Fig 2.

20,000 analog lines @ $75.00/month = yearly cost of $18 million

20,000 PRI lines @ $50.00/ month = yearly cost of $12 million

40,000 analog & PRI lines = total yearly cost of $30 million

20,000 analog lines @ $17.00/month = yearly revenue of 4.08 million

20,000 PRI lines @ $17.00/month = yearly revenue of 4.08 million

= total yearly revenue of 8.2 million

From this data, Bell Atlantic asserts the existence of a cross-subsidy of $22 million dollars through the course of 1996. While on the surface this evidence of a cross-subsidy appears astounding, we will see that Bell Atlantic has taken an enormous and unfounded leap.

In calculating the cost per line, Bell Atlantic includes the capital costs of providing the subscriber lines (segments 3 & 4 of diagram 1.) as well as the capital costs of the IOFs (segment 2 of diagram 1.). Their data misattribute all costs of the interoffice facilities to the ISP at the terminating end when; they should be distributed among traffic originators and terminators. This misattribution is illustrated in the RBOCs view that calls to Internet providers are essentially free. In his keynote address at Wescon96, Michael Fitzpatrick from Pacific Telesis, in discussing the huge costs of providing service to the ISPs asked; "*why the Bell companies or anyone else would want to invest that kind of money to facilitate a huge growth in unlimited* ***FREE***

calling?".[10] In the local telephony arena, the greatest revenue is generated at the originating end (*sender pays)*, reflected in the monthly bill received by telephone subscribers. Additionally, measured business lines (1MB), extended area local charges on residential calls to the Internet and residential ISDN services generate significant usage sensitive revenue to the LEC. Furthermore, the rapid growth of online services has spurred a corresponding jump in the sales of second phone lines. In identifying the $22 million dollar cross-subsidy, the Bell Atlantic study makes no reference to any revenues that accrue at the originating end where according to the ETI report (figure 3); revenues are higher and costs are lower compared to the terminating end.

Fig 3. Sources of Costs and Revenues From Calls to ESPs[11]

	ORIGINATION	*TERMINATION*
REVENUES	*High*	*Low*
COSTS	*Low*	*Moderate*

The RBOCs also disregard a substantial source of revenue, extracted from the ISPs in the form of installation fees, when calculating their total monthly revenues. Installation fees of approximately $58.00[12] per line; up front revenues that can

[10] Michael Fitzpatrick, "Internet Congestion: Crisis or Come On?", Keynote address at Wescon/96 in Anaheim, California. Oct 23, 1996. http://www.pactel.com.

[11] Lee L. Selwyn & Joseph W. Laszlo, "The Effects of Internet Use on the Nations Telephone Network", Economics and Technology, Inc. Jan 22, 1997.

[12]Based on tariffed PRI installation fees of $1400.00 per 24 lines (zero-mile)or $58.33 per line x 304,000 circuits.

accrue interest during the year are also assessed to the ISP. This installation fee is part of a classic two-part tariff whereby the RBOC can extract the entire consumer surplus, subject only to regulated rate limitations.

The addition of second phone lines by residential telephone subscribers for accessing online services has become a major source of revenue for the RBOCs. Building the facilities from the central office; aerial lines, buried cable, line equipment and the copper wire itself, involves very high initial costs. However in most homes today, the LEC provides capacity for more than a single line at the initial build out. Therefore the incremental cost of turning up a second phone line to a residential consumer is very low. The incremental switching costs of a second line are also low. Because the high cost switch hardware is already in place, adding additional residential lines simply requires upgrading switch software and perhaps the addition of additional line cards. In April 1996 Bell Atlantic reported their profits up by $56 million over the previous year's profits of $414.5 million. They credited the growing demand for modem lines for much of the growth.[13] In January of 1996, Bell Atlantic's Vice Chairman, James G. Cullen announced a 3.4% increase in access lines from the previous year. This increase includes 234,000 second lines for residential subscribers.[14] According to the following table found in the ETI report, in 1995, 44%

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[13] Will Rodger, "Online Revolution Boosts RBOC Profits, Interactive Week. April 19, 1996. http://www.zdnet.com.

[14] "Bell Atlantic Achieves Record Earnings Growth in 1995", Bell Atlantic Press Release. Jan 23, 1996. http://www.ba.com/nr/96/jan/1-23earnings.html

of additional residential lines installed were dedicated to online use (figure 4.). The data they use is gathered from FCC documents on industry wide distribution of residential phone lines. In 1995 the data indicates that 6,043,721 or 44% of the 13,890,593 second lines were dedicated to online use. With this in mind, the revenues collected from these lines must be included in any total cost figures of IOFs, as well as originating and terminating switch equipment, incurred for the purpose of terminating traffic to ISPs. An interesting correlation to the 44% of second lines, dedicated to online use, is the required 44% increase in IOF trunking estimated in the Bell Atlantic report.

Fig 4. Second Phone Line Statistics.[15]

Year	Households with Telephone Service	Additional Residential Lines	Estimated Additional Lines Dedicated to On-Line Use
1990	88,350,000	3,870,325	0
1991	89,379,000	6,537,450	1,311,024
1992	90,997,000	8,355,973	2,174,846
1993	93,036,000	8,845,773	2,385,085
1994	93,694,000	11,499,550	3,697,561
1995	94,233,000	13,890,593	6,043,721

Raymond W. Smith, in a speech delivered on February 2, 1996, estimated that 600,000 second lines would be sold in the Bell Atlantic region.[16] This 600,000 line estimate interestingly matches closely, the numbers presented in the Bell study's estimate of cost impacts to the PSTN. This can be illustrated by assuming a line-to-

[15] Lee L. Selwyn & Joseph W. Laszlo, "The Effects of Internet Use on the Nations Telephone Network", Economics and Technology, Inc. Jan 22, 1997.

[16] Speech as delivered Raymond W. Smith, to Emerald Asset Management,

customer ratio of 1:15, well within the ISP norm. The 40,000 lines which Bell Atlantic uses in calculating their $30 million in costs will provide sufficient lines between the switch and the ISP to serve 600,000 Internet subscribers.

(600,000 lines x 1/15 = 40,000)

Bell Atlantic's marketing projections and profit reports directly conflict with their switch study assertions of unrecoverable costs. In keeping with the RBOC's methodology, and using their own data, a cost recovery function, very different in appearance from that presented in the Bell Atlantic report, emerges. Simply including the monthly revenues generated from second phone lines dedicated to online use, a new cost recovery function is derived in figure 5. Due to the difficulty in identifying voice and data traffic on the PSTN, this calculation continues to exclude revenues generated from single line subscribers who also subscribe to the Internet. It further excludes any usage sensitive revenue, for calls to the Internet, not associated with the ISP lines or second subscriber lines, i.e. extended area charges or monthly and usage charges on residential ISDN. The non-recurring/installation fees account for an additional $17.7 million[17], thereby increasing the LEC yearly revenue to $79.8 million/year. Based on these figures, Bell Atlantic will make a 166% return on their $30 million dollar/year investment. The investment required to support ISP traffic is clearly not un-recoverable.

Feb 2, 1996. http://ba.com/speeches/2-2eam.html

[17] Based on tariffed PRI installation fees of $1400.00 per 24 lines (zero-mile)or $58.33 per line x 304,000 circuits.

Fig 5.

Given **600,000 second phone lines** *(based on Bell Atlantic's* sales projections)[18] and an estimate of 44% of second lines dedicated to online use (based on ETI statistics from 1995[19] and supported by Bell Atlantic's projections of IOF increase[20]), the estimated number of attributable second phone lines totals *264,000 lines.*

600,000 x .44 = 264,000 second lines dedicated to on-line use

264,000 lines @ $17.00/mo (based on Bell Atlantic's average tariff ***rate[21]) generate revenue of*** **$4.5 million/mo or $53.9 million/year**

40,000 ISP lines @ $17.00/mo generate revenue of ***$680,000/mo*** **or $8.2 million/year;** the revenues calculated by Bell Atlantic

Total Revenue Generated to LEC by ISP Traffic:

$53.9m + 8.2m = $62.1 million/year

*This figure does not include revenue generated through non-recurring charges.

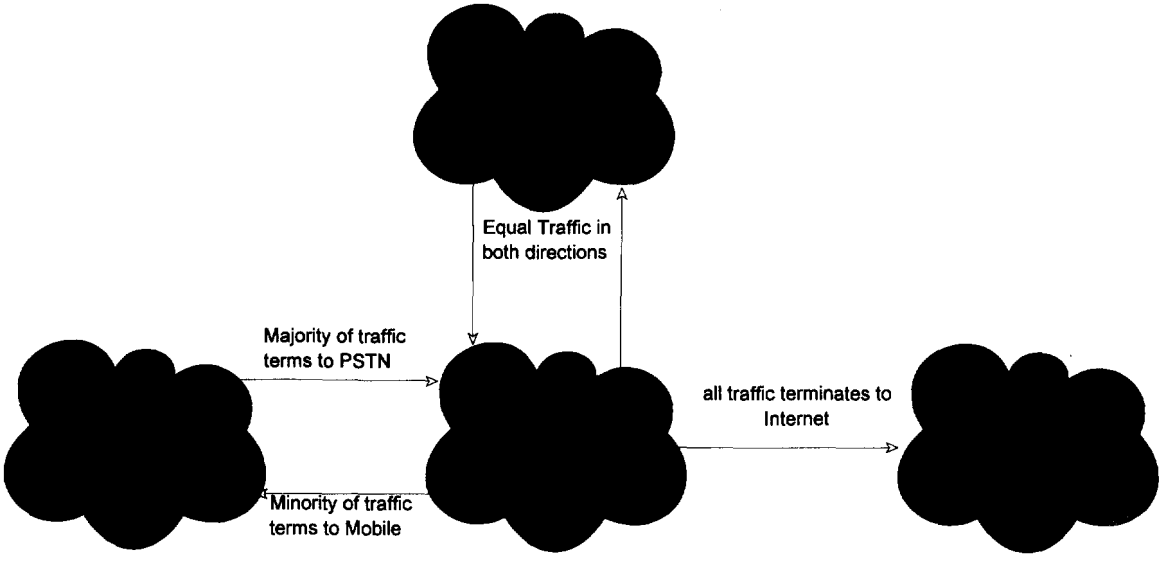
[18] Speech as delivered by Raymond W. Smith, to Emerald Asset Management, Feb. 2, 1996, http://www.ba.com/speeches/2-2eam.html.

[19] Lee L. Selwyn & Joseph W. Laszlo, "The Effects of Internet Use on the Nations Telephone Network", Economics and Technology, Inc. Jan 22, 1997.

[20] "Report of Bell Atlantic on Internet Traffic," March 1996, http://www.ba.com/ea/fcc/report.htm.
[21] "Report of Bell Atlantic on Internet Traffic," March 1996, http://www.ba.com/ea/fcc/report.htm.

Although academic, and beyond the scope of this paper, the new telecommunications act, and the controversy surrounding the ISPs' continued status as end-users, introduces additional questions regarding access fees. Should the ISP exemption be lifted and the ISPs be reclassified as telecommunications carriers, it could be argued that the RBOCs should be contributing to the maintenance of the Internet backbone network rather than receiving access fees from the ISPs. Diagram 3 depicts three different networks and the directionality of traffic on them. Given the uni-directionality of Internet traffic and the "mutual and reciprocal" recovery of transport and termination costs, outlined in the 96 Act[22], RBOCs would presumably be required to pay access fees to ISPs.

Diagram 3.



[22] Communications Act of 1934 as Amended by the Telecommunications Act of 1996; Sect 252 (d)(2)(A)(ii).

The extraordinary profits earned from second phone lines, indicates that the RBOCs are capturing a substantial amount of the consumer surplus associated with that line. This can be illustrated by breaking down the costs to the individual Internet subscriber. Given that a subscriber is willing to pay $19.95 for ISP access and $17.00 for a second line dedicated to online use, we can see that there is a total value of $37.00 per month for access to the Internet. The ISP, in a competitive market, and operating at or close to cost, must pass on a large portion of their revenues to the Internet backbone provider and the LEC, to cover the incremental cost of adding that subscriber. Conversely, the LEC is able to collect and keep all revenue from the second phone line. The RBOC essentially captures 45% of the subscriber's total value of having Internet access. It stands to reason that some of that surplus could be passed along to the Internet backbone provider to support the growth of their network. While economically feasible, the regulatory implications of this argument far exceed the stated parameters of this paper.

E. Emerging Technologies

The Bell Atlantic study concludes with a superficial examination of how the ESP exemption affects incentives for adopting new technologies that will relieve the pressure on the PSTN. These technologies include primarily packet switching solutions which involve high speed, high capacity digital subscriber loops. While these technologies look promising, they are still viewed as impractical by consumers and ISPs due largely to the prohibitively high costs. Furthermore HDSL, ADSL and ATM methods offer enormous capacity and speed but have not yet been widely

implemented by the RBOCs. These factors combine to prevent these technologies from reaching critical mass. Therefore, the RBOCs and the users are limited in their benefit from the kind of positive network externality, currently associated with switched services.

IV. Alternate Strategic Possibilities

It is clear that the RBOCs are aware of the revenue potential associated with the Internet. The phenomenal growth of the Internet over the last few years give the local providers incentive enough to employ strategic measures to ensure favorable field position in the telecommunications war that is bound to erupt. Raymond W. Smith, from Bell Atlantic, demonstrates the RBOC awareness of their strategic position in his remarks before Emerald Asset Management[23]:

> *I think the local exchange industry is in a uniquely advantageous position—perhaps the best position of anybody in the marketplace – to meet all of these market requirements and benefit from the insatiable consumer demand for connectivity and interactivity. The real challenge for us is identifying the profitable business opportunities in this vast and swelling digital ocean. If we do this successfully, we leverage the value of our most important asset: the telephone network itself.*

The leveraging of the telephone network is precisely what the RBOCs should want to do in order to maintain their monopoly power in local and extend their

[23] Speech as delivered by Raymond W. Smith, to Emerald Asset Management, Feb. 2, 1996, http://www.ba.com/speeches/2-2eam.html.

monopoly power to other lines of business. Given that the LECs are now getting into the ISP business, and given the enormous revenue potential of the Internet, the RBOCs have a substantial incentive to raise competitors costs. Imposing per-minute access charges would be an effective method of accomplishing this goal. Per-minute fees imposed on an industry that is already operating at or close to marginal cost, would be forced to pass additional costs to the consumers, resulting in a decrease in usage. James Love, from the Consumer Project on Technology points out that a decrease in usage due to usage based pricing is inefficient, leading to "*exactly the type of underutilization of the network that economic theory predicts from a monopoly.*"[24] The increasing demand for higher speeds and more bandwidth provides the LEC with a picture of the demand functions for varied local service offerings. Reducing output by delaying the widespread deployment of new technologies provides the RBOCs an opportunity to collect monopoly rents from high demand users; ISPs and Internet subscribers alike.

The stifling of competition is another method by which the LEC can maintain monopoly power in the local exchange market. The monopolist will spend a great deal to protect the profits it earns from its market position. This is evident in the tremendous efforts exerted by the RBOCs in generating network studies that help to justify their position with regard to access charges. The resources will have been well spent if the RBOCs succeed in their endeavor and find themselves the recipient

[24] James Love, "Reply Comments of CPT on Access Fee Reform", Before the FCC In the Matter of Access Charge Reform CC Docket No. 96-262. http://www.essential.org

of the lion's share of revenues sure to be generated by the Internet in the coming years.

With any firm acting rationally, whether monopoly or competitive, the decisions it makes are assumed to be in the best interests of the shareholders. With this in mind, there is a significant potential for the LECs to eliminate their competition through predatory pricing, thereby increasing market share. This can be illustrated in the recent marketing efforts of some of the RBOCs with regard to their new Internet offerings. At the recent FCC forum on bandwidth management on January 23, 1997, James Love of the CPT highlighted a promotion being run by PacBell whereby the purchase of a second phone line would provide the consumer 5 months of free unlimited Internet access. Given the highly competitive nature of the Internet, this is a promotion unlikely to be duplicated by the rest of the ISPs. Of this kind of promotion, James Love, of the CPT states; "*If a LEC owned ISP pays access fees to the LEC, it is simply moving money from one pocket to another. For non-affiliating ISPs, however, the access fees are real costs.*"[25] Furthermore the RBOCs' ability to make this offer sharply weakens their arguments that costs are not being covered in the provision of local services to ISPs, and that there is a significant level of congestion on the PSTN. A vertically integrated firm would not place the profit of a downstream product, ahead of the stability and viability of a common and essential

[25] James Love, "Reply Comments of CPT on Access Fee Reform", Before the FCC In the Matter of Access Charge Reform CC Docket No. 96-262. http://www.essential.org.

input. This contradiction is not unique to PacBell either. On their web page, Bell Atlantic offers a solution to congestion problems on the Internet through the purchase of a second phone line.[26] Again, Bell Atlantic's offer is one that can only be made by a vertically integrated firm. This in and of itself is not a bad thing; however, it indisputably contradicts the LECs' contention that ISP traffic, and the resulting congestion it generates, will inevitably cause the network to crash. Access fees or not, the key to the RBOCs' strategies would appear to be more closely tailored to the benefit of the shareholders rather than to the benefit of the consumers at large.

Foreclosure is another potential strategic mechanism by which the RBOCs can maintain monopoly control in the local exchange and extend their monopoly power into the Internet arena. Despite the passage of the Telecommunications Act of 1996, the local loop will remain a "bottleneck" for some time. The longer that control can be maintained the better the strategic position the RBOCs will enjoy if and when true competition emerges. Foreclosure involves the ability of the monopoly firm to deny access to the consumer by other firms, in an effort to extend monopoly power from a bottleneck segment to a potentially competitive segment. "*The foreclosure or essential facility doctrine states that the owner of such an essential facility has an incentive to monopolize complimentary or downstream segments as well*".[27] As we have seen, the growth of the Internet is spurring second line sales and Internet

[26] Bell Atlantic promotional material, http://www.getanadditionaline.com/
[27] Patrick Rey & Jean Tirole, "A Primer on Foreclosure", Feb 22, 1996.

access can be viewed as a value-added service to local telephone service. By this standard, Internet access is a complimentary segment; thereby the RBOC may seek to extend its monopoly power to this competitive segment.

The unwillingness to reveal true costs may yet be another motivating factor behind the RBOCs desire to have the ESP exemption lifted. It is generally agreed that access fees charged the IXCs far exceed marginal costs. The reasoning behind this is to afford the LEC the ability to subsidize service to high-cost areas. However, subsidization introduces a substantial barrier to entry in that it distorts entry decisions. Artificially low prices discourage efficient entry by potential competitors. In current arrangements, artificially low prices for subsidized services make it unprofitable for entrants to compete. By preventing the revelation of true costs, the LECs can effectively discourage entry into various markets now dominated by the RBOCs.

A final potential motive for the RBOCs position regarding access charges to ISPs is that of network externalities. With the ever-increasing integration of computers and telephony the value of having more users on a given network becomes even greater. This positive network externality will become even more significant with time as new lines of business open up and newer and more highly integrated services are offered. In a world of highly integrated computer and telephony applications, shifts in working trends toward the home and emerging technologies like Internet telephony and video conferencing over the Internet, the firm that controls access to the consumer can potentially gain control of the telecommunications industry as a whole.

V. Conclusion

While there may be reasons for the various regulatory bodies to further examine the issues of congestion and the distribution of network costs, a decision to impose usage sensitive charges on the ISPs is premature. The RBOC justifications for such fees as outlined in the Bell Atlantic study are flawed. Using Bell Atlantic's data it has been shown serious congestion let alone imminent network collapse are unlikely. Furthermore, it has been shown that the RBOCs make a substantial profit on their investments to support increasing Internet traffic.

The concept of charging ISPs for the termination of Internet calls raises more questions than it answers. The real cost to subscribers, ISPs and the telecommunications industry in general may be much higher than the cost of the access charge itself. If access charges are to be imposed it is important to ensure that a number of questions are answered first. 1) Will the cost to subscribers, industry players and regulatory bodies in metering usage outweigh the benefit of the fees collected? 2) In the event that facilities based competition emerges, will competitive providers be eligible to collect access fees? 3) If the competitive access provider is intermediate to the RBOC and the ISP, will the CAP pay access fees to the RBOC to have Internet traffic terminated to their network? 4) Would access charges provide incumbent LECs with unfair competitive advantages in light of

competitive goals set forth in the Telecommunications Act of 1996? 5) Would access charges provide the ILECs with incentives to deploy technologies that would bypass the network segments that generate access revenues? 6) With the imposition of access charges on ESP/ISPs, will there be a corresponding reduction in prices for consumers making local calls? These are but a few of the questions that will be debated as the controversial discussion on the ESP exemption continues. Ultimately the decision will rest on whether charging access fees to ISPs will have a negative impact on the development of the Internet, and the emergence of true competition that results in reductions in costs and increases in efficiency and innovation.

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