

**DECLARATION OF MARIUS SCHWARTZ**

**Professor of Economics  
Georgetown University**

I, Marius Schwartz, hereby declare the following:

**Biographical Information and Qualifications as an Expert**

1. I am a Professor of Economics at Georgetown University. I earned my B.Sc. degree from the London School of Economics with 1<sup>st</sup> class honors, and Ph.D. from UCLA. My teaching and research specialties are in industrial organization, competition, and regulation. From September 1998 to April 2000, I served at the Antitrust Division of the U.S. Department of Justice (DOJ) as the Economics Director of Enforcement, and for six months also as the Acting Deputy Assistant Attorney General for Economics (chief economist).

2. I have been actively involved in the telecommunications area both as an academic, government official, and private consultant. From April 1995 to June 1996, I served at the President's Council of Economic Advisers as the Senior Economist for industrial organization, working extensively on telecom issues including the 1996 Act. From 1996 to 1997, I was the DOJ's main economic outside expert on Bell entry into long-distance services. In 2000, I prepared to serve as the DOJ's testifying economic expert on Internet backbone issues in the proposed merger between WorldCom and Sprint. I have also consulted for the private sector on significant telecom matters, including international satellite services, international settlement rates, and the FCC's spectrum cap. I acted as expert consultant on Internet Backbone issues to SBC Communications, Inc. in connection with its 2005 acquisition of AT&T Corporation, submitting two declarations to the FCC in connection with that acquisition. My curriculum vitae is attached as Appendix 1.

3. I am submitting this declaration to respond to comments submitted in opposition to the proposed merger of AT&T, Inc. and BellSouth Corp. raising competitive concerns in two areas: (a) the Internet Backbone market, and (b) “net neutrality.” Part I of this Declaration will address Internet Backbone issues.<sup>1</sup> Part II will address net neutrality.<sup>2</sup>

**I. The Merger Will Not Adversely Affect Competition in the Tier 1 Internet Backbone Market**

4. In its recently-completed review of the SBC/AT&T merger, the FCC conducted an extensive analysis of the Internet Backbone sector and concluded that: (1) SBC was not a Tier 1 competitor – defined as one that does not pay any other Internet backbone for connectivity<sup>3</sup> – so that transaction did “not remove an existing Tier 1 provider”, and (2) “several Tier 1 competitors with significant market shares would remain in the market post-merger.”<sup>4</sup>

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<sup>1</sup> Petition to Deny of Time Warner Telecom at 25-32 and Appendix A (Declaration of Graham Taylor ¶¶ 19-47 (hereinafter “Taylor Decl.”)); Comments of Consumer Federation of America, *et al.*, at 5-8 and Declaration of Mark Cooper and Trevor Roycroft at 57-62 (hereinafter “Cooper/Roycroft Decl.”); Comments of Access Point, Inc., *et al.* at 29-34.

<sup>2</sup> Declaration of Susan Baldwin and Sarah Bosley on behalf of New Jersey Division of the Ratepayer Advocate (“Baldwin/Bosley Decl.”) ¶¶ 214-234; Center for Digital Democracy at 2-4; Cooper/Roycroft Decl. at 4-10, 40-57 (hereinafter “merger critics” or “critics”).

<sup>3</sup> *See In re Applications of SBC Communications Inc. & AT&T Corp.*, Memorandum Opinion & Order, 20 FCC Rcd. 18290, 18352 ¶ 111 (2005) (hereinafter “SBC/AT&T Merger Order”) (stating “Tier 1 IBPs peer with all other Tier 1 IBPs on a settlement-free basis”).

<sup>4</sup> *SBC/AT&T Merger Order* ¶ 124. The FCC based its conclusions on a Tier 1 market comprised of eight firms – AT&T, MCI (now Verizon), Qwest, Global Crossing, Sprint, (now Sprint-Nextel), Level 3 (which has since acquired WilTel), Cogent and SAVVIS. This list, in turn, was taken from my declaration. *See id.* ¶ 115, n. 344 (citing Schwartz Decl. ¶ 20). A number of large backbones not identified by the FCC sell DIA and transit services to US customers, and thus there may well be competitively significant, nearly fully peered Internet Backbones beyond these eight.

5. The FCC’s recent conclusions apply with equal force to the current proposed merger of AT&T and BellSouth. Regarding conclusion (1), the proposed merger likewise will not alter the number of Tier 1 competitors. BellSouth has only a modest regional backbone network for the transmission of Internet traffic and is further than SBC was from meeting the FCC’s definition of a Tier 1 Internet Backbone provider. Whereas AT&T does not pay any other backbone for the handling of its traffic, BellSouth is peered only with Cogent, and pays two other Tier 1 Internet Backbone providers for transit services to obtain global connectivity. Thus, the FCC’s first conclusion – that the transaction will “not remove an existing Tier 1 provider” – applies equally here.<sup>5</sup> Moreover, as I will show below, the FCC’s second conclusion – that “several Tier 1 competitors with significant market shares would remain in the market post-merger” – also applies to this merger. There is no evidence that the merged firm will be in a position to profit from degrading connectivity with competitors, or to de-peer them.

**A. Global De-Peering Requires An Installed Base Share Far Larger Than Would Be Possessed By the Merged Firm**

6. The established economic theory addressing whether a “larger” backbone has an economic incentive to deny or degrade interconnection with a “smaller” backbone — or to use a credible threat of degradation to impose de-peering — is built on the concept of an “installed base” of unique customers. A backbone’s installed base are those end users that (1) are uniquely reachable only through that backbone (or could be reached via other backbones only at significantly

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<sup>5</sup> Further, as the FCC found in *SBC/AT&T*, (a) the Internet Backbone market is not concentrated, and (b) SBC was not a uniquely situated potential competitor. *SBC/AT&T Merger Order* ¶ 139 (listing criteria that must be met for the acquisition of a potential competitor to raise antitrust concerns, and confirming that the criteria I identify in the text were not satisfied in that

higher cost or lower quality), and (2) who cannot easily switch to another backbone.<sup>6</sup> The economic analysis addresses conditions under which the network with the largest share of installed-base connectivity<sup>7</sup> might gain by degrading interconnection so as to impede rivals when competing to win new customers.

7. Global degradation — degradation of interconnection with *all* rivals — poses the following profitability tradeoff for the largest backbone: (a) All backbones, including the largest, suffer a loss of “quality” (none can offer universal connectivity), leading to a harmful decrease in the total number of new customers in the market; but (b) the largest backbone *might* win a larger *share* of new customers. Effect (b) hinges on whether degradation yields the largest backbone a relative quality advantage over rivals. If there is only one rival, i.e., duopoly, then (barring rather implausible consumer expectations) a backbone will obtain a quality advantage if (and only if) its share of the installed base is more than 50%. However, if there are two or more rivals, themselves interconnected (as is true of Internet backbones today), then degradation can cause the largest backbone to suffer a quality *disadvantage* and a reduced share of new subscribers no matter how large its installed-base share.<sup>8</sup>

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transaction). Given these conclusions, even if BellSouth is considered to be a potential Tier 1 competitor, this acquisition of a potential competitor cannot cause substantial competitive harm. *Id.*

<sup>6</sup> See, e.g., Jacques Cremer, Patrick Rey and Jean Tirole, “Connectivity in the Commercial Internet,” *Journal of Industrial Economics*, vol. 48 (Dec. 2000) at 433-472 (hereinafter “CRT”).

<sup>7</sup> If all connections are equally important, then the connectivity share equals the share of existing installed-base customers.

<sup>8</sup> The reason is that intra-network competition among the smaller but interconnected rivals causes them to price more aggressively to attract new customers, potentially giving their network a greater total connectivity universe (of installed-base *plus new* customers) than that of the backbone with the largest installed base. See David Malueg and Marius Schwartz, “Compatibility Incentives of a Large Network Facing Multiple Rivals,” *Journal of Industrial Economics* (forthcoming), available at: <http://ssrn.com/abstract=876084>.

8. The standard analysis, therefore, establishes that a share above 50% of the relevant installed-base connectivity universe is *necessary* to make global de-peering profitable, but generally is not sufficient. It is necessary, because a share of 50% or less will fail to yield a relative advantage over the other, interconnected backbones, but will reduce overall market demand.<sup>9</sup> It is not sufficient, because, with two or more rivals, the largest backbone may not even gain a relative advantage and, even if it does, this effect can be outweighed by the demand reduction effect.

9. Applying this analysis to the current facts, it is evident that this merger poses no risk to the Tier 1 Internet Backbone market from global de-peering by a post-merger AT&T. This conclusion is supported by all available metrics of “market share”, but I turn first to the metric that most closely approximates the concept of an installed base, namely broadband residential and small business “eyeballs.”

**1. “Eyeballs”**

10. For an Internet backbone, its *candidate* installed base consists of its immediate customers – the ISPs to whom it provides global connectivity in exchange for a transit fee, and the dedicated Internet access (DIA) customers (typically, larger business customers) who purchase such connectivity directly. Clearly, however, not all such customers qualify as an “installed base”: many DIA and ISP customers appear to face low switching costs, and can, and do, change providers

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<sup>9</sup> CRT, for example, conclude that in a model with four equally sized backbones, the merger of two of them to create a 50% share would not be sufficient to support a global degradation strategy: “[a] global degradation strategy is not profitable: it reduces again the demand and does not yield any competitive advantage to the new entity.” CRT at 458. *See also* Reply Declaration of Dr. Marius Schwartz, *In re Applications of SBC Communications Inc. & AT&T Corp.*, WC Docket 05-65 (2005) fn. 14 (if the customer base of the degrading network is no larger than that of the rivals collectively, then refusing interconnection will not yield a relative advantage but will harm the absolute quality).

with some frequency, and many, especially the larger ones, are multi-homed (for the security of a redundant Internet connection and to preserve competitive options).<sup>10</sup>

11. To the extent that any end-user customers can be viewed as both unique and quite sticky to an Internet backbone, the closest proxy would be the retail broadband customers who are served by the backbone's affiliated ISP — in the case of AT&T, the DSL subscribers of its affiliated broadband ISP. The extent of “stickiness” is questionable even then.<sup>11</sup> Nonetheless, such residential customers are likely at any point in time to be single-homed, and thus reachable only via the AT&T backbone network. As such, they are the closest proxy in today's world to an installed base, and therefore form the basis of my analysis below.

12. According to the broadband data provided in the Table at page 103 of the Public Interest Statement, a merged AT&T/BellSouth would account for 23% of the residential and small business broadband connections. This would still leave over three-fourths of the eyeballs in the hands of other large ISPs. Two of those (Verizon and Qwest) are themselves integrated with Tier 1 backbones. The great majority of remaining end users subscribe to a handful of large cable company ISPs (Comcast, TimeWarner Cable, Cox, Charter, Cablevision). As the FCC found, these large ISPs have the ability, and incentive, to switch backbone providers in the face of attempted strategic behavior by a backbone affiliated with their telephone company retail competitors.<sup>12</sup>

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<sup>10</sup> Legacy AT&T data on DIA customers from the end of 2004, for example shows a “churn” of approximately [begin confidential] [end confidential] per month, meaning that [begin confidential] [end confidential] of the customers turn over every year.

<sup>11</sup> See *SBC/Merger Order* ¶ 128 (eyeballs are not “sticky” because of the “widespread availability of competing broadband” alternatives).

<sup>12</sup> See *id.* ¶ 129. Contrast this with the European Commission's decision in *WorldCom/Sprint* that ISPs would be too fragmented to be able individually to affect backbone shares. See Commission Decision No. 4064/89/EEC (2000) (*WorldCom/Sprint*) ¶ 170 (hereinafter “*EC WorldCom/Sprint Decision*”).

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Under such circumstances, any attempt by a post-merger AT&T, with 23% of all eyeballs, to engage in global de-peering would not be profitable – AT&T would suffer not only an absolute loss in quality, but also *relative* to the other backbones and hence a competitive disadvantage.

13. Other metrics to measure a backbone’s share of the relevant connectivity universe are consistent with, and support, this conclusion. Although such metrics are less direct proxies for an installed base of customers, and therefore less reliable measures of the relevant “market share,” within the limits noted below, they offer a cross-check on the conclusions reached based on eyeballs.

## 2. Traffic

14. After eyeballs, traffic is likely to be the closest proxy for an installed base of customers. Traffic is a less satisfactory proxy, however, for a number of reasons. First, traffic does not convey whether the customer is unique to that IBP – in the case of traffic on a backbone coming from both DIA and ISP customers, for example, the customer often can be reached via one or more other backbones. Second, traffic on a backbone originating with a large ISP, such as Cox or Comcast, for example, represents eyeballs or customers “controlled” by that ISP, not by the IBP. The shifting by even one large ISP of its traffic from one Tier 1 IBP to another would greatly alter the relative shares of traffic carried by individual backbones.<sup>13</sup> With these caveats, it is noteworthy that current traffic data paints a similar picture as eyeball shares.

15. In my previous declaration, I used traffic data compiled by RHK, as augmented by actual traffic data of the merging parties, and I follow the same methodology here. In Table 1, I

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<sup>13</sup> The Commission has already found that there are no significant barriers to these large ISPs shifting traffic from one IBP to another. *SBC/AT&T Merger Order* ¶ 129, n.381.

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have calculated the shares of North American Internet traffic, utilizing RHK data.<sup>14</sup> Using BellSouth's traffic data for March, 2006, BellSouth carried approximately **[begin confidential]** **[end confidential]** of the traffic carried by AT&T for the same period, which would put BellSouth's share of North American Internet traffic at less than 2%. AT&T's post-merger traffic share of about 20% is thus relatively consistent with its post-merger eyeball share of 23% noted in Paragraph 12, above.

16. Even if the traffic universe is limited just to the 8 Tier 1 IBPs identified by the FCC in *SBC/AT&T*, the results do not fundamentally change. As shown in Table 1, within the more limited Tier 1 universe, AT&T's premerger share is **[begin confidential]** **[end confidential]** and the addition of BellSouth's traffic would take it to **[begin confidential]** **[end confidential]**. This still is well below the 50% threshold that needs to be exceeded for global degradation to be plausible in the Internet backbone market.<sup>15</sup>

### 3. Revenue

17. Finally, market shares may also be measured based on revenue. Stressing revenue, TWTC and Cooper/Roycroft argue that the merger will lead to high market share. There are,

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<sup>14</sup> I have utilized RHK data for the 4th quarter of 2004, as reflected in Annex A to the Reply Declaration of Dr. Michael Kende in the Verizon/MCI merger, as this is the most current data from RHK available to the parties.

<sup>15</sup> TWTC, relying on the DOJ's *Intermedia Competitive Impact Statement*, asserts that a company with 37% traffic share "would possess enough power to tip the Internet backbone market." TWTC Pet. at 28. In fact, however, DOJ was considerably more guarded, stating only that a "significant increase" above 37% would increase "the likelihood of tipping" the Internet backbone market. *United States v. WorldCom, Inc. and Intermedia Communications, Inc.*, Case No. 1:00CV02789, Competitive Impact Statement at 9-10 (D.D.C. filed December 21, 2000). Whatever the merits of 37% as a threshold of concern, the current *post-merger* shares are significantly below that. See also *SBC/AT&T Merger Order* ¶ 119 (finding that "the Tier 1 market has . . . become less concentrated [since *MCI/WorldCom/Sprint*] such that the proposed merger will not create a dominant backbone provider").

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however, at least two problems with utilizing revenue data: (a) revenue is a weak proxy for the size of the end user customer base because of the manner in which Internet services are priced, and (b) companies often categorize revenues from the same functionality differently, leading to potentially large discrepancies in reported revenue information.

18. Regarding point (a), large IBP customers receive significant discounts when purchasing Internet connectivity from backbones relative to prices paid by smaller IBP customers. As a result, an Internet backbone that does business mostly with very large ISPs – those with the greatest number of end-users – will show relatively low revenues, as compared to an Internet backbone that focuses more on smaller ISPs and retail business customers. Consequently, there can be a large divergence between IBPs' market shares based on revenues on the one hand, and traffic or eyeballs on the other.

19. As an example of this phenomenon, the 2003 IDC revenue data cited by the FCC in *SBC/AT&T* lists Level 3 (which targets primarily larger customers)<sup>16</sup> with only \$283 million in “backbone revenues,” i.e., upstream transit and DIA revenues.<sup>17</sup> This is a mere one-fourth of the same categories of revenue that IDC reported for legacy AT&T for 2003, while the RHK traffic data at that time showed that Level 3 and AT&T had approximately equal shares of Internet traffic.

20. Turning to the second point, I note that the FCC cited 2003 IDC revenues for upstream transit and DIA in its analysis of the *SBC/AT&T* merger, which were submitted by SBC

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<sup>16</sup> See <http://www.level3.com/580.html#business> (visited on June 16, 2006).

<sup>17</sup> IDC tracked revenues as follows: In the Wholesale category, sub-categories for (i) Dial Up/Managed Modem, (ii) Upstream Transit, and (iii) Other; in the Business IP category, sub-categories for (iv) DIA and (v) Remote Access. In *SBC/AT&T*, I identified categories (ii) and (iv) as most-closely capturing backbone functionality. (A second reason for selecting these sub-categories is that the elimination of Dial-Up revenues resulted in much higher shares for AT&T and SBC, because of the large revenues that MCI earned in that category, and thus my choice was in

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in an ex parte dated July 22, 2005.<sup>18</sup> In connection with this transaction, I requested that BellSouth provide its upstream transit and DIA revenues for 2003. According to BellSouth, it in fact had no upstream transit revenue at all in 2003, and DIA revenues of only approximately **[begin confidential]** **[end confidential]** in that year. IDC, however, reported that BellSouth had \$103 million in upstream transit and \$297 million in DIA revenues. Thus, BellSouth's actual combined revenues from upstream transit and DIA — the rough proxies for Internet backbone services — were about **[begin confidential]** **[end confidential]** of the \$400 million reported by IDC.

21. Alerted by this large discrepancy, I then asked AT&T to provide data for legacy AT&T and legacy SBC, so that I could assess whether the IDC revenues for these companies were likewise in error. AT&T data indicate that it had **[begin confidential]** **[end confidential]** in "Managed Internet Services" revenue for 2003, a category which includes both upstream transit and DIA revenues as classified by IDC. This is not far off the \$1,134 million reported by IDC for legacy AT&T. AT&T has advised me, however, that the **[begin confidential]** **[end confidential]** includes more than **[begin confidential]** **[end confidential]** in dial up access revenues (which properly belonged in one of the other IDC revenue categories), and another **[begin confidential]** **[end confidential]** in DSL retail services. Moreover, AT&T estimates that of the approximately **[begin confidential]** **[end confidential]** of revenue for DIA and transit, approximately 22% would represent access line

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part intentionally conservative.) As is evident from the analysis in the Paragraphs 19-24, however, even these remain, at best, crude approximations.

<sup>18</sup> *SBC/AT&T Merger Order* ¶ 123. Even in doing so, however, the Commission acknowledged that it was not endorsing revenue as the best, or even an appropriate, measure of market share, but simply the one dataset that it had on the record. *Id.* n.343.

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charges, so that AT&T's "true" DIA and transit revenues for 2003 are more in the range of **[begin confidential]** **[end confidential]**, or about 60% of the revenues as reported by IDC.

22. For legacy SBC, IDC reported total Internet backbone revenue of \$396 million, including upstream transit revenues of approximately \$111 million and DIA revenues of approximately \$286 million. SBC's actual transit revenues were **[begin confidential]** **[end confidential]**, but its DIA revenues were only **[begin confidential]** **[end confidential]**.

23. As shown in Table 2, simply adjusting the IDC 2003 revenue data to reflect actual legacy AT&T and legacy SBC, and using actual BellSouth revenues, would produce a post-merger revenue share within a "Tier 1 Internet Backbone Market" of a little over 29%. It is thus evident that the IDC revenue data has the potential to greatly overstate the parties' true revenue shares.

24. Besides the inaccuracies for the parties, the IDC data has additional anomalies as a measure of backbone services. Some Tier 1 backbones rank far lower on the IDC revenue list than do ISPs that are not Tier 1 backbones. For example, IDC's revenue data places Global Crossing, a Tier 1 backbone, at 16<sup>th</sup> based on combined revenues for upstream transit and DIA (after adjusting for the SBC/AT&T and Verizon/MCI mergers), with total upstream transit and DIA revenues of \$60 million, while large cable ISPs, such as Comcast and Cox, are ranked 7<sup>th</sup> and 14<sup>th</sup>, with revenues of \$166 million and \$68 million, respectively. Thus, the IDC revenue categories, while the best approximation of Internet backbone functionality from among the five categories that IDC tracks, are still quite imperfect measures.

25. In light of the apparent inaccuracies in the IDC revenue data, as well as the inverse relationship that can exist between price/gigabyte and total traffic carried by different backbones, it

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would seem inadvisable to rely on revenue data instead of eyeballs or traffic as a proxy for the “installed base” of unique customers that lies at the heart of the competitive effects analysis.

**B. Targeted De-Peering**

26. The above analysis shows that this merger poses no credible risk of global de-peering by any reliable measure. Turning to targeted de-peering, such a strategy will not be effective unless AT&T could credibly threaten to de-peer a sufficient number of other Tier 1 IBPs to adversely affect competition in the Tier 1 IBP market. Given the small increment that BellSouth adds to the present AT&T, such ability is lacking and, hence, the FCC’s prior analysis and conclusions remain applicable.

27. As I noted in my reply declaration in the SBC/AT&T transaction, the theory of targeted degradation requires that the targeted backbone (“TB”) must be prevented or seriously impaired from reaching customers of the degrading firm (“DF”), and therefore must be unable to purchase high-quality and competitively priced transit from another IBP that is peered with DF. By hypothesis, however, there will be other IBPs peered with DF since DF is not engaging in global de-peering.

28. Second, even if transit could be blocked, firm DF still faces an uncertain profitability tradeoff. Its quality improves *relative* to TB, but TB *and* DF suffer relative to other backbones that remain peered with both, since those backbones continue to offer universal connectivity. Focusing only on the first effect gives the misleading impression that if one backbone is sufficiently larger than another, then the larger one necessarily will profit from degrading interconnection by gaining a competitive edge over the latter. This ignores the negative second effect – the loss of competitiveness against the significant number of non-degraded rivals that

remain. Thus, at the theory level, even a large relative size advantage over a rival is not sufficient to make targeted degradation profitable.

29. This conclusion is borne out in reality. As I discussed in my reply declaration in *SBC/AT&T*, prior to its merger with SBC, AT&T engaged in settlement-free peering with backbones that were approximately 1/10<sup>th</sup> AT&T's size, as measured by the amount of Internet traffic that each carried. This empirical evidence is consistent with MCI WorldCom's peering practices in approximately 1999, when the European Commission found that MCI WorldCom maintained 11 settlement free peers notwithstanding its estimated 32-36% share of Internet traffic.<sup>19</sup> Because the current transaction does not materially alter today's relatively balanced market structure, the threat of targeted de-peering is not credible.<sup>20</sup>

## **II. The Transaction Should Not Be Blocked or Conditioned Based on Arguments About "Net Neutrality"**

30. This portion of the Declaration responds to claims that the merger should be blocked or subjected to conditions because it threatens so-called "net neutrality." There is no accepted definition of net neutrality, but the concept generally refers to what regulatory restrictions, if any, should be placed on broadband access providers in their traffic management practices, pricing models and other business practices. Proponents of net neutrality seek to restrict operators' latitude to depart from today's uniform "best-efforts" model for prioritizing Internet traffic and the

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<sup>19</sup> The 11 peers total is derived by subtracting from the seventeen "top level" networks identified by the Commission, the four networks that the Commission added and the two merging parties. See *EC WorldCom/Sprint Decision* ¶¶ 104-105, 116.

<sup>20</sup> The FCC's conclusions in *SBC/AT&T* that the Tier 1 Internet Backbone market was "sufficiently competitive and will remain so post-merger, [and] that the prices and terms of

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traditional pricing models (e.g., pricing to residential end users varies only based on the connection size). Accordingly, “net uniformity” may be a more accurate description than net neutrality.

31. Before exploring the merits of such regulation of the Internet, I first show in Section A that there is no basis to conclude that this proposed merger will have any significant effect on the ability or incentive of the merged company to engage in the practices cited by proponents of net neutrality. Since the supposed concerns are not merger specific, addressing them in the context of a merger review is bad public policy.

32. Section B addresses the merits of Internet regulation, even if applied industry-wide instead of selectively to the merging firms. What is termed “net neutrality” is a complex policy issue that continues to be widely debated, and the merger critics have only scratched the surface. Since the issue is not merger specific, this is not the place to attempt a comprehensive review of the broader debate. Nevertheless, at a high level, my view of the state of the debate is that net neutrality intervention is at best premature for two reasons:

(a) First, the nature and demands of the Internet have changed dramatically and are continuing to evolve. The practices challenged by net neutrality proponents offer clear potential to address these new business realities in an economically efficient manner and benefit consumers. Thus imposing regulation based on our current limited state of knowledge runs a serious risk of being quite damaging.

(b) Second, imposing regulation, especially heavy-handed common carrier type regulation geared to a monopoly regime, is inappropriate given the substantial and growing competition in broadband access. Not only is it wrong to prejudge that competition will be

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interconnection in the market will also be competitive,” *see SBC/AT&T Merger Order* ¶ 132, apply also to the current merger.

incapable of rendering moot any perceived concerns; imposing net neutrality regulation is likely to impede the development of further competition.

**A. The Net Neutrality Objections Are Not Merger Specific**

**1. Alleged Vertical Integration Into Internet Content**

33. Merger critics attempt to argue that the merger will increase AT&T's ability to discriminate so as to favor its own content and applications over the content and applications of third parties.<sup>21</sup> This argument fails on several levels.

34. First, BellSouth and AT&T are only minimally integrated into Internet content. AT&T's IPTV offering involves the delivery of content through a specific medium and format, but does not require AT&T to own the relevant content — only to acquire from the owner the right to distribute. Thus, this transaction is qualitatively different from *AOL/Time Warner* where a media distribution company (Time Warner) vertically integrated into ownership of a key Internet content and application provider (AOL).

35. Second, the November 2005 quote from AT&T's Chairman concerning charging content and application providers for access to AT&T's pipes does not state, or even imply, that AT&T intends to favor its own content, as alleged by merger critics.<sup>22</sup> To the contrary, the quote merely states that it may be appropriate to charge content and application providers (hereinafter "CAPs").

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<sup>21</sup> The vertical integration arguments are primarily advanced by Cooper/Roycroft Decl. at 4-5, 44-57, and by the Center for Digital Democracy at 3.

<sup>22</sup> Cooper/Roycroft Decl. at 4-5. From this quote, Cooper/Roycroft argue that it somehow illustrates that the prospect for AT&T "to favor content and services provided by AT&T the broadband provider (or its affiliates or strategic partners) is very real." *Id.* at 5.

36. Third, in the section of their declaration titled “Network Neutrality Conditions Are Necessary,” Cooper/Roycroft quote extensively from Cisco Systems White Papers purporting to show that Cisco equipment would give AT&T the ability to engage in discrimination at various levels.<sup>23</sup> This extensive discussion, however, merely shows that the ability to prioritize traffic and provide service tiering has long existed — one of the Cisco papers is dated 1999, and the most recent one is February 2005.<sup>24</sup> As such, the Cisco discussion does not raise any issues specific to this merger.

37. Fourth, it is ironic that Cooper/Roycroft have seized on IPTV as a potential harm from this transaction, when AT&T’s substantial investment in Project Lightspeed is intended to provide enhanced consumer choice in competition with cable and DBS. The few incidents to date in which IPTV has been permitted to compete with cable demonstrate the significant benefits to consumers from such competition. The *Financial Times*, for example, reported earlier this year that the introduction of IPTV by Verizon in Herndon, Virginia, as part of a bundled offering at \$109/month resulted in the incumbent cable company, Cox, dropping its bundled offering from \$130/month to \$90/month to persuade customers not to switch to Verizon.<sup>25</sup>

## 2. Consolidating Customer Base

38. As a second claim of merger specificity, Cooper/Roycroft raise the issue of the growing size of AT&T’s customer base, but do not link the increase in the customer base to any

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<sup>23</sup> *Id.* at 48-55.

<sup>24</sup> *Id.* at 49-55, nn. 92-94.

<sup>25</sup> Aline van Duyn & Paul Taylor, *Line of Sight: Why the Battle of the Bundle Is at the Doorstep*, *Financial Times* (Mar. 17, 2006) at 13.

specific alleged harm.<sup>26</sup> It is important to note that the customer bases in question — residential broadband subscribers — are almost entirely in non-overlapping regions, and thus there is virtually no increase in concentration within either company’s region and, hence, no loss of competition for broadband subscribers. To the extent the alleged harm is related to AT&T’s IPTV plans, I have shown above that the allegations are not merger specific, and ignore the strong competitive benefits that IPTV competition will bring to the video marketplace. To the extent that Cooper/Roycroft are claiming that a 23% share of national residential and broadband eyeballs raises competitive concerns from a network tipping standpoint, I have shown in the Internet Backbone portion of my declaration, that such concerns are unfounded.<sup>27</sup>

39. In short, the broad issues raised by merger critics simply are not specific to this merger. To the contrary, the arguments substantiate the position, implicit in comments by other opponents, that net neutrality regulation raises complex, industry-wide, policy issues. Such issues are inappropriate for consideration in the context of a specific transaction.

**B. Industry-wide Net Neutrality Intervention at Best Is Premature**

40. I now explain my conclusion that net neutrality regulation, whether applied to this merger alone or industry wide, is at best premature.

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<sup>26</sup> Cooper/Roycroft Decl. at 44-46.

<sup>27</sup> See *supra* ¶ 12.

**1. The Nature and Demands of the Internet Are Evolving and Call for Increased Flexibility for Network Operators**

41. As David Farber succinctly put it, “[t]he Internet is getting old.”<sup>28</sup> Internet traffic has traditionally been delivered on a “best-efforts” basis that treats all traffic uniformly. This model worked fairly well when the Internet was used for only a few applications, such as e-mail and web browsing, that were quite tolerant of packet delivery with delay or jitter (i.e., variations in delay). However, with the widespread digitization of various content and applications the Internet is, and increasingly will be, used to deliver a much broader array of services, placing quite different performance requirements on the network. For example, real-time, interactive services like VoIP or on-line gaming are much less tolerant of delay and jitter than are email and web browsing.

42. Along with the new applications comes an impending surge in Internet traffic. Video streaming and IPTV (especially High Definition IPTV) will consume large amounts of bandwidth, as do certain peer-to-peer applications such as those that distribute video files. Signs of this are already present.<sup>29</sup>

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<sup>28</sup> David Farber, *The Internet and the Neutrality Question*, KMB Video J., Vol. 22 No.2, available at: [http://public.resource.org/Volume\\_22\\_2.mp4](http://public.resource.org/Volume_22_2.mp4).

<sup>29</sup> See Broadband Working Group of the MIT Communications Futures Program, *The Broadband Incentive Problem*, Cambridge University Communications Research Network (Sept. 2005). The trends identified in the MIT Report are confirmed by more recent data. E.g., Matt Marshall, *Start-ups Find New Ways to Move Huge Data Files Over Internet*, available at <http://www.mercurynews.com/mld/mercurynews/business/14764812.htm> (“Major League Baseball games are hogging about half of the bandwidth of Akamai, which works with content providers, and says it delivers up to 20 percent of all Web traffic. . . .The amount of data bytes from video streaming across the Internet is doubling every three or four months, according to industry watchers.”) (posted June 8, 2006) (visited June 16, 2006); James Enck, *EuroTelco Snapshot: Thinking about the Data on Data*, Daiwa Institute of Research (Apr. 2006) (noting that the volume of Internet traffic has grown at a compound rate of 7.4% per month over the past fifteen months. “Assuming that this rate continues, daily traffic may double again by the end of this year [2006], and then again by October 2007.”). *Id.* at 1.

43. Addressing these developments in an efficient manner is likely to require considerable network investment (to bring fiber closer to the customer and to boost capacity in both local aggregation and backbone networks), as well as expanded service options (e.g., different price-quality options for end users and tailored to different applications). To support these investments and expanded service options, innovative pricing and contractual arrangements — such as customized relationships between broadband providers and individual CAPs — are likely to be needed. While it is impossible to predict the exact form of the efficient new arrangements, there is great value in allowing experimentation with innovative arrangements.

**2. Traffic Management Practices and Pricing Models Said to Violate Net Neutrality Have Clear Potential Economic Benefits for Consumers**

**a. Traffic Management Practices**

44. Cooper/Roycroft contend: “[w]hile the client-server model [which AT&T’s IPTV platform will use to deliver its video services] gives the content provider a high degree of control over the delivery of content, other technologies, such as the BitTorrent content-delivery architecture, utilize bandwidth more efficiently.”<sup>30</sup> The opinion is flawed on several grounds. First, Cooper/Roycroft provide no evidence that these other architectures, such as BitTorrent, could not be subject to similar controls by the operator. Second, BitTorrent cannot even offer real-time video delivery so it is meaningless to assert that it utilizes bandwidth “more efficiently.”<sup>31</sup> Finally,

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<sup>30</sup> Cooper/Roycroft Decl. at 48. In n. 91 they cite their source of support for the claims about BitTorrent as: [www.msnbc.msn.com/id/12694081](http://www.msnbc.msn.com/id/12694081).

<sup>31</sup> “BitTorrent was originally designed for file distribution. Therefore, pieces of the distributed file can reach the receivers in an order that is completely un-correlated with their positions in the file. However, to apply BitTorrent to real-time media streaming, pieces of a media stream should reach the receivers more or less sequentially so that the receivers can play the pieces back as they come in.” See Gang Wu & Tzi-cker Chiueh, *Peer to Peer File Download and Streaming*,

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the asserted “efficiency” relies heavily on a form of cost shifting, as BitTorrent itself eloquently points out:

When a file is made available using HTTP, all upload cost is placed on the hosting machine. With BitTorrent, when multiple people are downloading the same file at the same time, they upload pieces of the file to each other. This redistributes the cost of upload to downloaders, (where it is often not even metered), thus making hosting a file with a potentially unlimited number of downloaders affordable.<sup>32</sup>

Thus, the claim that AT&T sacrificed efficiency simply to retain “control” is unsubstantiated.

45. The critics are uniformly skeptical of traffic prioritization based on payment from the CAPs to the network operator.<sup>33</sup> They see such prioritization, including through Quality of Service (QoS) tiers, as merely an attempt by network operator to extract greater revenue, especially from CAPs. However, the potential benefits of such practices should be evident. Some applications require higher levels of QoS than others in order to perform well. For example, Mr. Graham Taylor, in support of Time Warner Telecom, observes that “because of the increasing importance of Internet traffic in terms of the applications, such as voice, that are now carried via the Internet, ‘best efforts’ are inadequate in many cases.”<sup>34</sup> A recent OECD report on net neutrality cautions:

The introduction of quality of service over the Internet is something that policy makers should encourage and promote. There is likely a wide range of future innovations that will require better quality of service than the current Internet can provide. The ability to designate priority to certain

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Department of Computer Science, Stony Brook University (June 2005) at 25, *available at* [http://www.ecsl.cs.sunysb.edu/tr/TR186\\_RPE.pdf](http://www.ecsl.cs.sunysb.edu/tr/TR186_RPE.pdf).

<sup>32</sup> See Bram Cohen, *Incentives Build Robustness in BitTorrent*, *available at* [www.bittorrent.com/bittorrentecon.pdf](http://www.bittorrent.com/bittorrentecon.pdf). (Bram Cohen is the Chief Executive Officer and Co-Founder of BitTorrent, Inc. and the creator of the BitTorrent peer-to-peer file distribution protocol.)

<sup>33</sup> See Baldwin/Bosley Decl. at ¶¶ 219, 224, 227; Center for Digital Democracy at 3; Cooper/Roycroft at 49-55.

<sup>34</sup> Taylor Decl. ¶ 28.

applications will be a boon for consumers and providers as long as there is sufficient competition in the market.<sup>35</sup>

Net neutrality regulations sought by the merger critics would preclude network operators from offering such benefits.

**b. Adding Charges to CAPs: The “Paying Twice” Fallacy**

46. Baldwin and Bosley write: “consumers are already paying for Internet access, so forcing companies behind the most useful Internet applications to pay a premium for their programs to be useful amounts to paying the network provider twice for providing one service –delivery of content.”<sup>36</sup> This “double recovery” is a common misperception, and deserves clarification.

47. Consider the case of CAP services that do not involve any payment between consumers and the CAP, e.g., visits to a web site of a portal or search engine. The web site owner (the CAP) gets revenue from advertising, but does not pay end users for visits nor is paid by them. In such cases, the ability to charge the CAP opens up a new revenue pool for the network operator — advertising revenue derived by the CAP. What are the likely effects of permitting the operator to charge CAPs?

48. To clarify, CAPs today do pay for their incremental costs of Internet access and transport, which they can purchase from entities other than – but have interconnection with – consumer broadband providers. However, CAP services require access to broadband consumers (“eyeballs”). The reverse is also true — the value of broadband to consumers rises with improved

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<sup>35</sup> Working Party on Telecommunication and Information Services Policies, *Network Neutrality: A Policy Overview*, Organisation for Economic Co-operation and Development (Apr. 2006) at 3.

<sup>36</sup> Baldwin/Bosley Decl. ¶ 227.

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supply of CAP services. The provider of a broadband access network, therefore, is like an intermediary, it offers a platform that allows beneficial interactions between consumers and CAPs. Economic efficiency, as well as profit-maximizing behavior by an operator, require that the structure of prices to the two sides be set in a way that “gets both sides on board” because the value to each side depends strongly on participation and usage by the other side (the two sides are strong complements).<sup>37</sup>

49. The right pricing structure in such circumstances involves a delicate balancing act, with prices depending on various elasticities of utilization and participation on both sides of the market, and will be quite context-specific. Regulators are unlikely to know the right answers. However, it is safe to say that the current pricing system, where the large costs of providing enhanced broadband networks to mass market consumers are predominantly covered by them alone, cannot be *presumed* to be efficient.

50. Moreover, if a broadband provider chooses to charge CAPs, the likely outcome would be that prices to consumers will *fall*. This is because broader consumer adoption and greater use of broadband drives higher revenues to CAPs, notably (but not exclusively) from advertising and, therefore, increases their willingness to pay for access to that consumer broadband network. If the broadband operator can share in CAPs’ revenue, it will therefore have a stronger incentive to stimulate consumer adoption and usage by reducing prices, improving quality, or otherwise enhancing its broadband offering. Nor is it correct to fear that “the sky is the limit” on CAP charges, because if the broadband operator charged excessively on that side, it would stifle CAP participation — which ultimately would also discourage consumer participation.

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<sup>37</sup> See generally Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report*, Institut D’Economie Industrielle (2005), available at

**3. Traditional Monopoly Style Regulation Is Inappropriate Given the Substantial and Growing Competition in Broadband Access**

51. A recurring assertion made by merger critics is that broadband access is a “cozy” and durable “duopoly” and thus eligible for common carrier-like regulation. This position is faulty for several reasons.

**a. Even Duopoly Is Qualitatively Different From Monopoly**

52. Baldwin and Bosley assert that “duopoly ... is only one step away from a monopoly.”<sup>38</sup> While this is true arithmetically, in an economic sense duopoly is fundamentally different from monopoly. Economic theory shows that the behavior of two competitors can range from replicating monopoly (if the firms collude perfectly) to fiercely competitive (in winner-take-all type settings). Moreover, the possibility of strong competition under duopoly is not merely theoretical but is observed in various industries. It is therefore a dangerous and unwarranted leap to extend the monopoly regulation paradigm to situations where monopoly is not deemed inevitable or desirable. In such settings, there are compelling reasons for relying on competition backed by antitrust rules as the primary check on firms’ misconduct.

**b. The Claims of “Cozy Duopoly” Claims Mischaracterize the Actual State of Broadband Competition**

53. Merger critics assert that there is lack of broadband competition, but essentially provide no evidence.<sup>39</sup> By various indicators broadband competition in the U.S. is substantial and — importantly for guiding future policy — is growing.

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[http://idei.fr/doc/wp/2005/2sided\\_markets.pdf](http://idei.fr/doc/wp/2005/2sided_markets.pdf).

<sup>38</sup> See Baldwin/Bosley Decl. ¶ 146.

<sup>39</sup> See Cooper/Roycroft Decl. at 7-8.; Baldwin/Bosley Decl. ¶¶ 219, 225.

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54. While only a few years ago, broadband access was heavily skewed in favor of cable modem, DSL has emerged as an increasingly strong competitor. According to the FCC's broadband deployment data, the share of all residential high-speed lines accounted for by cable modems has declined from 70% in June 2000 to 61% in June 2005, while ADSL rose from 24.4% to 37.2%.<sup>40</sup> Another source shows a still larger growth of DSL share at the expense of cable.<sup>41</sup> Moreover, the growth in DSL's share has accelerated in recent years: the FCC data show that DSL's share hovered around 31% between June 2001 and June 2003, but rose to 35.8% by June 2004 and to 37.2% a year later.<sup>42</sup>

55. Both platforms continue to add subscribers rapidly. According to the FCC data, between June 2000 and June 2005, residential ADSL subscribers increased from under a million to over 14 million while residential cable subscribers increased from approximately 2 million to over 23 million.<sup>43</sup> Moreover, according to the *Pew Broadband Report*, the rate of growth of residential

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<sup>40</sup> See *FCC Broadband Report* at Table 3.

<sup>41</sup> The Pew Internet and American Life Project found that DSL subscriber lines accounted for half of home broadband use as of the end of March 2006, with cable broadband at 41 percent and wireless access at eight percent. John Horrigan, *Home Broadband Adoption 2006*, Pew Internet and American Life Project (May 2006), available at: [http://www.pewinternet.org/pdfs/PIP\\_Broadband\\_trends2006.pdf](http://www.pewinternet.org/pdfs/PIP_Broadband_trends2006.pdf) ("*Pew Broadband Report*").

<sup>42</sup> A knowledgeable observer attributes this development to the D.C. Circuit's 2002 decision in *USTA I (United States Telecom Association v. FCC)*, 290 F.3d 415 (D.C. Cir. 2002)), and the FCC's ending of mandatory line sharing requirements in 2003 (see *In re Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd. 16978 (Aug. 21, 2003) ("*Triennial Review Order*"), both of which eased the regulatory obligations that had applied to telephone companies but not cable, and increased the telcos' incentives to invest in deploying DSL. Thomas W. Hazlett, *Rivalrous Telecommunications Networks With and Without Mandatory Sharing*, AEI-Brookings Joint Center for Regulatory Studies (working paper) (2005). Hazlett notes that once the line sharing regulations were lifted, the number of DSL subscribers began to grow more quickly.

<sup>43</sup> See *FCC Broadband Report* at Table 3.

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broadband subscribers has increased in the past year, primarily driven by DSL<sup>44</sup> The intensifying competition in broadband is also shown by the increase in the percentage of zip codes reported to have two or more providers. This percentage rose from 33.7% in December 1999 to 82.9% in December 2004 and 88.8% by June 2005.<sup>45</sup>

56. Broadband pricing has been decreasing. According to the *Pew Broadband Report*, the average price of residential DSL service has decreased from \$38 per month in February 2004 to \$32 per month in December 2005.<sup>46</sup> There is also ample direct evidence of head-to-head rivalry between cable and DSL providers, in the form of advertising targeted at the other's product<sup>47</sup> and pricing promotions targeted at the other's customers.<sup>48</sup>

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<sup>44</sup> According to the Report, the number of Americans who have broadband at home increased by 40 percent from March 2005 to March 2006, compared to the 20 percent increase from March 2004 to March 2005. *Pew Broadband Report* at 1. The higher growth in DSL versus cable for the past year is shown on page 6.

<sup>45</sup> See *FCC Broadband Report* at Table 15 (showing the following trend: December 1999: 33.7%, June 2000: 41.1%, December 2000: 50.7%, June 2001: 57.4%, December 2001: 59.9%, June 2002: 65.4%, December 2002: 70.6%, June 2003: 74.6%, December 2003: 78.3%, June 2004: 80.4%, December 2004: 82.9%, June 2005: 88.8%). While the zip code data overstates somewhat the percentage of households in that locality that are actually accessed by both DSL and cable, the trends in this percentage should be less vulnerable to this bias.

<sup>46</sup> See *Pew Broadband Report* at 6-7.

<sup>47</sup> Comcast explicitly targets DSL customers to switch to cable through its "Slowskys" advertisements featuring turtles that prefer DSL because it is supposedly slower than cable. See, e.g., <http://www.theslowskys.com/>

<sup>48</sup> See note 25, *supra*. Despite this evidence of competition, Cooper/Roycroft (at 8) claim that lack of competition explains the decline in broadband penetration in the U.S. relative to other countries from 3<sup>rd</sup> in 2000 to 16<sup>th</sup> in 2005, based on ITU data. Such international comparisons must be handled with great care. For example, the rankings are sensitive to the measure of performance being used. More importantly, even for a given and consistent measure, differences between countries depend on factors that affect deployment costs, such as differences in population density, and on the price of alternatives to broadband (e.g., the availability of unlimited dial-up calling in the U.S. but not in many other countries makes U.S. consumers more willing to retain dial up Internet access). Cooper/Roycroft do not control for these factors and provide no evidence regarding differences in the level of competition internationally

57. Finally, it is important to stress that broadband access is not a blockaded duopoly. While it is true that DSL and cable today are the predominant platforms, there are no legal barriers to further entry. Furthermore, alternative technologies and providers already exist. Their share is relatively small today but their importance seems to be growing. FCC data show that between December 2004 through June 2005 the number of satellite and wireless broadband lines almost doubled, from 550,000 to almost 1 million.<sup>49</sup> While virtually all of this increase has been for business customers, the FCC and others believe that wireless technologies have wider potential for broadband provision.<sup>50</sup> In conclusion, broadband access cannot be characterized as a duopoly, let alone a durable duopoly.<sup>51</sup>

**c. Net Neutrality Regulation Is Likely To Impede Broadband Competition**

58. To the extent that additional broadband competition would be desirable, imposing intrusive net neutrality regulation is likely to retard the development of such competition.

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<sup>49</sup> This includes all high-speed lines, not just those for residential end-users. See *FCC Broadband Report* at Table 1.

<sup>50</sup> See FCC Report: *Connected & On the Go: Broadband Goes Wireless* (Feb. 2005), available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-257247A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-257247A1.pdf); see also Working Party on Telecommunication and Information Services Policies, *The Implications of WiMAX for Competition and Regulation*, Organization for Economic Co-operation and Development (Mar. 2006), available at <http://www.oecd.org/dataoecd/32/7/36218739.pdf>.

<sup>51</sup> As the FCC stated: “[t]he competing analyses fail to recognize the dynamic nature of the marketplace forces. We fully recognize that not all American households can choose between cable modem and DSL-based Internet access service today. But a wide variety of competitive and potentially competitive providers and offerings are emerging in this marketplace. Cable modem and DSL providers are currently the market leaders for broadband Internet access service and have established rapidly expanding platforms. There are, however, other existing and developing platforms, such as satellite and wireless, and even broadband over power line in certain locations, indicating that broadband Internet access services in the future will not be limited to cable modem and DSL service.” See *In the Matters of Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd. 14853, 14880-81 ¶ 50 (Sept. 23, 2005) (footnotes omitted).

59. ***Diminished Investment Incentives.*** Most obviously, regulatory restrictions can be expected to reduce incentives for new investment in network infrastructure. Merger critics dismiss this issue, contending that the “duopoly” should not be allowed to “extract rents,” especially from content or application providers.<sup>52</sup> This position ignores the fact that the deployment of enhanced broadband networks requires massive and recurring new investments.<sup>53</sup> Merger critics seem comfortable arguing that allowing broadband providers to charge CAPs will stifle investment and innovation at that end — but curiously resist acknowledging that depressing returns to broadband investment can be expected to discourage investment and entry there.<sup>54</sup>

60. ***Reduced Scope for Differentiation.*** Baldwin and Bosley, citing the critique by Roycroft, reject the argument by Ford et al. that net neutrality regulations may make it more difficult to support additional broadband competitors by impeding the ability of competitors to differentiate their offerings.<sup>55</sup> While the empirical magnitude of this effect is uncertain, the theoretical point made by Ford et al. is correct. Impeding through regulation competitors’ ability to differentiate their offerings can reduce the prospects for entry. The fact that net neutrality

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<sup>52</sup> See Baldwin/Bosley Decl. ¶ 225.

<sup>53</sup> See Broadband Working Group of the MIT Communications Futures Program, *The Broadband Incentive Problem*, Cambridge University Communications Research Network (Sept. 2005).

<sup>54</sup> See Letter from Albert Cinelli, President, QComm Corp., *In the Matter of Consumer Protection In the Broadband Era*, WC Docket No. 05-271 (Mar. 16, 2006).

<sup>55</sup> Baldwin/Bosley Decl. ¶ 230 (commenting on George Ford, et al., *Phoenix Center Policy Paper No. 24 – Net Neutrality and Industry Structure*, Phoenix Center for Advanced Legal & Economic Public Policy Studies (April 2006)). Their work was criticized by Trevor Roycroft, *Network Neutrality, Product Differentiation, and Social Welfare: A Response to Phoenix Center Policy Paper No. 24*, Roycroft Consulting (May 3, 2006). Ford et al., refuted Roycroft’s main points in *Network Neutrality and Scale Economies: A Response to Dr. Roycroft*, Phoenix Center for Advanced Legal & Economic Public Policy Studies (May 2006).

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obligations would not entirely eliminate the ability to differentiate, as argued by Roycroft, does not negate the basic point.

**C. Conclusions**

61. The evolution of Internet applications, content, and usage patterns can be expected to place increased strain on the traditional Internet business models of infrastructure providers. Expanded price/service options and large increased investments in enhanced mass market broadband networks are likely to be needed in order to address the evolving demands. As I have shown, imposing net neutrality regulation runs the serious risk of stifling the emergence of efficient new options and *reducing* the incentives for broadband investment. Merger critics seem to greatly downplay this issue – as well as the substantial and growing broadband competition that undercuts the need for regulation. There are sound economic reasons to continue to allow competition to evolve, rather than to overlay the Internet with intrusive regulation at this stage.

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

Signature: /s/ Marius Schwartz  
Marius Schwartz

Date: June 19, 2006

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**APPENDICES & TABLES**

**Appendix 1**  
**Curriculum Vitae of Professor Marius Schwartz**

**Table 1**  
**Internet Traffic Shares: North America Total and Tier 1**

**Table 2**  
**Internet Revenues Shares: Backbone Related Functions for Tier 1 Internet Backbone Providers**

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### EDUCATION

University of California, Los Angeles: Ph.D. in Economics, September 1982  
University of California, Los Angeles: M.A. in Economics, March 1978  
London School of Economics: B.Sc. in Economics (1st Class Honors), August 1976

### PROFESSIONAL EXPERIENCE

#### Georgetown University, Department of Economics

Professor, June 1993–present  
Associate Professor, August 1987–May 1993  
Assistant Professor, January 1983–July 1987 (part time in Fall 1982)

Excellence in Undergraduate Teaching Award, Economics Department, 2001  
Director of Graduate Studies: Spring 1993–Spring 1995

Courses Taught: *Graduate*—Industrial Organization, Microeconomics for executives and policy makers, Macroeconomic Theory I and II, Monetary Policy. *Undergraduate*—Antitrust, Industrial Organization, Mergers & Corporate Control, Microeconomics (Principles, and Intermediate), Topics in Competition and Regulation, International Economics, Macroeconomic Theory.

#### President's Council of Economic Advisers

Senior Staff Economist, June 1995–May 1996 (part-time consultant April & May 1995, June 1996).

Served as the senior economist responsible for antitrust, regulated industries, and other industrial organization matters. Work included: Telecommunications Act of 1996; competition in international satellite services; competition in the electric utility industry; reforming the patent and trademark office; intellectual property rights; international trade disputes; health care.

#### U.S. Department of Justice, Antitrust Division

Acting Deputy Assistant Attorney General for Economics, January 1999–June 1999

Economics Director of Enforcement, September 1998–December 1998, July 1999–April 2000

In these positions, I was responsible for overseeing economic analysis at the Antitrust Division of numerous mergers and non-merger matters in various industries, including:

*Mergers & Joint Ventures*—Ameritech/SBC, Bell Atlantic/GTE, AT&T/BT, Cargill/Continental, Aetna/Prudential, CBS/Viacom.

*Monopolization*—suit against American Airlines for predatory pricing (pending).

*Regulatory*—Bell entry into long-distance telecommunications services.

## **U.S. Department of Justice, Antitrust Division (continued)**

### **Outside Expert**

*UPM-Raflatac/Bemis-MACtac* merger, 2003—testified at trial.

*News Corp-DirectTV* partial acquisition, 2003.

*General Electric/Honeywell* merger, 2000-01—prepared to serve as the testifying economic expert.

*WorldCom/Sprint* merger, 2000—prepared to serve as the testifying economic expert on Internet backbone issues.

*Bell entry, 1996-997*—served as DOJ's outside economic expert on Bell entry into long-distance telecom services long-distance telecommunications services, under section 271 of the Telecom Act, and submitted two affidavits on behalf of DOJ to the Federal Communications Commission.

**Economist**, January 1983–May 1995 (part time), October 1980–December 1982 (full time).

### *Expert Testimony*

Presented written and oral court testimony in successful challenges of merger and of consent decree.

### *Mergers*

Investigated mergers in several industries and helped to design appropriate relief.

### *Business Practices*

Worked on vertical-restraints cases (tying, exclusive dealing, resale price maintenance, exclusive territorial arrangements) and horizontal-conduct cases (collusion and predation).

### *Legislation, Congressional Matters, Division Reports*

Provided input to Antitrust Division's Merger Guidelines (1992) and Vertical Restraints Guidelines (1984). Helped draft Division comments on various Congressional legislation and responses to inquiries in several areas including price discrimination and dealer termination.

### *Cooperation with Foreign Competition Authorities*

Interacted with competition officials from several countries and agencies, and commented on various documents covering subjects such as predatory pricing, price discrimination, distribution systems, sole import distributorships, joint R&D, and the interaction between trade and competition policies.

## **Other Professional Experience**

New Zealand Commerce Commission, Consultant (2005-2006)

Consultant in private antitrust and regulatory matters — details and references available on request.

OECD: Lecturer in Seminar on Vertical Restraints for competition officials from Czech Republic, Hungary, Poland, and Slovakia in Cracow, Poland, November 20-22, 1995.

ILADES: Participated in designing and teaching a short course in industrial organization to policy makers and executives in Santiago, Chile, June 1994.

Pew Freedom Fellows Program: Taught short course in microeconomics to twenty Fellows from transition economies, annually, January 1993–1999. (Fellows hold middle-level or upper-level positions in government and private business.)

Center for Economic Development, Slovakia: Academic Advisory Board.

World Bank: Consultant.

Abt Associates/USAID: Advised Government of Zimbabwe in Harare on formulating antitrust law, summer 1993 (consultant to Abt, work funded by USAID's Implementing Policy Change Project).

## LANGUAGES

French, Hebrew, Romanian (speak and read Hebrew fluently; proficient in French and Romanian).

## HONORS

U.S. Department of Justice, Antitrust Division: Special Achievement Awards

Brookings Institution: Research Fellow, 1979-80

University of California, Los Angeles: Earhart Fellowship, 1977-78

University of California, Los Angeles: Regents Fellowship, 1976-77

London School of Economics: Premchand Prize in Monetary Economics, 1976.

## PUBLICATIONS

### Refereed Journals

"Compatibility Incentives of a Large Network Facing Multiple Rivals," *Journal of Industrial Economics*, forthcoming (with David Malueg) <<http://ssrn.com/abstract=876084>>

"The No Surcharge Rule and Card User Rebates: Vertical Control by a Payment Network" (with Daniel Vincent), *Review of Network Economics*, vol. 5, issue 1 (March 2006): 72-102. <<http://www.rnejournal.com>>

"Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity: Reply," *American Economic Review*, vol. 94 (June 2004): 802–803 (with R. Preston McAfee).

"International Telecom Settlements: Gaming Incentives, Carrier Alliances, and Pareto-Superior Reform," *Journal of Industrial Economics*, vol. 49 (September 2001): 335-377 (with David Malueg).

"The Economic Logic for Conditioning Bell Entry into Long Distance on the Prior Opening of Local Markets," *Journal of Regulatory Economics (Practitioners' Section)*, vol. 18, no. 3 (2000): 247-288.

"A Quality-Signaling Rationale for Aftermarket Tying," *Antitrust Law Journal*, vol. 64 (Winter 1996): 387-404 (with Gregory J. Werden).

- "The Non-Existence of Pairwise-Proof Equilibrium," *Economics Letters*, vol. 49 (1995): 251-259 (with R. Preston McAfee).
- "Equity as a Call Option on Assets: Some Tests for Failed Banks," *Economics Letters*, vol. 48 (1995): 389-397 (with Behzad Diba and Chia-Hsiang Guo).
- "Parallel Imports, Demand Dispersion, and International Price Discrimination" *Journal of International Economics*, vol. 37 (November 1994): 167-195 (with David Malueg).
- "Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity," *American Economic Review*, vol. 84 (March 1994): 210-230 (with R. Preston McAfee).
- "Preemptive Investment, Toehold Entry, and the Mimicking Principle," *RAND Journal of Economics*, vol. 22 (Spring 1991): 1-13 (with David Malueg).
- "Patent Protection through Discriminatory Exclusion of Imports," *Review of Industrial Organization*, vol. 6, no. 3 (1991): 231-246.
- "Third-Degree Price Discrimination and Output: Generalizing a Welfare Result," *American Economic Review*, vol. 80 (December 1990): 1259-1262.  
Reprinted in *Readings in Microeconomic Theory*, Manfredi La Manna Ed., Dryden Press, 1997.
- "Investments in Oligopoly: Welfare Effects and Tests for Predation," *Oxford Economic Papers*, vol. 41 (October 1989): 698-719.
- "Entry Deterrence Externalities and Relative Firm Size," *International Journal of Industrial Organization*, vol. 6 (June 1988): 181-197 (with Michael Baumann).
- "The Competitive Effects of Vertical Agreements: Comment," *American Economic Review*, vol. 77 (December 1987): 1063-1068.
- "The Nature and Scope of Contestability Theory," *Oxford Economic Papers*, vol. 38 Supplement (November 1986): 37-57.  
This issue of the journal was published in parallel as *Strategic Behavior and Industrial Competition*, Morris et al. Eds., Oxford University Press, 1986.
- "The Perverse Effects of the Robinson-Patman Act," *Antitrust Bulletin*, vol. 31 (Fall 1986): 733-757.
- "Divisionalization and Entry Deterrence," *Quarterly Journal of Economics*, vol. 101 (May 1986): 307-321 (with Earl Thompson).
- "Illinois Brick and the Deterrence of Antitrust Violations," *Hastings Law Journal*, vol. 35 (March 1984): 629-668 (with Gregory Werden).
- "Contestable Markets: An Uprising in the Theory of Industry Structure: Comment," *American Economic Review*, vol. 73 (June 1983): 488-490 (with Robert Reynolds).

### **Monographs, Book Chapters, and Other Publications**

- "Monopsony Concerns in Merger Review," (with Susan M. Davies), American Bar Association Antitrust Section, Clayton Act Committee Newsletter, vol. II, no. 1, Winter 2002  
<<http://www.abanet.org/antitrust/committees/computer/clayton/winter02.pdf>>

“Conditioning the Bells’ Entry Into Long Distance: Anticompetitive Regulation or Promoting Competition?,” in Giuliano Amato and Laraine L. Laudati, Eds., *The Anticompetitive Impact of Regulation*, Edward Elgar, 2001.

“Competitor Cooperation and Exclusion in Communications Industries,” in H. Davis and R. Dick, Eds., *E-Commerce Antitrust & Trade Practices: Practical Strategies for Doing Business on the Web*, Practising Law Institute, New York, 2001.

Discussant Comments on papers by Andrew Joskow, by Daniel Rubinfeld, and by Janusz Ordover and Margaret Guerin-Calvert, *Review of Industrial Organization*, Vol. 16 (March 2000): 219-223.

“Buyer Power Concerns and the Aetna-Prudential Merger,” Address presented at 5<sup>th</sup> Annual Health Care Antitrust Forum, Northwestern University School of Law, October 20, 1999, posted on web site of Antitrust Division, Department of Justice:  
<http://www.usdoj.gov/atr/public/speeches/3924.htm>

Discussant Comments on papers by Patrick Rey and Ralph Winter and by Robert Anderson et al., in Robert D. Anderson and Nancy T. Gallini, Eds., *Competition Policy and Intellectual Property Rights in the Knowledge-Based Economy*, Calgary: University of Calgary Press, 1998.

“Telecommunications Reform in the United States: Promises and Pitfalls,” in Paul J.J. Welfens and George Yarrow, Eds., *Telecommunications and Energy in Systemic Transformation*, Heidelberg and New York: Springer, 1997.

“Protecting Intellectual Property by Excluding Infringing Imports: An Economist's View of Section 337 of the U.S. Tariff Act,” *Patent World*, Issue 25 (September 1990): 29-35.

Review Essay of: Jean Tirole, *The Theory of Industrial Organization*, MIT Press, 1988. *Managerial and Decision Economics*, Vol. 11 (May 1990): 131-139.

Book Review of: J. Stiglitz and F. Mathewson eds., *New Developments in the Analysis of Market Structure*, MIT Press, 1988. *Journal of Economic Literature*, Vol. 36 (March 1988): 133-135.

“Vertical Restraints,” published in German by *Forschungsinstitut für Wirtschaftsverfassung und Wettbewerb* by E.V. Köln, Heft 5, 1984.

## **REGULATORY FILINGS, DISCUSSION PAPERS AND WORK IN PROGRESS**

Reply Declaration of Marius Schwartz for SBC/AT&T in FCC, WC Docket 05-65, May 2005  
<[http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6517601199](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517601199)>

Declaration of Marius Schwartz for SBC/AT&T in FCC, WC Docket 05-65, February 2005,  
<[http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6517309104](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517309104)>

“Should Antitrust Assess Buyer Market Power Differently than Seller Market Power?” presented at DOJ/FTC Workshop on Merger Enforcement, Washington DC, February 2004  
<<http://www.ftc.gov/bc/mergerenforce/presentations/index.html>>

“Interconnection Incentives of a Large Network Facing Multiple Rivals,” (with David Malueg), Georgetown University, Department of Economics Working Paper 03-01, January 2003  
<<http://econ.georgetown.edu/workingpapers/>>

- "The National Television Ownership Cap and Localism," paper submitted with Comments of NAB and NASA to FCC in *2002 Biennial Regulatory Review - Review of the Commission's Broadcast Ownership Rules and Other Rules*, FCC 02-249, Notice of Proposed Rulemaking (rel. Sep. 23, 2002), January 2, 2003 (with Daniel R. Vincent).
- "Same Price, Cash or Card: Vertical Control in Payment Networks" (with Daniel Vincent), Georgetown University, Department of Economics Working Paper 02-01, February 2002, <<http://econ.georgetown.edu/workingpapers/>>
- "Interconnection Incentives of a Large Network," (with David Malueg), Georgetown University, Department of Economics Working Paper 01-05, revised January 2002 <<http://econ.georgetown.edu/workingpapers/>>
- "Exclusive Dealing, Product Differentiation, and Rent Extraction," in progress (with Serge Moresi and Francis O'Toole).
- "Are Spectrum Limits Needed to Preserve Competition?" paper submitted on behalf of CTIA to FCC in *2000 Biennial Regulatory Review Spectrum Aggregation Limits for Commercial Mobile Radio Services*, WT Docket No. 01-14, Notice of Proposed Rulemaking (rel. Jan. 23, 2001), April 13, 2001 (with John Gale).
- "The Appropriateness of Nondiscriminatory Access Regulation for Interactive Television," paper submitted on behalf of NCTA to FCC in *Nondiscrimination in the Distribution of Interactive Television Services Over Cable*, CS Docket No. 01-7, Notice of Inquiry (rel. Jan. 18, 2001), March 19, 2001 (with John Gale).
- "Intelsat Restructuring and Comsat's Non-Dominance: Reply to Dr. Owen and Professor Waverman," paper filed on behalf of Comsat Corporation with the FCC, *In the Matter of Comsat Corporation Petition for Forbearance from Dominant Carrier Regulation and for Reclassification As a Non-Dominant Carrier*, ("Comsat's Forbearance Petition") File No. 60-SAT-ISP-97, March 1998.
- "Competition in International Satellite Services: Wither INTELSAT Restructuring?" paper filed on behalf of Comsat with the FCC in Comsat's Forbearance Petition, November 1997.
- "Competitive Concerns with Gaming of the International Settlements Process under Asymmetric Liberalization of International Telecommunications and Above-Cost Settlement Rates," Affidavit submitted on behalf of AT&T to FCC, in proceedings on *Rules and Policies on Foreign Participation in the U.S. Telecommunications Market*, IB 97-142, November 18, 1997.
- "The 'Open Local Market Standard' for Authorizing BOC InterLATA Entry: Reply to BOC Criticisms," Supplemental Affidavit submitted on behalf of U.S. DOJ to FCC, along with DOJ's evaluation of following BOC application(s): BellSouth in South Carolina, November 4, 1997 and in Louisiana, December 10, 1997. <[www.usdoj.gov/atr/statements/1281.htm](http://www.usdoj.gov/atr/statements/1281.htm)>
- "Competitive Implications of Bell Operating Company Entry into Long-Distance Telecommunications Services," Affidavit submitted on behalf of U.S. Department of Justice (DOJ) to FCC, along with DOJ's evaluations of following BOC applications: SBC in Oklahoma, May 16, 1997; Ameritech in Michigan, June 25, 1997; and BellSouth in South Carolina, November 4, 1997 and in Louisiana, December 10, 1997. <[www.usdoj.gov/atr/statements/Affiw60.htm](http://www.usdoj.gov/atr/statements/Affiw60.htm)>
- "Towards Competition in International Satellite Services: Rethinking the Role of INTELSAT," paper distributed at OECD Ad Hoc Meeting of Experts on Competition in Satellite Services, Paris, June 1995 (with Joseph E. Stiglitz and Eric Wolff).

- “Competitive Markets in Generation: Economic Theory and Public Policy,” paper presented at conference on “Electric Utility Restructuring: Whither Competition?” organized by International Association for Energy Economics Los Angeles Chapter, and Micronomics Inc., Los Angeles, May 1995.
- “Option Values of Deposit Insurance and Market Values of Net Worth: Some Evidence for U.S. Banks,” mimeo, December, 1992 (with Behzad Diba and Chia-Hsiang Guo).
- “Do Sunk Costs Discourage or Encourage Collusion?” U.S. Department of Justice, Antitrust Division, EPO Discussion Paper 85-10 (September 1985).
- “Signalling Equilibria Based on Sensible Beliefs: Limit Pricing Under Incomplete Information,” U.S. Department of Justice, Antitrust Division, EPO Discussion Paper 84-4 (May 1984) (with Maxim Engers).

## **OTHER SCHOLARLY ACTIVITIES**

### ***Seminars Presented***

Bellcore  
 Bureau of Competition Policy, Industry Canada  
 California State University, Hayward  
 Center for Strategic and International Studies  
 Columbia University  
 ENSAE, Paris  
 Federal Reserve Bank of Philadelphia  
 Georgetown University  
 George Washington University  
 U.S. International Trade Commission  
 Johns Hopkins University  
 New York University – Economics Department  
 New York University – Stern School of Business  
 Pennsylvania State University  
 Simon Fraser University  
 Tel Aviv University Law School  
 Tulane University  
 University of Alberta  
 University of British Columbia  
 University of Calgary  
 University of California, Davis  
 University of California, Los Angeles  
 University of Colorado, Boulder  
 University of Illinois  
 University of Maryland  
 University of Montreal  
 University of Pennsylvania  
 University of Toronto  
 University of Virginia  
 U.S. Department of Justice  
 U.S. Federal Communications Commission  
 U.S. Federal Trade Commission

### ***Conferences: Speaker, Discussant or Panelist***

- Federal Reserve Bank of New York, "Antitrust Activity in Card-Based Payment Systems: Causes and Consequences," New York, September 2005
- Institut d'Economie Industrielle, "The Economics of Electronic Communication Markets," Toulouse, October 2004
- DOJ/FTC Merger Enforcement Workshop, Washington DC, February 2004
- Cosmos' Club, 125<sup>th</sup> Anniversary Symposium, "The Changing Nature of Business 1878-2003), Washington DC, December 2004
- DOJ/FTC Hearings on Health Care and Competition Law and Policy, Washington DC, April 2003
- International Industrial Organization Conference, Boston, April 2003
- "Integration, Investment and Innovation: Future Directions for the Telecommunications Industry," Georgetown University McDonough School of Business, February 2003
- "The Regulation of Information Platforms," University of Colorado School of Law, Boulder, January 2002
- Phoenix Center for Advanced Legal & Economic Public Policy Studies, U.S. Telecoms Symposium, Washington DC, July 2001
- Practising Law Institute, "Antitrust and Trade Practices Issues in Cyberspace" New York, March 2001
- 28th Annual Telecommunications Policy Research Conference, Washington DC, September 2000
- Schwab Capital Markets LP, Washington Research Group, "Telecom, Internet and Ecommerce Conference," Washington DC, September 2000
- "Experiences with Telecommunications Deregulation," semi-annual meetings organized by AEI-Brookings Joint Center for Regulatory Studies and Centre for European Policy Studies, Washington DC, April 2000
- "Telecommunications After Bell Entry," Conference at University of Colorado School of Law, Boulder, April 2000
- 48<sup>th</sup> Annual Antitrust Spring Meeting, American Bar Association Section of Antitrust Law, Washington DC, April 2000
- Telecom-IT Americas '99 Conference, Institute of the Americas, La Jolla, November 1999
- 5<sup>th</sup> Annual Health Care Antitrust Forum, Northwestern University School of Law, Chicago, October 1999
- "Regulatory Reform in Japan, Mexico, the Netherlands and the United States," OECD, Paris, March 1999
- Federal Communications Bar Association Competition Committee, Symposium, Washington DC, January 1999
- Conference on Current Topics in Merger and Antitrust Enforcement, Charles River Associates, Washington DC, December 1998
- Conference on Anticompetitive Regulation, Robert Schuman Centre of the European University Institute, Florence, September 1999
- 47<sup>th</sup> Annual Antitrust Spring Meeting, American Bar Association Section of Antitrust Law, Washington DC, April 1999
- 25th Annual Telecommunications Policy Research Conference, Washington DC, September 1997
- Telecommunications seminar series, Canadian Bureau of Competition, Ottawa, September 1997
- Competition Policy Workshop, The World Bank, June 1997
- Economics of Interconnection Forum, Federal Communications Commission, Washington DC, May 1996
- Authors' Symposium on Competition Policy and Intellectual Property Rights, Canadian Bureau of Competition, Aylmer, Quebec, May 1996
- Electric Generation Association, Annual Meetings, West Palm Beach, April 1996
- "Wheeling & Dealing: Opportunities and Challenges in the New Electric Industry," conference sponsored by the Center for Regulatory Studies, Illinois State University and the Institute of Government and Public Affairs, University of Illinois-Urbana, Chicago, April 1996
- "New Social and Economic Approaches to a Multimedia World," OECD Symposium, Tokyo, March 1996
- "Telecommunications and Energy Regulation in Transition Economies," Center for Economic Development, Bratislava, October 1995
- "Electric Utility Restructuring: Whither Competition?" organized by International Association for Energy Economics Los Angeles Chapter, and Micronomics Inc., Los Angeles, May 1995.

- "New Learning on Barriers to Entry in Competition Policy," Canadian Bureau of Competition, Ottawa, March 1995
- Southeastern Economic Theory Meetings, Charlottesville, October 1994
- EARIE Conference, Tel Aviv, September 1993
- Midwest International Economics Meetings, Pittsburgh, October 1992
- Latin American Econometric Society, Mexico City, September 1992
- Conference on Industrial Organization, Carleton University, Ottawa, July 1991
- Workshop on Strategic and Dynamic Aspects of International Trade, SUNY at Stony Brook, July 1991
- AEI Conference on "Innovation, Intellectual Property and World Competition," Washington DC, September 1990
- EARIE Conference, Lisbon, September 1990
- Conference on "International Trade and Technology," Brussels and London, November 1989
- EARIE Conference, Budapest, August 1989
- Conference on Strategy and Market Structure, Dundee University, Dundee, August 1988
- Conference on "Firm Ownership and Competition," Graduate School of Business, Stanford University, June 1987
- EARIE Conference, Berlin, August 1986
- AEA Annual Meetings, Dallas, December 1984

### ***Referee for Professional Journals***

*American Economic Review*  
*Canadian Journal of Economics*  
*Economica*  
*Economic Journal*  
*Economics Letters*  
*European Economic Review*  
*European Journal of Political Economy*  
*International Economic Review*  
*International Journal of Industrial Organization*  
*Journal of Business*  
*Journal of Business Economics*  
*Journal of Economic Dynamics and Control*  
*Journal of Economic Education*  
*Journal of Economic Theory*  
*Journal of Economics and Management Strategy*  
*Journal of Industrial Economics*  
*Journal of International Economics*  
*Journal of Law & Economics*  
*Journal of Political Economy*  
*Managerial and Decision Economics*  
*Quarterly Journal of Economics*  
*Quarterly Review of Economics and Business*  
*RAND Journal of Economics*  
*Review of Industrial Organization*  
*Review of International Economics*  
*Scandinavian Journal of Economics*  
*Southern Economic Journal*

### ***Outside Evaluator—Research Proposals and Tenure & Promotion Cases***

National Science Foundation  
 Small Business Administration  
 Duke University  
 INSEAD

Northwestern University School of Law  
Texas A&M University  
University of Calgary  
University of California at Los Angeles  
University of Colorado, Boulder  
University of Michigan  
University of Virginia

**Table 1**  
**Internet Traffic Shares: North America Total and Tier 1**

Company	Pre-Merger Traffic Shares			Post-Merger Traffic Shares		
	N.A. Traffic	N.A. Share	Tier 1 Share	N.A. Traffic	N.A. Share	Tier 1 Share
Legacy AT&T	52.33	12.58%	18.17%	52.33	12.58%	
Legacy SBC (1)	24.13	5.80%	8.38%	24.13	5.80%	
<b>AT&amp;T Total</b>	<b>76.46</b>	<b>18.38%</b>	<b>26.55%</b>			(5)
Company B	51.31	12.33%	17.81%	51.31	12.33%	
Company C	45.89	11.03%	15.93%	45.89	11.03%	
Verizon (2)	39.19	9.42%	13.61%	39.19	9.42%	
Company E	25.46	6.12%	8.84%	25.46	6.12%	
Company F	19.33	4.65%	6.71%	19.33	4.65%	
Company G	15.19	3.65%	5.27%	15.19	3.65%	
Company H (3)	15.19	3.65%	5.27%	15.19	3.65%	
<b>Tier 1 Total</b>	<b>288.02</b>	<b>69.24%</b>	<b>100.00%</b>			
BellSouth (4)						
<b>N.A. Total</b>	<b>416.00</b>			<b>416.00</b>		

Source: RHK Data for the 4th Quarter 2004, as reflected in Annex A to the Reply Declaration of Michael Kende, *Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control*, WC Docket No. 05-75, modified as noted below.

(1) Figures for Legacy SBC have been calculated based upon the ratio of Legacy SBC's traffic to Legacy AT&T's traffic using December, 2004 proprietary data provided by the parties.

(2) Figures for Verizon reflect the combination of Verizon and MCI. Legacy MCI traffic is reported based on RHK data. Traffic for Legacy Verizon has been calculated based upon the Reply Declaration of Michael Kende, *Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control*, WC Docket No. 05-75.

(3) Figures for Company H are presented assuming the same size as Company G, the 7th largest company surveyed by RHK, in order to reflect a total of 8 Tier 1 Internet backbone providers.

(4) Figures for BellSouth are based on 2006 proprietary data provided by the parties.

(5) Note that this figure represents the combined North American traffic of Legacy AT&T, Legacy SBC, and BellSouth.

**Table 2**

**Internet Revenues Shares: Backbone Related Functions for Tier 1 Internet Backbone Providers  
2003 Calendar Year (\$ Millions)**

<b>IB Provider</b>	<b>Pre-Merger Revenue Shares</b>		<b>Post-Merger Revenue Shares</b>	
	<b>Backbone Revenue</b>	<b>Revenue Share</b>	<b>Backbone Revenue</b>	<b>Revenue Share</b>
Legacy AT&T (1)				
Legacy SBC (2)				
BellSouth (3)				
<b>AT&amp;T Total</b>				
Verizon (4)	1102		1102	
Sprint	600		600	
Level 3 (5)				
Qwest	170		170	
SAVVIS	107		107	
Global Crossing				
Cogent(6)				
<b>Tier 1 Total</b>				

Source: Unpublished IDC Report, 2004, as reflected in Annex A to the Declaration of Dr. Michael Kende, Verizon Communications, Inc. and MCI, Inc., Applications for Approval of Transfer and Control, WC Docket 05-75

- (1) Figures for Legacy AT&T are based on 2003 proprietary data provided by the parties.
- (2) Figures for Legacy SBC are based on 2003 proprietary data provided by the parties.
- (3) Figures for BellSouth have been omitted from the pre-merger revenue calculations due to fact that BellSouth does not currently qualify as a Tier 1 Internet backbone provider.
- (4) Figures for Verizon reflect the combination of Verizon and MCI. IDC reported 2003 Internet backbone revenues of \$403 million for Legacy Verizon, and \$699 million for Legacy MCI.
- (5) Figures for Level 3 reflect the combination of Level 3 and WilTel. IDC reported 2003 Internet backbone revenues of \$283 million for Level 3, and [ ] million for WilTel.
- (6) The revenue shares for AT&T and Bell South are conservative, since Cogent's revenues have not been updated to reflect revenue attributable to the businesses of Verio and Fiber Network Solutions, Inc. which Cogent has acquired.