ATTACHMENT 16

DECLARATION OF MICHAEL KENDE

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

In the Matter of	)	
	)	
Verizon Communications Inc. and	)	
MCI, Inc.	)	WC Docket No. 05-75
Applications for Approval of	)	
Transfer of Control	)	

DECLARATION OF MICHAEL KENDE

ISP trends for 2000–5

Declaration of Michael Kende, Principal Consultant, Analysys Consulting

1 Introduction

1. This declaration examines the current competitive position of providers of Internet connectivity – that is, firms that operate Internet backbones. The Internet business in the past five years has changed markedly due to powerful commercial and technological forces. MCI currently faces significant and ever-increasing competition from a number of Internet connectivity providers of comparable size and scope. Verizon is not a significant Internet connectivity provider today. Thus, the merger would have little or no impact on MCI's competitive position under the measures discussed below. Moreover, while MCI operates several network access points (NAPs), NAPs have become less significant in general, and also face new sources of competition.

2 Internet backbones

2. All available information about Internet connectivity providers shows that MCI's relative position has declined over the past five years and that there are now approximately half a dozen providers of comparable size. The best method for measuring the relative size of Internet connectivity providers involves the use of traffic and revenue data, but unfortunately no complete and reliable data sources are publicly available. There is publicly available information about the number of Autonomous Systems (AS) connections, but this measure has significant shortcomings. Another indication about the relative sizes of Internet connectivity providers is peering policies, and those that have been made publicly available confirm that many of these providers consider themselves to be peers of MCI. The US Department of Justice defined "Tier 1" Internet backbone providers to include Internet connectivity providers that have large national or international networks and that typically maintain direct peering arrangements with all other Tier 1 providers.[1] Based on the available data, it is reasonable to assume that this category today includes at least MCI, AT&T, Level 3, Sprint, Qwest and SAVVIS, and that it may also include AOL Transit Data Network and TeleGlobe.

[1] *United States v. WorldCom, Inc. and Sprint Corp.*, Case No. 1:00CV01526, para. 27 (filed June 27, 2000) (available at http://www.usdoj.gov/atr/cases/f5000/5051.htm).

3. The merger would have little or no impact on MCI's size or competitive position, based on the measures discussed below. Moreover, Verizon is primarily a transit customer of two of the larger Internet connectivity providers, has limited peering with such providers, and provides transit services to other Internet Service Providers (ISPs) only to a limited extent.

4. *Revenue* IDC tracks data on revenues of ISPs, which appears to be a category broader than the Internet connectivity services at issue here. These data include business and wholesale revenues, for both dedicated access and dial-up. The two revenue categories that most closely match the backbone operations of Internet connectivity providers are (1) U.S. Wholesale Upstream Transit IP Revenue and (2) U.S. Dedicated Internet Access IP Revenue by ISP.[2] Exhibit 1 shows these two revenue breakdowns for the largest 10 providers, along with the total revenues from these backbone services and the change since 2002. Whether these two categories are considered individually or collectively, MCI did not have the largest share of revenue in 2002 or 2003. Moreover, when MCI's and Verizon's total revenues in 2003 are added together, the total is less than that of the company with the largest share in 2003, and there are many other providers with significant revenues.

5. *Traffic* RHK provides estimates of the traffic shares of the top seven Internet connectivity providers, but for confidentiality reasons publishes only the top name. These estimates are found in Exhibit 2. According to this measure, MCI does not hold the top position. RHK does not state whether Verizon is on the list of top seven Internet connectivity providers. This list shows fairly tight bunching between the top provider with 12.5% of the Internet traffic and the bottom three tied at five percent, and this suggests a grouping of at least seven roughly equal providers measured by traffic.

6. *Connectivity* TeleGeography lists the connections that Internet connectivity providers have to different Autonomous Systems (AS), which provides a rough proxy for the number of each provider's ISP and large-enterprise customers. Exhibit 3 below shows the changes for the current top 50 providers between 2000 and 2004, and Exhibit 4 compares the current top 10 providers in 2004 with their ranking in 2000. There are several general issues to note about using these numbers as a potential measure of relative competitive position, as well as observations specific to the current review.

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2 The first of these two categories apparently includes connections between the point of presence of an ISP that purchases transit services and the point of presence of the seller of transit services. This tends to overstate revenues of incumbent local exchange carriers that sell both transit and access to points of presence compared with other ISPs that sell transit services.

7. General issues are as follows:
   - First, by definition the number of AS connections only includes the customers that have their own AS numbers, and these tend to be ISPs and large enterprises. Backbones that focus on smaller customers without AS numbers would show up as disproportionately small on the TeleGeography list.
   - Second, the number of AS connections provides at best only a partial picture of the share of connections of each Internet connectivity provider – a simple list of customers does not consider the capacity of each customer's connection, the volume of traffic sent, the revenue generated by that customer or even the geographical location of that customer.
   - Third, there has been volatility in the rankings of the Internet connectivity providers that currently occupy the top ten positions, as shown in Exhibit 4 – two (Internap and AboveNet) were not on that list in 2000, and two on the list in 2000 (XO Communications and TeleGlobe) are no longer on the list in 2004. In addition, SAVVIS replaced Cable & Wireless USA after the former acquired the latter's assets.[3]
   - Fourth, there was a substantial decrease in concentration: the combined share of the top five Internet connectivity providers fell to 39% of all connections in 2004, from 58% in 2000. Furthermore, the top four providers experienced a decline in connectivity over 2003 and 2004, while those slightly lower in the rankings experienced an increase.

8. The information in Exhibits 3 and 4 also shows that the combination of MCI and Verizon raises no competitive concerns. While MCI has remained at the top of the list of backbones ranked by connections, other backbones have closed the reported gap since 2000 because MCI has had the smallest increase in connections over that time period of any of the backbones ranked in the top 15 today. Verizon does not appear in this list at all, and so the merger would have no noticeable impact on the concentration of the market as measured by AS connectivity.

9. *Peering policies* As the name suggests, peering is reserved for peers. Accordingly, an Internet connectivity provider's peering policy indicates how big other providers must be if the issuer of the policy is to consider them as peers. The publicly available peering policies of Internet connectivity providers are, therefore, a qualitative indication of their relative size.

10. Since the late 1990s, a number of Internet connectivity providers, including MCI, have published their peering policies to provide transparency about when they peer. These peering policies typically

[3] See *SAVVIS Closes Purchase of Cable & Wireless America Assets*, http://www.wamnet.com/news/read_news.phtml?newsid=713.

include two types of requirements relating to the relative size of a backbone: network requirements and peering requirements.[4] Network requirements refer to the geographical scope of the network and the raw capacity of the network required to qualify for peering. Peering requirements relate to the peering connections between the two peers. For instance, the network requirement could specify the general capacity that a network must have, while the peering requirement specifies the capacity of the connection between the networks. Exhibit 5 in Annex D below presents all publicly available network and peering requirements for the North American backbones in TeleGeography's list of the top 50 in 2004.

11. According to the publicly available peering policies, six Internet connectivity providers – MCI, Level 3, SAVVIS, Qwest, TeleGlobe and AOL Transit Data Network – have significantly more stringent network and peering requirements than the others listed in Exhibit 5, and consider themselves to be peers of MCI and other large Internet connectivity providers.[5] This list is clearly incomplete, because other firms known to have large backbones, including AT&T and Sprint, have chosen not to publish their peering requirements. Nonetheless, the list provides further confirmation that MCI is just one of a substantial group of large Internet connectivity providers – a group that does not include Verizon.

3 Network access points

12. For several reasons, NAPs in general, including MCI's NAPs, are less significant today than they were five years ago. ISPs increasingly exchange traffic via direct interconnection and not through public peering sites like NAPs, because they find direct interconnection more efficient. TeleGeography states that the relevance of public Internet exchange points in the US has "diminished" and is "on the wane".[6] A more recent trend accelerating this shift has been the increasing popularity of Internet Exchange Points (IXPs), such as those owned by Equinix and Switch and Data's PAIX exchanges. Unlike NAPs, IXPs are not operated by Internet connectivity providers, and IXPs provide an efficient, relatively low-cost means of direct interconnection between Internet connectivity providers (and direct connection between content providers).[7]

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4 Peering policies also contain operational requirements relating to network reliability, but I do not discuss them because they do not give any indication of the relative size of a backbone.

5 Both AOL Transit Data Network, which has a backbone network connected to three continents, and TeleGlobe declares itself to be an operator of Tier 1 backbone networks on its Web sites. *See* www.atdn.net and http://www.teleglobe.com/en/our_network/.

6 TeleGeography, Global Internet Geography, 2004 at 25.

7 A cross connect used for direct peering at an IXP could cost X hundreds of dollars, far less than the cost of building facilities to connect two networks directly.

13. The growth of IXPs has led to a steady increase in the number of public exchange points over the past decade. According to data from Telegeography, the number of exchange points increased from only 6 in 1995 to 41 in 2002, and only four of these 41 exchange points were the MAEs operated by MCI, while seven were owned by Equinix and another seven by PAIX – and none by Verizon.[8] Furthermore, the cumulative square footage of colocation space has also grown significantly. For ten major cities tracked by TeleGeography, the Internet exchange space available grew from 1.6 million square feet at the beginning of 2000 to 3.9 million by the end of 2003.[9] For example, in the Washington area where MCI's MAE-East was one of the original NAPs, TeleGeography now counts 34 colocation facilities with over 3,400,000 square feet of space (compared with 108,000 square feet at MAE-East).[10]

4 Conclusion

14. MCI currently faces competition from a number of Internet connectivity providers (not including Verizon) that have backbones of comparable size and scope to MCI. The merger would have little or no impact on MCI's competitive position according to the publicly available data. Moreover, all NAPs, including MCI's, are facing more competition, and Verizon does not own any Internet exchange points.

8 TeleGeography, Global Internet Geography, Internet Exchange Growth, 1994–2002.

9 The ten cities tracked are Atlanta, Chicago, Dallas, Denver, Los Angeles, Miami, New York, San Francisco, Seattle and Washington. TeleGeography, Colocation Report and Database, 2004.

10 TeleGeography research, Colocation Report and Database, 2004.

I declare under the penalty of perjury that the foregoing is true and correct.

Executed on March 9, 2005

Michael Kende

Annex A: IDC Revenue Data

	Dedicated Internet Access	*Market Share*	*Wholesale Upstream Transit*	*Market Share*	*Total Backbone Revenues*	*Market Share*	*Change from 2002*
AT&T	1031.3	16.0%	103.0	8.2%	1134	14.7%	6.7%
MCI	578.9	9.0%	120.0	9.5%	699	9.1%	-24.9%
Sprint	397.5	6.2%	202.0	16.0%	600	7.8%	-9.6%
Verizon	283.2	4.4%	120.0	9.5%	403	5.2%	15.0%
BellSouth	297.0	4.6%	103.0	8.2%	400	5.2%	16.8%
SBC	285.5	4.4%	111.0	8.8%	396	5.1%	26.7%
Level3	16.1	0.3%	267.0	21.2%	283	3.7%	194.8%
Qwest	163.5	2.5%	6.0	0.5%	170	2.2%	-40.1%
Comcast	166.0	2.6%	0.0	0.0%	166	2.2%	247.0%
Savvis	106.2	1.7%	0.4	0.0%	107	1.4%	-30.3%

Exhibit .1: *2003 Backbone Revenues [Source: IDC Unpublished Data, 2004]*

Note: Level3 purchased Genuity in 2003, and thus the increase in 2003 revenues for Level3 includes the addition of Genuity's revenues.

Annex B: RHK Traffic Data

Company	*Traffic Share*
AT&T	12.5%
Company B	12.0%
Company C	9.0%
Company D	8.0%
Company E	5.0%
Company F	5.0%
Company G	5.0%

Exhibit.2:

Internet Traffic Shares [Source: RHK]

Annex C: TeleGeography connectivity rankings

Rank	*Provider*	*2000*	*2001*	*2002*	*2003*	*2004*	*Change 2003–4*
1	MCI	2242	3129	3212	3276	3034	-7%
2	AT&T	694	1197	1423	2052	1966	-4%
3	Sprint	1036	1417	1603	2333	1842	-21%
4	Level 3	658	1048	1009	1388	1167	-16%
5	Qwest	418	644	973	1007	1074	7%
6	Internap	211	362	437	554	668	21%
7	SAVVIS	210	296	270	275	664	141%
8	NTT Communications	379	445	475	553	636	15%
9	Global Crossing	217	432	551	601	616	3%
10	AboveNet	207	547	569	488	590	21%
11	Cogent	105	202	196	323	544	68%
12	Globix	45	520	411	457	530	16%
13	SBC	90	155	243	337	514	53%
14	Swisscom	51	79	87	97	477	391%
15	Time Warner Telecom	38	84	207	314	452	44%
16	XO Communications	385	338	329	377	441	17%
17	COLT Telecom	20	30	62	273	394	44%
18	TeliaSonera	115	195	226	333	375	13%
19	Cable & Wireless	1150	1230	1118	1222	359	-71%
20	KPN	148	236	406	174	357	105%
21	France Telecom	94	219	275	291	348	19%
22	DACOM	97	143	147	259	319	23%
23	KDDI	82	111	230	261	308	18%
24	Tiscali	70	335	335	306	295	-4%
25	Hurricane Electric	15	38	30	145	289	100%
26	REACH	71	122	187	241	285	18%
27	Broadwing	26	120	194	251	284	13%
28	WilTel	23	32	116	249	280	12%
29	Korea Telecom	102	183	184	250	278	11%
30	TeleGlobe	270	392	391	185	244	32%
31	Group	4	45	116	171	239	40%
32	BT	83	138	161	215	230	7%

Rank	*Provider*	*2000*	*2001*	*2002*	*2003*	*2004*	*Change 2003–4*
33	Deutsche Telekom	45	74	87	131	229	74%
34	Telefonica	5	25	98	197	227	15%
35	TDC	30	46	48	57	223	294%
36	Telenor	19	29	30	35	222	537%
37	Net Access	15	36	40	215	222	3%
38	VBCnet	13	15	7	31	217	590%
39	Microsoft	28	36	33	154	209	36%
40	IIJNET	109	123	149	169	200	18%
41	SingTel	100	170	204	211	183	-13%
42	Electric Lightwave Inc	92	165	169	166	178	8%
43	Telecom Italia	80	126	143	141	161	14%
44	Song	3	15	14	197	156	-21%
45	RTComm	66	87	101	107	154	45%
46	Powernet Global	32	39	36	82	142	74%
47	Yipes!	5	38	87	104	138	33%
48	RCN	16	106	116	122	131	7%
49	Transtelecom	0	2	33	76	125	65%
50	LambdaNet	1	9	41	135	125	-8%

***Exhibit 3**:* *Top 50 ISPs by AS Connections [Source: Telegeography Global Internet Geography, 2005]*

	2004		2000		
Provider	*Rank*	*Number of AS connections*	*Rank*	*Number of AS connections*	*% change in AS connections*
MCI	1	3034	1	2242	35%
AT&T	2	1966	4	694	183%
Sprint	3	1842	3	1036	78%
Level 3	4	1167	5	658	77%
Qwest	5	1074	6	418	157%
Internap	6	668	11	211	216%
SAVVIS	7	664	12	210	216%
NTT	8	636	8	379	68%
Global Crossing	9	616	10	217	184%
AboveNet	10	590	13	207	185%

***Exhibit 4**:* *Changes in Top 10 ISPs by AS Connections [Source: TeleGeography Global Internet Geography. 2005]*

Annex D: Publicly available peering policies

Criteria	*MCI*	*Level 3*	*SAVVIS*	*QWEST*	*AOL Transit Data Network*
Network requirements					
Geographical scope of network	Must operate facilities in 25 states and be dispersed in eight regions across country	See below	IP backbone shall have backbone hubs in the nine geographical regions in which SAVVIS also has nodes	Candidate shall have a national network with IP traffic termination in a minimum of ten major Metropolitan Statistical Areas located in at least three US time zones	Eight or more geographically dispersed cities
General capacity	OC-48	OC-192	OC-192	OC-192	OC-192
Minimum number of transit customers	1000	N/A	N/A	N/A	
Peering requirements					
Peering points	N/A	20 international interconnection points including five in Europe	At six locations across all regions	Minimum of six geographically diverse interconnection points	Must peer in at least four different locations in the US
Interconnection capacity	N/A	OC-12	OC-12	OC-12	OC-12
Minimum traffic volume	1000Mbips	N/A	800Mbips	600Mbips	800Mbips
Maximum traffic imbalance	1.8:1	2:1	2:1	1.5:1	2:1
Miscellaneous		Must have made similar investments to Level 3 and show financial stability	No applicant that is a SAVVIS transit customer shall be entitled to enter into a peering relationship		

Criteria	*TeleGlobe*	*RCN*	*Broadwing (public/direct)*	*Time Warner Telecom*	*SBC (public/direct)*	*Cox Cable (public/direct)*	*AboveNet*
Network requirements							
Geographical scope of network	Presence at least at 13 sites in eight dispersed geographical locations	More than one common location	Backbone nodes in the eight geographical regions	N/A	Three dispersed peering points	Coast-to-coast backbone	N/A
General capacity	OC-48	N/A	OC-12	N/A	OC-48	OC-12	Must have a backbone sufficient to carry traffic to the peering locations without congestion
Peering requirements							
Peering points	Peer in four regions including one at each coast	N/A	No fewer than two interconnection connections in two different areas	Build sessions in at least three diverse continental US locations (east, central and west)	N/A	At least one on west coast and one on the east coast or in mid-west	Must connect to the AboveNet network in three cities spanning two time zones
Interconnection capacity	OC-12	N/A	155Mbps	N/A	N/A	N/A	N/A
Minimum traffic volume	300Mbips	N/A	Public: 20Mbips Direct: 75Mbips	50Mbips in at least one direction	Public: 50Mbps Direct: 250Mbps	Public: 10Mbps Direct: 100Mbps	N/A
Maximum traffic imbalance	2:1	N/A	2.5:1	N/A	N/A	N/A	N/A
Miscellaneous	No transit customers	No transit customers from last nine months	No Broadwing transit customers	No transit customers	No transit customers from past six months		No transit customers

Exhibit 5: *Publicly available peering policies for backbones [Source: Operators' Web sites]*

Michael KENDE, Principal Consultant, Analysys Consulting

Fields of Expertise

IP interconnection; telecoms regulation; economics; broadband deployment; merger policy

Education

- B.A. Honors Degree in Mathematics and Economics, Bowdoin College, USA (1981–85)
- Ph.D. in Economics, Massachusetts Institute of Technology, USA (1988–92)

Employment History

- 2003 to date: Principal Consultant, Analysys
- 2000 to 2003: Senior Consultant, Analysys
- 1999 to 2000: Director of Internet Policy Analysis, Office of Plans and Policy, Federal Communications Commission, Washington
- 1997 to 1999: Senior Economist, Policy Divisions, Common Carrier Bureau, Federal Communications Commission, Washington
- 1992 to 1997: Assistant Professor of Economics, INSEAD, France
- 1993 to 1994: Antitrust Consultant, IBM
- 1997: Antitrust Consultant, Digital Equipment Corporation
- 1985 to 1988: Systems Analyst, Procter and Gamble

Relevant Experience (Details)

- Experience working on Internet interconnection issues
  - For a major US Internet backbone provider, studied the policy of peering as a form of interconnection with other backbones.
  - Prepared a position paper for a leading Brazilian Internet backbone provider, analyzing the competitive dynamics of the Brazilian Internet market.

- Managed a project for Telstra in Australia preparing a report documenting the decisions that a number of regulators have taken around the world not to regulate interconnection between Internet backbone providers.
- Provided strategic advice to the Irish government on the effect of international peering facilities on the country's attractiveness to investors.
- Recommended that the Infocomm Development Authority (IDA) of Singapore not apply interconnection regulations to IP networks.
- On behalf of the Infocommunications Development Authority, Project Director for a rigorous analysis of the development of competition in Singapore's telecoms markets, that included IP transit markets.
- While at the FCC, focused on Internet interconnection issues during the MCI/WorldCom merger review; later wrote an OPP Working Paper entitled "*The Digital Handshake, Connecting Internet Backbones.*"
- Represented the FCC at a series of bilateral World Trade Organization meetings in Geneva that dealt with the regulatory classification of Internet services

- Experience working on competition and antitrust issues.
  - At the FCC was a team leader on the SBC-Ameritech and Bell Atlantic-GTE merger reviews, and also worked as a team member on the MCI-WorldCom and AOL Time Warner merger reviews.
  - As Director of Internet Policy Analysis for the FCC. Analyzed the potential impacts of proposed policies on the Internet, and researched policies to accommodate Internet convergence
  - For the Infocommunications Development Authority (IDA) in Singapore, Project Director for a review of the competitiveness of the international telecommunications services market, including IP transit, in response to a request from the incumbent to be exempted from dominant provider regulations in the provision of these services.
  - For one of the largest IT companies, acted as antitrust consultant retained to analyze the competitiveness of the company's products in the European data processing industry. Results presented to the Directorate General IV (division of the European Union responsible for antitrust)

– Part of an Analysys team that undertook a wide-ranging study examining the major trends, including the impact on the competitiveness of markets, in the area of VoIP and associated convergent services such as instant messaging for DG Information Society, European Commission.

Research

- 'A forward-looking policy framework for the broadband world', with Dr David Cleevely, ITU Telecom World 2003, published in proceedings for the session 'At the Cutting Edge'
- 'The Digital Handshake: Connecting Internet Backbones', *CommLaw Conspectus*, Vol. 11, No. 1 (2003), pp. 45–70
- 'An Overview of International Internet Interconnection Issues', *Global eCommerce law and business report*, October 2000
- 'Government Support of the European Information Technology Industry', in Neven, Damien J. and Lars-Hendrik Roller (eds): *The Political Economy of Industrial Policy in Europe and the Member States*, Sigma/WZB, Berlin, 2000, pp. 141–182

Presentations

- 'The New Regulatory Framework in Europe and VoIP Services', Spring VON Conference, Santa Monica, CA, 29 March 2004
- 'Interconnection and Tariff Best-Practices', CRC Workshop, Ulaanbaatar, Mongolia, 8 May 2002
- 'Going beyond "best effort" interconnection to develop quality for real-time services', Pricing and costing IP interconnection, Visions in Business Conference, London, 6 June 2001
- 'The Impact of the Internet on Telecommunications Market and Policy: Can we Continue NOT to Regulate?', Institute of Public Utilities 32nd Annual Public Policy Conference, Williamsburg, VA, 7 December 2000
- 'The US approach to IP interconnection', Vision in Business Conference on Pricing and Costing IP Interconnection, London, 4 July 2000

- 'The Information Interchange: Interconnection in the Internet', MIT/Tufts Workshop on Internet Service Quality Economics, Cambridge, MA, 3 December 1999. 27th annual Telecommunications Policy Research Conference, Alexandria, VA, 25–27 September 1999
- 'Interconnection in the US', Interconnect 98, London, 6 October 1998
- 'Europe and the Internet', INSEAD research presentation, November 1996
- 'Government Support of the European Information Technology Industry', Centre for Economic Policy Research conference, Berlin, April 1996, INSEAD Alumni Association, Helsinki, November 1996, INSEAD research presentation, September 1995