIP, and financial market applications that demand very low levels of latency. This is significant because, even if IBPs make good faith efforts to seamlessly interconnect with one another, the latency of Internet transmissions between two users will generally be lower if both users are customers of the same IBP, than if they are customers of two different IBPs. Thus the greater importance attached to low latency has amplified the advantage that customers receive from being connected to the largest IBP and thus increased the tendency of the market to tip to the largest provider.

In addition to suggesting that the danger of tipping has increased, this recent development also suggests another important metric that can be used to help measure the potential competitive harms created by a merger. This is because a merger will become more problematic to the extent

that it creates a new firm that directly serves a disproportionately large share of customers compared to all other firms relative to the situation that exists before the merger.

Of course the Renesys data on shares of Internet addresses served can be interpreted as providing data on shares of customers served by each IBP prior to the merger. Recall that these shares are presented in the second column of Table 1. In its published analysis of the Level 3/Global Crossing transaction, Renesys also estimates that the merged firm would serve 55% of all Internet addresses.[12] Of course the share of Internet addresses served by other firms will not change because of the transaction.

Therefore after the transaction, the merged firm will serve 55% of all Internet addresses, while the next largest firm will served only 22% of all Internet addresses. Thus the largest firm will serve more than twice as many Internet addresses as the second largest firm. Today, prior to the merger, the largest firm serves only 1.33 times as many Internet addresses as the next largest firm. Therefore, to the extent that there are positive network affects associated with the base of customers that an IBP directly serves (due to reduced latency), the effect of the transaction will be to create a disproportionately dominant firm relative to its rivals.

4. CONCLUSION

As the Commission has previously recognized, a merger between competing IBPs will pose a particular risk to competition if it creates a single provider that is disproportionately larger

[12] Note that the share of Internet addresses served by the merged firm will be less than the sum of the Internet addresses served by each of the merging firms because some customers multi-home with both merging firms.

and more dominant than all other firms in the market, and thus creates a danger of tipping. This study has presented three different calculations of the effect of the proposed Level 3-Global Crossing transaction on economically relevant measures of size, concentration and market dominance. All three calculations yield the same conclusion. Namely, the result of this transaction will be to create a disproportionately larger and more dominant firm than other firms in the market. This reduction in competition between IBPs will result in higher prices and reduced innovation.

TABLE 1

SHARES OF INTERNET ADDRESSES SERVED BY THE TOP 10 IBPS

IBP	Share of Internet Addresses Served	Estimated Market Share Of Traffic
Level 3	40%	20%
Global Crossing	30%	15%
NTT	22%	11%
Sprint	20%	10%
Tinet	16%	8%
Telia	16%	8%
Tata	16%	8%
Verizon	15%	7.5%
?	13%	6.5%
Savvis	12%	6%
Total	200%	100%

Notes:

1. Source of Data on Share of Internet Addresses Served: Renesys Blog, www, renesys.com/blog/, "Level Crossing," April 14, 2011 and "Quavis: The Battle for Second," April 29, 2011. Some of the data was only presented in graphs and the precise values of the data had to be measured from the graphs. Also information about the identity of the ninth largest provider was not published. A value intermediate between the two values for the adjacent firms was chosen.
2. Renesys provides a more detailed and comprehensive discussion of its methodology for calculating shares of internet addresses served at www.renesys.com/tech/presentations/pdf/monog2.pdf.

TABLE 2
CALCULATION OF MARKET SHARES OF TRAFFIC FOR THE TOP 10 IBPS BASED ON RELATIVE TRAFFIC EXCHANGE BETWEEN XO AND IBPS

IBP	Estimated Market Share of Traffic
Level 3	[START CONFIDENTIAL****
Global Crossing	****
IBP #3	****
IBP #4	****
IBP #5	****
IBP #6	****
IBP #7	****
IBP #8	****
IBP #9	****
IBP #10	****END CONFIDENTIAL]
Total	100.0%

Notes:

1. Data on total traffic that XO exchanges with each IBP provided by XO.

2. Market shares for each IBP calculated by calculating the traffic XO exchanges with each IBP as a percent of the total traffic that XO exchanges with all ten IBPs.