conduct separate proceedings limited to ISP-bound traffic, the carriers (and the Commission) would needlessly be forced to expand significant resources to pursue a parallel track of arbitrations and appeals for each state. A duplicative set of arbitrations could only increase the transaction and litigation costs of entry and the risk of inconsistent outcomes, and thus undermine the Commission's goal of introducing local competition as quickly as possible.

Finally, the Commission should clarify that any rule changes adopted in this proceeding will have no retroactive effect on existing interconnection agreements and arbitrated decisions concerning reciprocal compensation arrangements. As the Commission has previously acknowledged, in the absence of a federal rule governing compensation for such traffic, the states "had no choice but to establish an inter-carrier compensation mechanism." *Declaratory Ruling* ¶ 26. Moreover, the Commission expressly found that nothing in the Act, the Commission's rules, or in the 1999 *Declaratory Order* "precludes the state commissions from determining . . . that reciprocal compensation is an appropriate interim inter-carrier compensation rule pending completion of the rulemaking we initiate below." *Id.* ¶ 27. Consistent with these findings, and the findings of a majority of state commissions since the *Declaratory Order*, the Commission should unambiguously confirm the lawfulness of prior agreements and state decisions on reciprocal compensation.

CONCLUSION

For the foregoing reasons, the Commission should require cost-based reciprocal compensation for ISP-bound traffic on a uniform basis with other voice and data traffic.

Respectfully submitted,

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July 21, 2000

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

In the Matter of	)	
	)	
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996	)	CC Docket No. 96-98
	)	
Inter-Carrier Compensation For ISP-Bound Traffic	)	CC Docket No. 99-68

DECLARATION OF

LEE L. SELWYN

AND

PATRICIA D. KRAVTIN

on behalf of

AT&T Communications

July 20, 2000

Introduction and Summary

1. My name is Lee L. Selwyn. I am President of Economics and Technology, Inc., One Washington Mall, Boston, Massachusetts 02108. Economics and Technology, Inc. (ETI) is a research and consulting firm specializing in public utility economics, regulation, management and public policy. I have been actively involved in the field of public utility economics, policy and regulation for more than thirty years; my overall experience and education are summarized in my Statement of Qualifications, which is provided as Attachment 1 hereto.

2. Since founding ETI in 1972, I have formulated and developed numerous policy recommendations and regulatory devices that have been widely embraced by policymakers at all levels. I have provided expert testimony and analysis on technology, rate design, service cost analysis, market structure, form of regulation, and numerous other telecommunications policy issues, including more recently, inter-carrier compensation issues, before more than forty state commissions, the FCC, the United States Congress and a number of foreign regulatory bodies. I have appeared as a speaker on numerous panels around the world and have published dozens of articles on telecommunications industry issues. I received a Ph.D in Management at the Alfred P. Sloan School of Management, Massachusetts Institute of Technology. I also hold a Master of Science in Industrial Management degree from MIT; and a B.A. with Honors in Economics from Queens College of the City University of New York.

3. My name is Patricia D. Kravtin. I am Senior Vice President at ETI. I have been actively involved in the field of public utility economics, policy and regulation for almost twenty years; my overall experience and education are summarized in my Statement of Qualifications, which is provided as Attachment 2 hereto.

4. In more recent years, I have very actively participated in proceedings before the Commission and state public utility commissions around the country relating to the implementation of local competition. My participation has encompassed in-depth analysis of the

full range of issues relating to facilities-based competition, the use of unbundled network elements, and total service resale. I frequently testify as an expert witness before state regulatory commissions, having submitted testimony before twenty state commissions on these issues and a myriad of others related to telecommunications regulatory and economic policy. I have authored numerous declarations and studies submitted before the Commission on a wide range of telecommunications and video/broadband-related matters. In addition, I have testified as an expert witness in antitrust litigation before United States District Court, and also before a number of state legislative committees. I have served as technical economic advisors to state public service commissions. My academic background is in economics, having studied economics in the Ph.D. program at the Massachusetts Institute of Technology under a National Science Foundation Fellowship. I also hold a B.A. with Distinction in Economics from the George Washington University.

5. This declaration addresses claims by incumbent local exchange carriers (ILECs) that the costs of delivering Internet-bound calls are so significantly and categorically lower than the costs of delivering other calls that Internet-bound calls should be excluded from the established "reciprocal compensation" arrangements pursuant to which one carrier compensates another carrier at cost-based rates for delivering a call initiated by a customer of the first carrier. In particular, this declaration responds to the points raised in ILEC-sponsored studies by Drs. Taylor[1] and Aron[2] that purportedly support the ILEC view.

6. As detailed below, the ILEC studies provide no basis for singling out Internet Services Provider (ISP)-bound traffic for disparate treatment. First, there are no categorical technical differences in the manner by which "ordinary" and "ISP-bound" traffic are handled. Whether

1. William E. Taylor, Agustin Ros, and Aniruddha Banerjee (NERA), "An Economic and Policy Analysis of Efficient Intercarrier Compensation Mechanisms for ISP-Bound Traffic," November 12, 1999 ("NERA Report").

2. Debra J. Aron, William C. Palmer, "Response to HAI Consulting and Quantitative Solutions' Critique of Ameritech's Cost Study, LECG Inc., December 14, 1999 (Aron Response).

traffic is voice or data traffic, and whether the recipient of the call is an individual, an ISP, or another business, the "terminating" carrier employees some mix of the same switching and transport facilities to deliver the call. Thus, any claim that ISP-bound traffic is less costly for CLECs to deliver must: (1) rest on specific empirical proof that identified differences in the mix of facilities used or the manner in which they are used cause significant and categorical cost differences, and (2) demonstrate that there are no offsetting increased costs associated with ISP-bound traffic. The ILEC-sponsored studies do neither. Rather, those studies simply *assume* significant cost decreases associated with the increased average holding time of ISP-bound calls and ignore obvious offsetting cost increases in order to preclude any finding other than that the reciprocal compensation rates established by state commissions on the basis of ILEC costs overcompensate CLECs with respect to the delivery of ISP-bound traffic.

Background

7. Prior to the 1984 break-up of the former Bell System, the vast majority of local and long distance telephone calls in the US were handled end-to-end by one or more Bell affiliates. Revenues were apportioned among the various Bell System entities (including the Long Lines Department of AT&T, which provided long distance service) under the so-called "Division of Revenues Plan" ("DRP"). Where a portion of the service was furnished by a non-Bell System entity, such as an Independent Telephone Company, a Bell-Independent settlement arrangement was invoked to take care of the revenue split.

8. Generally, Bell and Independent local phone companies settled for their exchange of local traffic under a so-called "bill-and-keep" arrangement, whereby each carrier would retain the full revenue received from its (originating) customers and the connecting carrier would complete (terminate) calls without a specific charge to the originating carrier. This arrangement was premised upon a *quid pro quo* between the two carriers – *i.e.*, carrier B would complete local

calls handed off to it by carrier A, in exchange for which carrier A would complete local calls handed off to it by carrier B. It was generally assumed that the total volume of traffic in each direction would be approximately equal, so a bill-and-keep scheme simply avoided the costs and paperwork involved in detailed usage measurement in favor of a "peer-to-peer" type of compensation arrangement. These types of arrangements are still employed today for exchange of local traffic between ILECs and Independents.

9. ILEC-CLEC reciprocal compensation can certainly be structured under the same types of bill-and-keep arrangements that have long been used for ILEC-to-Independent settlements. Section 251(b)(5) of the Telecommunications Act of 1996 requires "reciprocal compensation arrangements for the transport and termination of telecommunications," and Section 252(d)(2) provides that such arrangements must approximate the "costs of terminating such calls" and may include "arrangements that waive mutual recovery (such as bill-and-keep arrangements)." A number of CLECs had on various occasions expressed an affirmative preference for bill-and-keep, only to have this rejected by ILECs.[3] In opposing bill-and-keep, ILECs generally believed that traffic would not be "in balance." ILECs thus insisted upon compensation systems under which each connecting carrier would pay the other for terminating traffic actually handed off by one carrier to the other. In practice, the payments due each by the other would be offset, and a net settlement payment would be made by the carrier presenting the higher volume of terminating

3. See, e.g., Maryland Public Service Commission, Case No. 8584, Re: MFS Intelenet of Maryland, Inc., Order No. 71155, April 25, 1994, 152 PUR 4th, 102, 119-120 (MFS-I seeks bill-and-keep arrangements with Bell Atlantic-Maryland (BA-MD) for local exchange service, BA-MD argues for explicit charges); Michigan Public Service Commission, Case No. U-10860, In the Matter, on the Commission's Own Motion, to Establish Permanent Interconnection Arrangements Between Basic Local Exchange Service Providers, Opinion and Order, June 5, 1996, 170 PUR 4th, 4, 10 (TCG advocates adoption of bill-and-keep, Ameritech-Michigan argues for retention of previously-determined local termination rate); Washington Utilities and Transportation Commission, Docket Nos. UT-941464 et al, WUTC Complainant v. US West Communications Respondent, et al, Fourth Supplemental Order Rejecting Tariff Filings and Ordering Refiling, Granting Complaints, In Part, October 31, 1995, at 23-24 (ELI, MCI, MFS and AT&T advocate bill and keep, GTE and US West oppose it).

traffic to the other. If traffic were exactly "in balance," no net settlement payment in either direction would be made.

10. The terminating compensation rates were generally set in interconnection agreements negotiated between an ILEC and a CLEC. Section 252(d)(1)(A) of the *Telecommunications Act*[4] requires that such rates, like all charges associated with interconnection and unbundled network elements (UNEs) obtained by CLECs from ILECs, be set on the basis of cost. The FCC went on to establish "proxy" rates for terminating local traffic at 0.2 to 0.4 cents per minute, subject to supersedure in individual interconnection agreements or in tariffs adopted by state PUCs on the basis of specific cost studies.[5]

11. Many ILECs contended that the FCC proxy rates were below their own actual costs, and both before and after the FCC's determination of the proxy rates, ILECs produced their own cost studies that were used to justify substantially higher per-minute rates. For example, the July 1996 interconnection agreement that Ameritech reached with TimeWarner provided for reciprocal compensation rates of $0.9 per minute for tandem switching and $0.7 per minute for end office switching.

12. In dictating the reciprocal compensation rate, the ILEC was engaging in a form of economic negotiation sometimes described as "I cut, you choose." Suppose that Bob and Bill are trying evenly to divide a chocolate cake between them. Under "I cut, you choose," Bob, for example, would cut the cake into what he believed were two equal pieces, and Bill would then have the right to select which piece he would get. Obviously, in such a process, Bob has a powerful incentive to make his slice as close to a 50/50 split as possible since, if the two pieces are unequal, Bill will then have the right to select the larger piece. Note also that under this type

4. Pub. L 104-104, 110 Stat. 56 (hereafter, Telecommunications Act of 1996).

5. Id., 11 FCC Rcd 15499, 15905-15908 and 16229.

of negotiation arrangement, it doesn't actually matter which party does the slicing and which does the choosing, since both would share the identical incentive no matter which role each assumes.

13. The establishment of a symmetric reciprocal compensation rate by the ILEC that the CLEC is then free to either pay to the ILEC or have the ILEC pay to it should provide the ILEC with precisely the same incentive to "get it right" as Bob has in slicing the chocolate cake. So it is therefore entirely reasonable and correct to assume that in setting its existing reciprocal compensation rate, ILECs attempted to get as close to their (and their competitors') actual costs as possible, since the risk of being wrong (too high or too low) would necessarily cost it money. In fact, ILECs would have deliberately set their price in excess of cost only if they believed that CLECs would be unable to achieve a net traffic flow in their favor. That error, had ILECs made it, would be in the nature of a bad business judgment which, like other management decisions, firms must live with in competitive market environments. Of course, the "I cut, you choose" method only works where all traffic is included. Otherwise, the ILEC incentive will be to set rates for ISP traffic artificially low and increase rates for other traffic.

14. With several years of actual experience under their belts, ILECs began to realize that CLECs were serving many ISPs, and that ISPs generally have disproportionately high call termination volumes. The ILECs responded by urging regulators to rule that ISP-bound traffic is sui generis, and that ILECs should pay CLECs nothing for the use of their facilities in delivering calls from the ILECs' customers to ISPs. As demonstrated below, there is no economic basis for any such rule. Indeed, the ILECs have not provided any legitimate basis for discriminating between ISP-bound traffic and other traffic for reciprocal compensation purposes.

The main arguments raised in the ILEC studies are irrelevant to the questions of inter-carrier compensation at issue in this docket.

15. At issue in this docket is the question of whether generic reciprocal compensation payments, determined on the basis of ILEC costs, overcompensate CLECs in the special case of

ISP-bound traffic. To answer this question entails an evaluation of how generic reciprocal compensation payments received by CLECs for their role in terminating ISP-bound traffic compare to the costs incurred in delivering ISP-bound traffic. Significantly, the ILEC studies submitted in this docket do not even attempt to make the necessary evaluation. Rather, they focus on issues that, while of obvious monetary import to the ILECs, are basically irrelevant to the question at hand.

16. For example, the starting frame of reference for Dr. Taylor's analysis is the premise that "Internet calls give rise to local exchange switching and transmission costs for incumbent local exchange carriers ("ILECs"), and that "Internet Service Providers (ISPs) are largely exempt from paying ILECs for these costs."[6] Dr. Taylor then proceeds to bemoan the fact that while "CLECs are permitted to collect regular business service rates from the ISPs they serve, the ILECs that originate the bulk of those [Internet-bound] calls collect nothing from the ISPs."[7] Similarly, Dr. Aron's study, as well as the Ameritech Internet Cost Study[8] it defends, focuses on the question of whether the ILEC recovers the full cost of an additional line used to access the Internet from its end user customers.[9]

17. These types of arguments are fundamentally flawed in the context in which they are presented. Whether ILECs are being fully compensated for the costs of *originating* Internet-bound traffic is plainly not relevant to the question of whether CLECs are being overcompensated for the *termination* of such traffic. ILECs are compensated for the costs of originating traffic to the Internet, or any other destination for that matter, through charges to end users. Reciprocal compensation payments, on the other hand, are designed solely to compensate the "terminating carrier" for the costs it incurs in delivering traffic.

18. If end user charges are inadequate to cover the ILECs' costs of originating traffic – and

6. NERA Report at ¶3.

7. Id.

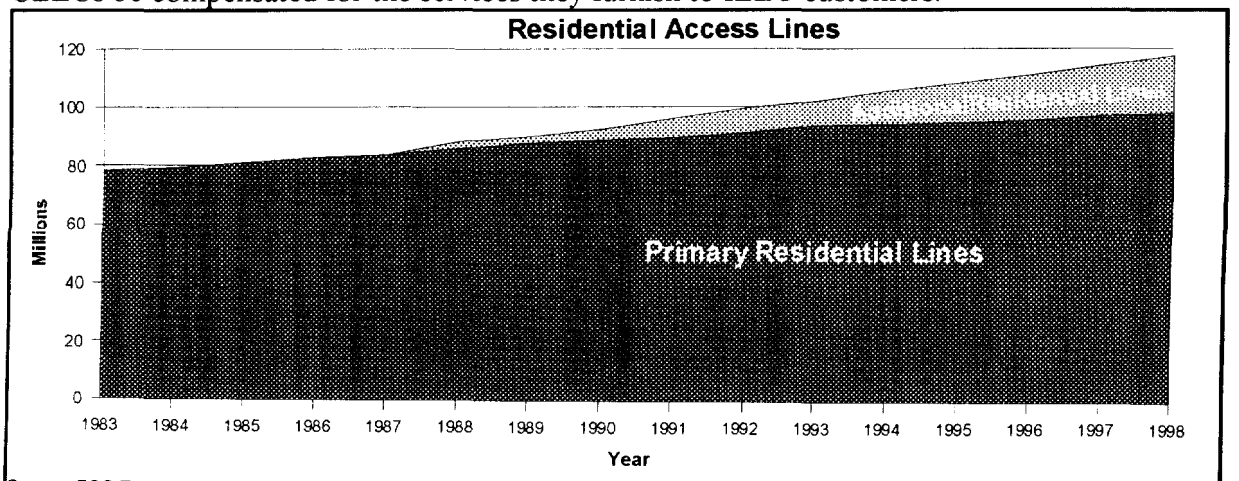
8. "Cost vs. Revenue Analysis for a LEC Providing Service to an End User of an ISP Served by Another LEC, Attachment A to Comments of Ameritech, CC Docket 99-68 (filed April 12, 1999).

9. Aron Response at 2.

the ILECs' studies have not shown that to be so – then the proper response on the part of the ILEC would be to seek an increase in those end user charges. It would be totally inappropriate, and indeed quite harmful to emerging competition in the local exchange market, to relieve the ILECs of their obligation to pay other carriers for the costs associated with terminating calls that would otherwise have to be terminated on the ILECs' network.

19. As to the issue of whether end user charges are inadequate to cover the ILECs' cost of originating traffic, there is no compelling evidence that the Internet has had a material impact upon the average per-line volume of local traffic carried over the PSTN. Data routinely collected by the FCC and published in its annual *Statistics of Communications Common Carriers* demonstrate that while the Internet has had a significant impact upon the demand for additional residential access lines, it has had little impact upon the *average volume of local traffic* carried over each line.

20. As shown in Figure 1 below, beginning in about 1990 the demand for additional residential access lines began to mushroom, and by the end of 1998 — the latest year for which FCC data is available — over one-fifth of all US households had an additional residence line, representing some 20.4-million such lines nationwide. During that same period, the per-line volume of local calling increased by only 19% (Figure 2). ILECs realize substantial additional revenues from the sale of additional residential access lines. To the extent that CLECs participate in the carriage of traffic generated over these additional access lines, it is both appropriate and essential, in terms of fostering a robustly competitive marketplace for local telephone service, that CLECs be compensated for the services they furnish to ILEC customers.



Source: FCC Report, Trends in Telephone Service, September 1999, Table 14.5 - Household Telephone Subscribership in the United States, Table 20.4 -Additional Residential Lines for Households with Telephone Service.

Figure 1. Demand for additional residence access lines has grown substantially over the past decade.

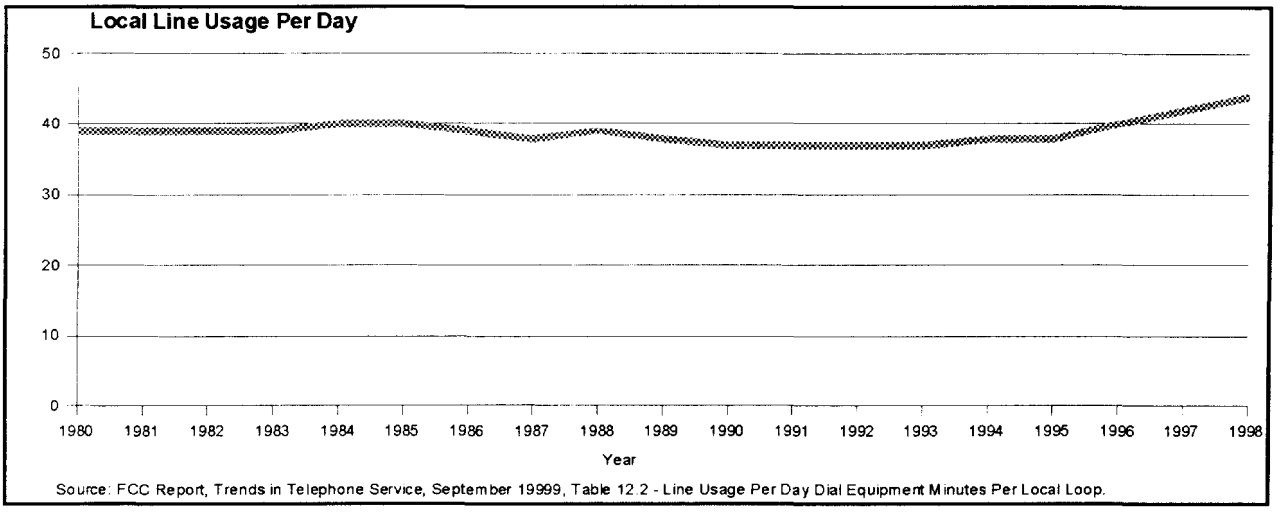


Figure 2. Local usage per line has risen modestly overall, despite the growth in Internet-related calling.

Because CLECs unquestionably employ the same facilities in the same manner whether delivering voice or data traffic, the ILECs should bear the burden of demonstrating the existence of any significant cost differences.

21. ILECs argue that inter-carrier compensation arrangements with CLECs should make a distinction between traffic that is destined for a conventional voice telephone line, and traffic that is destined for an ISP – so-called ISP-bound traffic. In this context, the NERA Report contends that ISP-bound traffic is very different from ordinary voice and data traffic, and as a consequence should be subject to entirely different inter-carrier compensation arrangements than those applied to non-ISP-bound local traffic exchanged between carriers.[10]

22. As we explain below, there is in fact no relevant technical difference in the manner by which these two types of traffic (i.e., "ordinary" and ISP-bound) are terminated. Fundamentally, the cost characteristics of a telephone call do not depend upon the *content* of the call or the purpose or use motivating the call (e.g., to connect to and transmit data to/from an ISP vs. a voice call to a friend or to a nearby retail or service establishment). Virtually all activities

10. NERA Study, at page 6.

performed by the ISP may be undertaken by a wide range of non-carrier businesses which use the PSTN to communicate with their customers. For example, call answering bureaus may perform all of these functions except for providing Internet access. Similarly, many retail banks design, market and sell on-line banking services to their customers for a monthly fee, and may advertise local dial-in numbers for those customers' convenience. While ISPs are in a specialized line of business, the manner in which they use the PSTN shares many characteristics with other classes of business customers, as the Commission has recognized previously.[11]

23. Rather than varying with call content, the cost of processing a telephone call depends solely upon the public switched telephone network (PSTN) resources (primarily switching and transport) that are utilized by the call, which are affected, to varying degrees, by the call's duration, the number of switching operations involved in processing the call, the distance over which the call travels, and most significantly, the extent to which the use of these resources affects their peak-demand capacity at the time that the call is in progress. If the PSTN resources required to terminate two calls are identical, then the costs of terminating each call are identical, even if one of the calls terminates at an "ordinary" end user's telephone and is used for a voice communication, and the other call terminates at an ISP modem line and is used to connect to the Internet.

24. For this reason, calls to ISP modem lines that are connected to the PSTN within the calling party's local calling area are technically indistinguishable from "ordinary" end-user to end-user local calls, whether completed entirely on the ILEC's network or involving a hand-off by the ILEC to a CLEC for termination. In either case, routing a call from an originating end user to an ISP's incoming modem line is technically identical to routing a call from the same end user to any local telephone number served by the incumbent or other LEC.

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11. Access Charge Reform Order, 12 FCC Rcd at 16133-34.

25. As shown in Figures 3 and 4, the switch serving the recipient end user's line receives the incoming call on a trunk from another switch (either another end office switch or a tandem switch), identifies the appropriate line to "ring" (*i.e.*, the line on which to signal an incoming call), and then proceeds to generate a ringing signal to the recipient access line. When the incoming call is answered (whether by a person picking up a handset, an answering or fax machine going "off-hook" in response to the ringing signal, or by a modem automatically going "off-hook") the ringing signal is immediately terminated and a direct (circuit-switched) connection between the calling and called parties is established. This same sequence of events takes place when an end user customer calls his or her neighbor, connects to their local bank via a dial-up modem to perform some on-line banking, or places any other locally-rated call,[12] *including a call to an ISP Point of Presence (POP) whose number is within the originating party's local calling area.* In terms of the use of local exchange network resources, it is also essentially the same thing that happens when an incoming long distance call reaches the switch serving the called customer. On a technical basis, there is no reason to distinguish among any of these types of PSTN traffic.

12 By "locally-rated" call, we refer to a call that the originating LEC treats as subject to its local exchange tariffs rather than its access or toll tariffs (e.g., the LEC may charge the caller local message units), without reference to the jurisdictional status of the call.

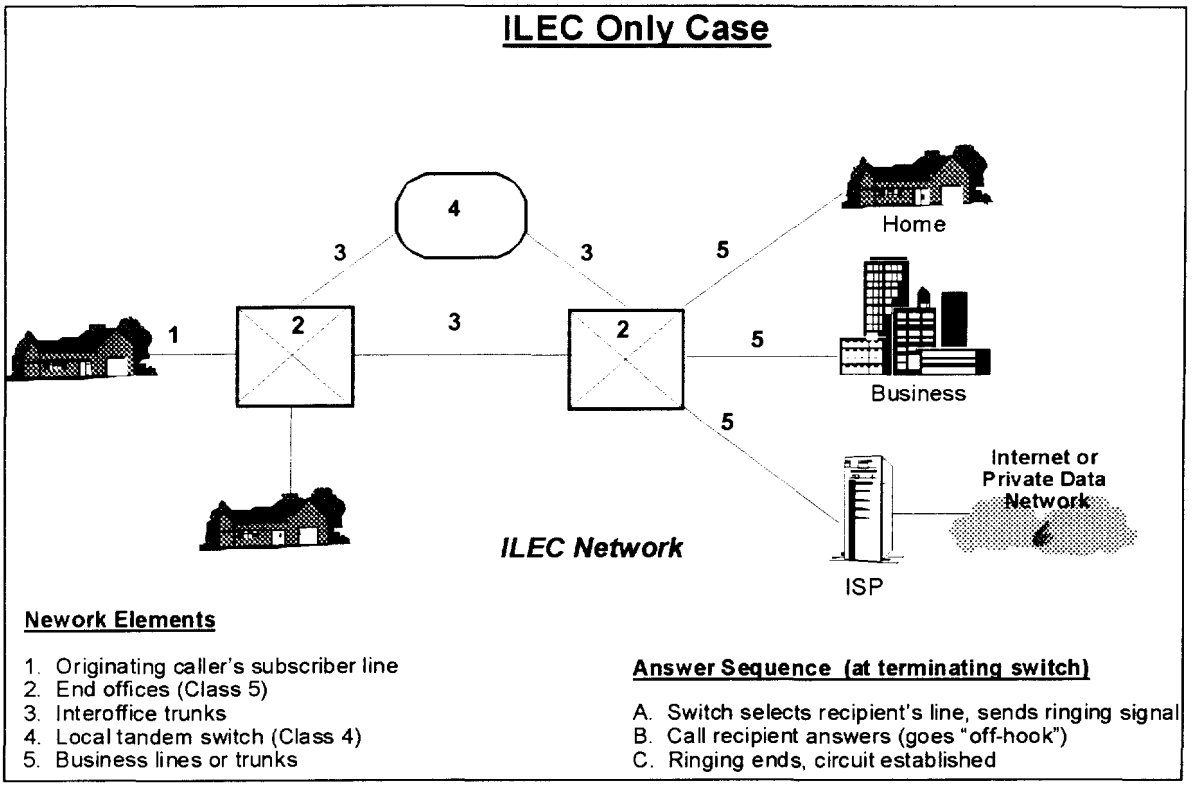

Figure 3. Routing a call to an ISP is technically identical to routing a call to any other local telephone number (Case 1: ILEC customer calls an ISP served by the ILEC).

26. As shown in Figure 4, where the call is directed to a customer (end user or ISP) served by a CLEC, the originating LEC (typically an ILEC) routes the call from the originating Class 5 end office to a Class 4 tandem office from which it and other calls from other Class 5 end offices that are bound for the same CLEC are aggregated and routed to a CLEC Point of Interconnection ("POI") with the ILEC. The CLEC then routes the call from the POI through its network to its ISP customer.

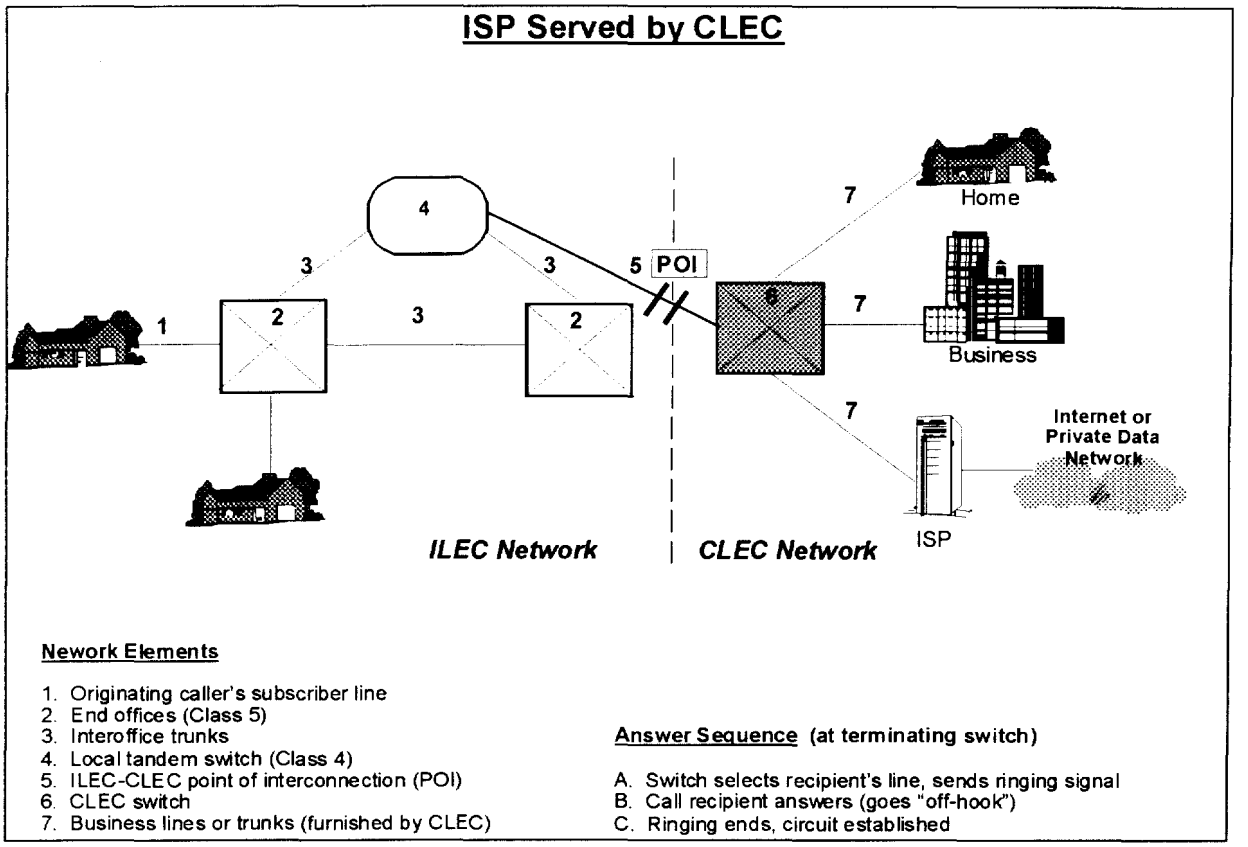

Figure 4. Routing to an ISP is technically identical to routing a call to any other local telephone number (Case 2: ILEC Customer calls ISP served by a CLEC).

27. If the ISP is served directly by the ILEC, calls would be routed either from the originating Class 5 end office to a tandem office, and then to the terminating Class 5 end office from which the ISP's service is furnished, i.e., to which the ISP's access lines are connected, or directly to that end office via a Class 5-to-Class 5 interoffice trunk (Figure 3). Where a high volume of traffic exists between the originating and terminating end offices, the use of direct interoffice trunk routing that bypasses the tandem may in some cases be more efficient. The matter of direct vs. tandem routing is an economic decision for the ILEC to make based upon the volume and variability of the traffic, and the relative costs of direct trunking and tandem switching in each instance.

The ILECs have failed to demonstrate that call duration, or any other factor, makes delivering ISP-bound calls significantly less costly than other calls.

28. The NERA Study opines that the costs that CLECs incur when terminating ISP-bound traffic may be significantly less than the costs of delivering other traffic due specifically to the average longer call duration of such calls.[13] NERA contends that the longer-duration of ISP-bound calls relative to the duration of the average locally-rated call implies a lower per-minute cost, because the initial, fixed costs of call set-up can be spread over more minutes.[14] Second, NERA speculates that CLECs' actual incremental cost for terminating ISP-bound traffic may be lower than ILECs' because they can enjoy certain efficiencies, such as collocating ISPs' equipment in their central offices.[15]

29. As discussed below, in reality, neither the NERA Report nor the other ILEC-sponsored submissions in this proceeding supplies any persuasive empirical evidence to support either of those two contentions. Moreover, even if the ILEC has shown that call set-up costs are a relatively high proportion of call termination costs such that differences in the average fixed component of different types of calls were significant – and they have not – the appropriate prescription would be to better align the rate structure for reciprocal compensation with the underlying cost structure (e.g., to establish separate, cost-based set-up and duration charges), rather than to select one category of locally-rated calling based on its *use* and expose it to different rate treatment, as NERA and the ILECs propose.

30. With regard to the first contention, i.e., that due to the longer average call duration of ISP-bound calls, the average total cost per minute of such calls must necessarily be demonstrably less in comparison to other calls, the NERA Report makes several leaps of faith. Granted, it is an

13. NERA Report, at 7-8.

14. Id.

15. Id., at 8.

algebraic truism that, all else being equal, to the extent that fixed call set-up costs exist, the total cost per minute (including both call set up and incremental per minute costs) will necessarily fall as duration increases. However, it is the relative magnitudes of the costs of call set-up functions versus the incremental per minute costs for local call termination as experienced by both the CLEC and the ILEC that determine the significance of the differences in total costs that result. As discussed below, the NERA Report makes a number of unsupported assumptions regarding these important questions.

31. NERA presents a numerical example comparing the total cost per minute of a 3-minute call with the total cost per minute of a 20-minute call. In its example, the incremental cost per minute for both calls is 0.5¢, and the fixed cost of the call set-up for both calls is 2¢. Under these assumptions, Dr. Taylor shows the total 20-minute call to cost about 40%-50% less on a total cost per minute basis than the 3-minute call.[16] All that NERA demonstrates in this example is that the algebraic truism is true. NERA's example provides no meaningful evidence concerning the relative magnitudes of call set-up versus incremental per minutes costs for CLECs carrying ISP-bound traffic such as would be required to prove NERA's contention. Neither have ILECs been forthcoming with this type of information in publicly accessible studies.

32. Given the characteristics of CLECs' network architecture and traffic load patterns discussed below, it is perfectly plausible that – contrary to Dr. Taylor's assumptions – both CLECs' incremental per minute cost for terminating Internet-bound calls is significantly higher than ILEC costs, and the costs of the call set-up functions for CLECs is a much less significant component of the cost of termination than for the ILECs. Accordingly, it would be reasonable to assume in the example above, that the incremental cost per minute for the 20-minute call is 1¢ (versus the 0.5¢ for the 3-minute call) and that the fixed call set-up cost for the 20-minute call is

16. Dr. Taylor makes two elementary mistakes in his analysis. First he incorrectly divides 3.5 by 3 (the correct answer is 1.16 and not 1.66). Second, he incorrectly divides the total cost of the 20-minute call by 10, and instead of by 20, (the correct answer is 0.6, not 1.2). Notwithstanding these errors, the overall conclusion of Dr. Taylor's analysis is unchanged.

only 0.2¢ (versus the 2.0¢ for the 3-minute call). Under these different, but plausible assumptions (for the reasons discussed below), the difference in the total per minute costs of these two calls becomes relatively insignificant.[17]

33. As discussed further below, a CLEC's network will typically consist of relatively less switching and relatively more transport than would an ILEC network. While switching costs are sensitive both to the number of call set-ups as well as to aggregate call duration, transport costs tend to vary primarily with duration. Thus, it is reasonable to expect that CLEC local usage costs will exhibit proportionately greater duration-sensitivity and proportionately less set-up sensitivity than do ILEC usage costs. Accordingly, NERA's unsupported assertion that because ISP-bound traffic is of a longer average call duration CLECs' costs must necessarily be lower than the ILECs' costs is merely that, an unproven assertion.

34. Similarly unproven is the notion, advanced by certain ILECs, that CLECs enjoy lower incremental per-minute costs due to the fact that traffic load characteristics for ISP traffic may vary from those experienced by an ILEC, which reflect a larger variety of end users' traffic patterns. ILECs assert (with little hard evidence to support that assertion) that less of the overall volume of ISP traffic occurs in the busy hour (i.e., the hour of highest traffic volumes, which drives the sizing of switches and other capacity-constrained network facilities, and thus their related costs), and accordingly, that CLECs will experience lower busy-hour demand and thus lower costs for serving the same volume of traffic under a more sharply-peaking traffic load profile. In fact, just the opposite is likely to be true.

35. Precisely because the ILECs' network was designed to carry a larger variety of end users' traffic patterns relative to a CLEC carrying high proportions of Internet-bound calls, the latter will have less opportunity than the ILEC to smooth out peak traffic loads. While for the

17. For the 3-minute call, the total cost per minute remains at 1.16¢. For the 20-minute call, the total cost per minute under the new assumptions is 1.1¢.

ILECs it may be true that ISP-bound traffic tends to fall disproportionately outside of their traditional busy hour compared to the average traffic profile and hence carry a lower incremental cost per minute than the average voice call carried on the ILECs' network,[18] that is unlikely to be the case for the CLECs. For a CLEC, whose traffic may consist of a high proportion of ISP-bound traffic, ISP-bound traffic is likely to define the network peaks. Thus, for the CLEC, the Internet-bound call will have a higher likelihood of being carried at peak times and will carry a *higher* incremental cost per minute on average than voice traffic carried on the ILECs' network. Moreover, as explained further below, because CLECs serve a far smaller customer population and carry far less traffic than do ILECs, they are necessarily forced to operate at a far smaller scale, and because of this, CLEC networks will tend to exhibit higher average costs than ILEC networks.

36. Along the same lines, relative to the second contention made by Dr. Taylor, it is by no means obvious that CLECs as a class will experience lower costs for terminating ISP-bound traffic than ILECs just because the ISPs and the CLECs that serve them may target their facilities "in high-density, central business locations" and collocate ISP equipment in the CLEC's central offices.[19] Indeed, CLECs locating facilities in high-density, central business districts will face real estate costs and other costs of doing business much higher than elsewhere. Given the relatively low costs of transport (see discussion below), collocation will not necessarily produce substantial overall cost savings.

37. Dr. Taylor's speculation that CLECs may hold a cost advantage over ILECs in the termination of ISP-bound traffic is also contradicted by evidence supplied by the ILECs themselves in a prior FCC proceeding. In the course of lobbying the FCC to eliminate the

18. Since ILEC end user rates are based upon average load profiles, the ILECs will be in an increasing position to benefit in the way of "windfall profits" as the off-peak Internet-bound traffic they carry increases.

19. *Id.* at 8.

exemption of enhanced services providers (ESPs)[20] from interstate access charges, several regional Bell operating companies (RBOCs) submitted studies purporting to show that the concentrated nature of ISP-bound traffic has caused them to incur costs incremental to their ordinary call termination costs. In a "Pacific Bell ESP Impact Study" filed with the FCC in July 1996, Pacific Telesis claimed that the growth of ESPs had "caused Pacific Bell to incur additional costs to increase network capacity as Pacific has already identified $13.6-million in central office reengineering costs for 1996 associated with providing business lines to ESPs. These costs are over and above the normal growth expenditures associated with comparable quantities of business lines provisioned for typical business customers."[21] In June 1996, Bell Atlantic filed a study with the FCC that addressed the impacts of increased Internet usage.[22] Similar to Pacific, Bell Atlantic contended that serving ISPs with high levels of inbound calling caused it to incur increased investments in traffic-sensitive facilities to accommodate the termination of that traffic, and specifically concluded that "the network elements most affected by heavy traffic loads from ISPs are line units, switch modules and interoffice trunking."[23] While some aspects of these studies are flawed,[24] they do provide some evidence that the costs of terminating concentrated traffic,

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20. The category of enhanced services providers encompasses Internet service providers and other suppliers of on-line services.

21. Pacific Bell ESP Impact Study, attached to July 2, 1996 Letter from Alan F. Ciamparcaro, Pacific Telesis Vice President, to James D. Schlichting, Chief of FCC Competitive Pricing Division.

22. Report of Bell Atlantic on Internet Traffic, attached to June 28, 1996 Letter from Joseph J. Mulieri, Bell Atlantic Director – FCC Relations, to James D. Schlichting, Chief of FCC Competitive Pricing Division ("BA Internet Usage Study").

23. *Id.* at 14.

24. In particular, the Pacific Bell and Bell Atlantic studies, as well as similar studies prepared in the same timeframe by US West, NYNEX, and BellCore, failed to perform proper comparisons of the total revenues and costs associated with increased ESP/Internet usage, and thus did not substantiate their claims that the ESP exemption should be discontinued. *See* Selwyn, L. and Laszlo, J., "The Effect of Internet Use on the Nation's Telephone Network," January 22, 1997, at pages 35-49.

including ISP-bound traffic, are actually higher than the costs of terminating more relatively dispersed traffic. Thus, according to the RBOCs' own representations, those CLECs who provide relatively large proportions of their services to high-volume inbound calling services, including the termination of ISP-bound traffic, may well incur higher, not lower, costs for terminating that traffic.

Offsetting scale and mix considerations ignored by the ILECs preclude any finding that the reciprocal compensation rates established by state commissions on the basis of ILEC costs overcompensate CLECs with respect to the delivery of ISP-bound traffic.

38. Because of fundamental differences in the architecture of ILEC and CLEC networks which affect their relative economics, it is a gross over-simplification to conclude, as Dr. Taylor does, that CLECs' will universally confront lower call termination costs than do ILECs. Dr. Taylor is noticeably silent as to these fundamental differences between ILEC and CLEC networks.

39. As mentioned above, the principal architectural differences between ILEC and CLEC networks arise largely in the relative *mix* of their basic network components, i.e. subscriber loops, switching, and interoffice transport. ILEC networks have been built up over more than a century and generally consist of a large number of end offices that are physically located in relatively close geographic proximity to the subscribers they directly serve.[25] When a call involves customers served by different end offices (for example, customers located in different communities), completion of the call requires that it be routed between the two end offices over an interoffice trunk. In order to avoid deploying dedicated interoffice trunks between every possible pair of ILEC end offices, in most cases individual end offices are connected (via interoffice trunks) to an

25. For example, SWBT currently operates approximately 725 local, end office ("Class 5") switches in its Texas service areas at which subscriber loops are terminated and connected. FCC ARMIS Database, Report 43-07, Table I: Switching Equipment, for Southwestern Bell-Texas (COSA ASWTX), row 111 (year-end 1998 local switches in SWBT's Texas serving area equals 725). Source: http://gullfoss.fcc.gov:8080/cgi-bin/websql/prod/ccb/armis1/forms, accessed 2/28/00.

intermediate switching point known as a "tandem" office. The tandem switch (sometimes referred to as a "Class 4" switch in the North American network hierarchy) can then interconnect any of the individual end offices to which it is directly trunked. Where the end offices involved in a particular call are trunked to (subtend) different tandem switches, the call is completed via an interoffice trunk between the two tandems. In certain situations in which particularly high volumes of traffic exist within pairs of end offices, direct interoffice trunks may be used to connect the two end office switches involved.

40. The differences between ILEC and CLEC network architectures are best explained in terms of the relative economics of switching vs. transport. Subscriber loops support a transport function, carrying traffic between the customer's premises and the serving wire center; interoffice trunks also provide a transport function, carrying traffic from one switch to another. Switching and transport facilities are often economic substitutes for one another; for example, as described above, by introducing a tandem switch to interconnect a number of individual end offices, one avoids the need to deploy direct interoffice trunks between every possible pair of end offices on the ILEC's network. Similarly, by deploying end office switching facilities in close geographic proximity to the individual subscriber, it is possible to concentrate traffic on a smaller complement of transport facilities than would be possible if, for example, individual switches are used to serve subscribers located across a large geographic area.

41. The specific mix of switching vs. transport facilities in a network thus depends heavily upon the relative cost of each and the overall *scale* of operations of the network. ILECs can serve millions of individual subscribers statewide and can thus afford to deploy relatively efficient, large-scale switching systems in close geographic proximity to their customers. CLECs typically serve a customer population that is a minute fraction of the size of the ILEC's customer base. In order to achieve switching efficiencies, CLECs will typically deploy a relatively small number of

large switches, and so must transport their customers' traffic over relatively large distances. As a result, the CLECs overall costs may be higher than the ILEC's costs.

42. The overall cost of constructing and operating a telecommunications network are heavily impacted by the overall volume of traffic and number of individual subscribers that the network is designed to serve; that is, telecom networks are characterized by substantial *economies of scale and scope*. The effects of these scale and scope economies are further compounded by the fact that ILECs (particularly the larger Bell Operating Companies) are able to purchase switching, transport and other network components at a far more favorable price than their much smaller CLEC rivals.[26]

26. For example, testimony offered by SBC in the 1998 Connecticut DPUC proceeding to consider the Joint Application of SBC and SNET for approval of their merger indicated that following the merger SNET's costs of equipment purchases would decrease substantially due to the increased purchasing power of SBC relative to that of a stand-alone SNET. Of course, the stand-alone SNET, with some 2.3-million residential and business access lines in Connecticut, is itself still much larger than many CLECs. Accordingly, it is entirely reasonable to expect that, without the volume discounts available to a large ILEC such as a Bell Atlantic or a Pacific Bell, a CLEC will experience higher capital-related costs. See Joint Application of SBC Communications, Inc. And Southern New England Telecommunications Corporation for Approval of a Change of Control, Connecticut Department of Public Utility Control Docket No. 98-02-20. See also SBC Response to MCI-4, Exhibit A, "Introduction and Opening Comments of Don Kiernan," January 5, 1998, SBCSNET004573.

None of the ILECs' other policy-based arguments can overcome their failure to demonstrate significant, categorical cost differences for Internet-bound traffic.

43. The NERA Report attempts to fashion a distinction between ISP-bound local calls and other types of local calls on the basis of cost-causation. In NERA's view, ISPs are closely analogous to interexchange carriers (IXCs), because instead of being "a passive end-user recipient" of a local call, an ISP (such as AOL) "designs, markets and sells Jane [the ISP user] the service, collects her monthly fee for Internet access, answers her questions, establishes telephone numbers at which she can access its services without paying toll charges, and pays the CLEC for access to the public switched telephone network."[27]

44. By seeking to draw the analogy between ISPs and IXCs, NERA asserts an ILEC entitlement to payments from ISPs in the form of access charges under the guise of cost causation and economic efficiency. This argument is completely void of economic merit. For one, access charges were designed to recover historic, embedded costs of the ILECs. Accordingly, to apply these types of charges (or the equivalent) to ISPs would be totally at odds with the very principles of cost causation and economic efficiency that NERA raises. Under NERA's distorted logic, the absence of a subsidy flowing to ILECs (resulting from the ISP exemption from access charges) is synonymous with the presence of a subsidy to ISPs.[28] This is simply untrue.

45. As discussed earlier, this docket is not the proper forum to address whether ILECs are being adequately compensated by their own end user customers, and ILECs should not be permitted to seek additional recovery under the guise of reciprocal compensation issues. Indeed, there is no reason, other than economic self-interest on the ILECs' part, for ILECs to be entitled to additional revenues relating to the carriage of ISP-bound calls which they do not terminate.

27. NERA Study, at page 5.

28. NERA Report at 2-6.