Connection Locations. Provision of multiple ISPs requires a determination of where the ISPs will connect to the cable facility. Several physical connection locations are possible, including: (1) the headend; (2) the regional data center; and (3) the national Internet backbone. Each location has advantages and disadvantages -- discussed below -- that are best weighed by the particular parties who have detailed knowledge of network architecture, physical plant capacity, and ISP needs.

Connecting at the headend can be accomplished by permitting ISPs to connect to the cable operator's CMTS.[233/] This option is likely to permit better performance of caching and traffic management systems, resulting in lower network architecture restructuring costs and may be more scalable.

However, there are drawbacks to connecting at the headend. First, the greater number of connection locations will increase operational problems as various ISPs seek physical access to facilities for installation, maintenance, and other functions. Many headends are unmanned and some even have restricted access times due to local zoning. Second, the number of ISPs that can effectively connect at these local sites, which typically have little spare floor space, may be more limited than at alternative connection locations.

Connecting at the regional or national level presents different concerns. Adding the aggregate ISP traffic loads at the regional or national level would require increasing regional network capacity, increasing the cost of overall network service. After all, each ISP's traffic must eventually arrive at the headend somehow. Moreover, caching and traffic management functions are more difficult to accomplish at higher levels. Aggregating the caching function at

[233/] Although it would be possible to assign each ISP its own channel, such an approach would soon consume much of the bandwidth used by the cable operator to deliver video programming. To prevent that result, the number of ISPs that could be accommodated on individually dedicated bandwidth would have to be severely limited.

the regional or network level forces the deployment of more expensive technologies, increases demands on the regional network system, and raises the potential for network congestion.

Bandwidth Management. Cable systems have a "shared" network architecture. Because bandwidth and CMTS resources are shared, what each ISP does affects every other ISP on the system. If one ISP launches a streaming service (long packets of data, music or video), it might block all of the other ISPs from using the bandwidth set aside for Internet access. If an ISP tries to offer an IP telephony service, another ISP could send enough packets to severely degrade the telephony quality. If one ISP's customers are using a disproportionate amount of bandwidth, the other ISPs' customers will have to share the remaining bandwidth, resulting in slower service. Within the protocol known as the DOCSIS 1.0 standard [234] there is currently no technical way to limit the amount of bandwidth that any individual ISP can utilize. Rather, it is up to the cable operator to manage that bandwidth by creating incentives for ISPs to limit their bandwidth use in reasonable ways.

One possible means of managing bandwidth is by measuring and charging for each individual data packet (and its priority) as well as the speed of that data on a cable pipe, enabling customers to choose their data speeds. The protocol DOCSIS 1.1, currently in the final testing phase, will enable the cable operator to set cable modems to operate at different speeds. A subscriber that wants more speed will be able to receive it. DOCSIS 1.1 will also permit large packets to be broken up into cells, each of which can be sent at different times and then reassembled at the receiving end CMTS or cable modem. This will prevent one large packet from occupying all available bandwidth at a given time and thus permit bandwidth to be shared more evenly and effectively among competing customers and ISPs.

DOCSIS 1.1 also allows the cable operator to set priorities, so that different ISPs can obtain brief bursts of "guaranteed" delivery, or obtain service at different speeds at different times, further enabling the cable operator to manage bandwidth use efficiently. For example, a system could be programmed so that requests for voice over IP service, which is more sensitive to delay and interference, can be prioritized and assigned higher speeds. Customers simultaneously using voice over IP and surfing the Internet (which is not as latency-sensitive) could receive service at two different speeds and levels of priority.

Although DOCSIS 1.1 offers significant advantages over DOCSIS 1.0, its introduction will not resolve all outstanding technical issues immediately. First, not all users will immediately upgrade to DOCSIS 1.1.[235/] The upgrade to DOCSIS 1.1 will also be extremely expensive. The transition will therefore be gradual, and many cable operators will continue using DOCSIS 1.0, which has no bandwidth management capability. Second, even DOCSIS 1.1 would not enable a cable operator to accommodate every ISP.[236/] Efficient cable bandwidth management is possible only if there are a reasonable number of ISPs using the network. Third, DOCSIS 1.1's prioritizing capabilities will raise new bandwidth management issues. In particular, difficult questions of which ISPs will have priority and how and when that priority is assigned will need to be resolved.

Traffic Management. Providing multiple ISPs on a cable system also raises new and possibly difficult engineering issues, including capacity management and traffic engineering

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[234] The Data Over Cable Service Interface Specification (DOCSIS) defines interface requirements for cable modems involved in high-speed data distribution over cable television system networks. DOCSIS 1.0 is in deployment and DOCSIS 1.1 deployment is imminent.

[235/] In fact, some older DOCSIS 1.0 modems cannot be upgraded to DOCSIS 1.1. Newer DOCSIS 1.0 modems allow for upgrades.

difficulties. The cable plant (in particular, the number of customers per node) has been physically designed in accordance with the cable operator's business plans and traffic assumptions. If an ISP implements a business plan that significantly alters that forecast -- by, for example, offering video streaming -- the traffic could well exceed the amount the system is designed to handle. This problem is exacerbated by the fact that each ISP will be signing up customers and launching services in a manner that will be kept secret from the other ISPs, and likely from the cable operator as well.

By interfering with the ability of cable operators to forecast usage accurately, multiple ISP service can have a detrimental effect on the cable plant's capabilities. All customers could experience slower connect times. In particular, unpredicted excessive traffic could cause significant problems for cable telephony, since excessive traffic leads to packet loss and an increase in jitter and latency, each of which could cause unacceptable impairment to cable telephony.

Operational Issues. Provision of multiple ISPs also raises complicated operational and logistical issues. The quality of each ISP's connection to its subscribers, whether created through policy based routing, tunneling, or MPLS-VPN (discussed below), will be of extreme importance to it. Indeed, the degrees of packet loss, delay, jitter, and other factors encountered will affect the ISP's perceived level of service by its customers. How will the quality of this packet transport be measured? Today there are few metrics and fewer tools to accomplish this. It is inevitable that some ISPs will request direct control over the network elements over which its packets are transiting. The owners of these network elements will object to this request because of their loss of network management control. These issues of coincident network

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[236/] The various technical trials of multiple ISP access to the cable system have demonstrated that the maximum number of ISPs that can be accommodated is in the range of seven to ten ISPs.

management in an environment of shared responsibility are only now being recognized, much less addressed. Customer care and network troubleshooting in the multiple ISP environment will be a challenge.

Billing/Office Support Issues. A host of billing and customer support issues will need to be resolved when multiple ISPs access the cable plant. Cable operator billing systems, many of which are newly installed and very expensive, are not designed to allow an MSO to bill an ISP for the ISP's customers. Further, the numerous capabilities of DOCSIS 1.1, allowing the cable operator to prioritize bits and deliver services at different speeds, presumably will all come with a different price tag, and billing systems would need to address these features, as well as integrate with the operator's provisioning systems. Business issues concerning whether the cable operator or the ISP controls certain aspects of the customer relationship, including assigning customer IP addresses and setting up service initially, also raise difficult technical issues. Finally, systems will have to be designed to address customer requests to terminate service or switch ISPs, to ensure that data are sent to the correct ISP and the proper parties are billed.

2. The Technical Difficulties Posed By Providing Multiple ISPs Would Be Exacerbated By Forced Access.

Government intrusion into the relationships between cable operators and ISPs would reduce the likelihood of a successful transition into a multiple-ISP environment. If cable operators and ISPs are allowed to negotiate free of government intervention, they will be able to work out business relationships that take into account the business plans and capabilities of each party. These arrangements will necessarily include technical solutions that enhance, rather than smother, those unique attributes. For example, cable operators and ISPs can establish mutually acceptable payment mechanisms that address heavy bandwidth use. They can negotiate the

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See n.232, *supra*.

sharing of traffic forecasting information so that the operator's and ISP's business plans (including plans for cable telephony) do not interfere with each other. They can also negotiate arrangements to utilize DOCSIS 1.1 prioritizing, and establish the terms for handling the customer relationship. In a forced access environment, however, where access to the cable plant is assured, the ISPs' incentives to reach agreement on these issues will be greatly diminished.

If unlimited numbers of ISPs are allowed access to the cable plant, it will also make it extremely difficult for any ISP to formulate an accurate business plan or incorporate any subscriber or financial predictions. Each time an additional ISP demands and obtains access to the system, the quality of service provided by existing ISPs would diminish, potentially driving away interested subscribers.

An example of a technical issue best left to private commercial agreement, rather than a government mandate, is the means of routing data between customers and ISPs. As described above, there are currently two technical ways to direct data from a customer's modem to the proper ISP network termination point: packet tunneling and source-based routing. Others, such as Multi-protocol Label Switching – Virtual Private Network ("MPLS/VPN"), are in development.[237/]

Although most operators have determined that tunneling is unworkable, it may work better for a particular cable operator-ISP connection, while other methods may work better in systems with different architecture. Still other cable operators may find that MPLS or an as-yet-undeveloped approach may harmonize best with the needs and design of their systems. If the

[237/] MPLS allows IP carriers to create virtual IP networks for each ISP that wishes to interconnect. This approach has several advantages: it does not require additional equipment; it scales better than other tunneling approaches since tunnels are established per ISP rather than per subscriber; and it can be used in conjunction with source-based routing at the ingress edge of the network to lend greater flexibility in implementation. However, it is a new, immature

government compels use of a certain technology or technological approach, however, such approaches may never be discovered or utilized.[238/] An example is Internet Protocol Version 6 (IPv6). This coming upgrade to the Internet brings with it a needed increase in address space, as well as other capabilities such as auto-configuration which network and cable operators will need the flexibility to deploy. Mandating connection technologies could severely hamper this aspect of Internet progress. If all relationships are forced into a particular technical mold, the result may very well be unworkable, or at the very least, impractical, for any number of those involved, which can only harm the nascent broadband industry.

3. Forced Access Would Require Substantial Government Oversight To Resolve Technical Concerns.

In addition to forcing creatively-structured relationships into a one-size-fits-all mold, a forced access regime would require continuing substantial government involvement in the technical area. If cable operators and ISPs are forced to enter into business relationships, the government, not mutual contract, will become the enforcement tool. ISPs (particularly, as discussed above, those using more than their pro-rata share of bandwidth) will have less incentive to cooperate with each other or with the cable operator to ensure that they do not exceed a reasonable amount of bandwidth usage or cause other technical problems, since liability will be determined later, if at all, through government process. These ISPs will be competing heavily for customers, and that environment will further create perverse incentives for ISPs to forego resolving these issues cooperatively. As a result, implementation of a forced access

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technology, which will need time to gain acceptance. Government dictate of an existing approach would eliminate this possibility.

[238/] Dictating a particular technological approach also directly affects and determines the "winners" and "losers" among those who manufacture and provide the necessary equipment for ISP access. This perhaps unintended result also is both unwarranted and unwise at this early stage.

regime would require the government to institute extremely detailed mechanisms to prevent this type of behavior. As discussed above, such regimes would be extremely complicated, unprecedented, and costly.

4. Cable Operators Are Conducting Technical And Operational Trials That Will Enable The Provision Of Multiple ISPs To Customers.

Cable operators are devoting substantial time and resources to conduct technical and operational trials to test how multiple Internet service providers can offer cable modem service over their networks. As discussed above, AT&T Broadband has commenced a 500-customer trial involving eight ISPs in Boulder, Colorado; AT&T has announced plans to conduct similar trials in Massachusetts in 2001; Time Warner is conducting a trial in Columbus, Ohio that connects unaffiliated ISPs to Time Warner's cable system in that area; and Comcast has announced a third-party technical trial. The myriad technical issues involved with multiple ISP access are being studied as part of the trials. These results will lead to competitive choice in ISPs for cable customers without the need for forced access. The trials themselves demonstrate that government-mandated access is unnecessary as well as unwise.

B. Requiring A Technically Or Commercially Unreasonable Level Of "Openness" Will Harm The Development Of The Broadband Industry.

As the FCC has observed, there has been no agreed-upon definition of "open access" advanced by proponents of cable modem service regulation.[239/] For this reason, perhaps, the Notice asks how "open" a network should be, and what steps the Commission should take to

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[239/] *See Notice* ¶ 27 ("Currently, there is no universally accepted definition of 'open access'"); BROADBAND TODAY, at 38 ("despite a flurry of national and grass roots activity concerning 'open access,' our panelists [the business, government, and public interest advocates that the FCC consulted] were not able to agree on a single workable definition of the term, much less recommend an appropriate regulatory classification and enforcement mechanism.").

ensure sufficient "openness."[240/] Viewing the question in this way, particularly while so many technical issues are yet to be resolved, will only lead to industry paralysis on the issue, as it has in Canada. Regardless of whether the Commission believes that complete "openness" (whatever that may mean) is desirable -- and as discussed above, it is not at all clear that unlimited openness is a desirable or achievable policy goal -- requiring a level of "openness" that exceeds current technological ability will only delay progress in this area.

The Canadian forced access experience provides compelling evidence of the regulatory complications that arise from premature, overreaching regulation. As discussed above, despite having mandated "open access" nearly five years ago, Canadian cable television companies do not appear to be any further along in accommodating multiple ISPs than American cable operators that have been permitted to respond to market forces. Although the CRTC has approved the rates and terms for the provision of high-speed Internet access services by the four large cable carriers (Cogeco, Rogers, Shaw and Videotron) to ISPs, no ISP has requested access under the terms of the CRTC Order. Rather, the ISPs appear to be waiting for the resolution of a large number of technical issues that still remain outstanding, such as how and when to exchange traffic forecasting and other network-related information; how and when to disconnect an end-user's service; how to obtain customer authorization to switch ISPs and whether anti-"slamming" mechanisms are necessary; how billing procedures will be carried out; and how to define the connection interfaces between the cable network and the ISP network.[241/] The CRTC has

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[240/] *Notice* ¶ 41-42.

[241/] *See* CRTC Industry Steering Committee, Task Identification Form (Nov. 30, 2000) (discussing several technical issues facing the Steering Committee with respect to cable modems such as modem compatibility and certification); CRTC Industry Steering Committee, Task Identification Form (Nov. 30, 2000) (listing network operations issues that have resulted from a forced access regime such as network management guidelines and the vast details behind forecast information exchanges); CRTC Industry Steering Committee, Task Identification Form (Nov. 30, 2000) (raising business processes issues such as customer transfers, a mechanism for

established an "Industry Steering Committee" to study these issues. As U.S. cable companies proceed with their trials, Canadian forced access appears to be at a standstill and the future holds the certainty of grinding technical and service regulation designed to curb the monopoly power of the incumbent local telephone company.[242/]

As the Canadian experience illustrates, the imposition of a forced access requirement would inevitably embroil regulators and the affected industries in ongoing and contentious proceedings to adjudicate a range of technical, operational, and pricing issues. Requiring a technically or commercially unreasonable level of "openness" serves no purpose but to harm the continued development of the broadband industry.

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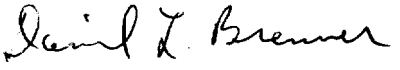
resolving slamming disputes and terms of service violations, and how to deal with cancellation notifications); CRTC Industry Steering Committee, Task Identification Form (Nov. 30, 2000) (examining issues regarding points of interconnection to the cable facilities).

[242/] Premature attempts at multiple ISP access in the United States also led to failure. For example, as discussed above, despite the tremendous publicity that the GTE trial in Clearwater, Florida generated, GTE never implemented the "Clearwater solution" even on its own cable systems or extended the experiment beyond the trial phase.

CONCLUSION

For the reasons set out above, the Commission should find that there is no legal or policy basis for government-mandated access to the cable modem platform. Further, it should reiterate its belief that regulatory restraint best ensures the competitive development of the nascent broadband industry and refrain from initiating a rulemaking to address multiple ISP access to cable systems.

Respectfully submitted,



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ATTACHMENT A

The Incentives of Cable Operators to Carry Multiple ISPs

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December 1, 2000

*The *curriculum vitae* of the authors are in Attachment 1 to this report.

1. Introduction.

In its Notice of Inquiry,[1] the Commission seeks comments on "the appropriate legal and policy environment for cable modem service and the cable modem platform...."[2] In particular, the Commission asks "whether market-based approaches are sufficient to achieve the level of access by ISPs to the cable modem platform that the Commission determines is appropriate."[3] This paper explains why there are strong financial incentives for cable operators to allow unaffiliated ISPs onto their systems. Because the number of customers who purchase cable modem service depends on the value of that service to them, cable operators must offer these customers a service that they value highly, including an appropriate variety of ISPs from which they may choose. Moreover, competition from other providers of broadband Internet access places additional pressures on cable operators to offer a wide range of ISPs to their subscribers in order to prevent them from employing, or switching to, these alternatives. Consequently, government intervention to deal with any perceived market failure in this regard does not appear to be justified.

In analyzing the offering of multiple ISPs by cable operators, the Commission must recognize two important characteristics of this business. First, as the Commission has stated, competition to provide high-speed Internet access to consumers will exist among a number of "different network architectures and transmission paths, including copper wire, cable, terrestrial wireless radio spectrum, satellite radio spectrum, or a combination of these and other media."[4] Because broadband access to the Internet over cable is not a separate market, any action that the Commission adopts affecting the cable operator's choice of how many ISPs to offer must be made with the recognition that other technologies will compete to provide this service to consumers.

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[1] *In the Matter of Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, GN Docket No. 00-185, Adopted: September 28, 2000, Released: September 28, 2000 (henceforth "NOI").
[2] NOI, para. 14
[3] NOI, para. 35.
[4] NOI, para. 7.

Second, providing high-speed Internet access to residential customers is a nascent business. There is considerable uncertainty about which services consumers will desire, how much they are willing to pay for these services, the relative advantages and disadvantages of the various technologies in providing these services, and the costs of the various alternatives. Although some consumers are experimenting with alternative technologies and services to determine which ones best meet their needs, the vast majority of the users who are projected eventually to take these services are still waiting on the sidelines to see how these technologies and services develop. This observation suggests that the Commission should take a cautious approach in imposing regulation on cable modem service. Moreover, because many of these competing alternatives have just begun to be offered, the numbers of customers currently served by each may provide a poor indication of the competitive pressure that they will impose on cable operators in the near future. It is important, therefore, that the Commission take these facts into account when evaluating the costs and benefits of various regulatory options.

2. Cable operators have strong incentives to offer unaffiliated ISPs to their subscribers.

Because they face competition from other broadband platforms, both developed and perhaps yet to be developed, and because most would-be customers of broadband Internet access have not yet purchased such access, cable operators have strong incentives to offer their customers the packages of services promising the largest net benefit. This is because customers will choose among competing Internet access providers based on the value of services they provide. If artificially limiting the availability of unaffiliated ISPs reduces the value of the services offered by a cable operator to some of its potential customers, it increases the likelihood that these customers will choose service from a competing high-speed access provider. Such lost customers represent forgone profits that the cable operator could have earned, since the operator would have shared in the revenue earned by the unaffiliated ISPs to which these customers would otherwise have subscribed.

In addition, to the extent that these consumers choose other services from their high-speed access provider, the losses to cable operators are not limited to their lost profits from selling high-speed Internet access to consumers. For example, if a consumer takes high-speed access from, say, a satellite provider, the cable operator may lose the opportunity to sell video services to that consumer. Similarly, a consumer who takes high-speed access from the telephone company may be less willing to purchase cable telephony service.

The incentives of a cable operator to offer multiple ISPs to their subscribers are most easily seen in the case of a cable operator that does not have an affiliated ISP. In this case, the operator's profit from providing high-speed service is derived solely from the revenues generated by the subscribers attracted by the unaffiliated ISPs available on the cable system. The more ISPs the operator provides to its subscribers, the more customers will be attracted to the system and, thus, the greater profits the cable operator will earn. As we demonstrate below, the opportunity to earn these profits continues to create strong incentives for the operator to provide its subscribers with multiple ISP choices even if the cable operator is affiliated with an ISP.

2.a The fallacies of the incomplete analysis.

The typical, but flawed, explanation of why a cable operator that is affiliated with an ISP might discriminate against unaffiliated ISPs is the following. Suppose that the operator sells ISP services to its customers at a positive margin. Suppose, further, that customers could choose to purchase either the operator's ISP service or that of a competitor. If the cable operator were not to make available a competing ISP service, it would likely sell more of its own service than if the competitor's service were available. Since ISP services are sold at a positive margin, selling more units to this group of customers results in greater profit. Thus, it is argued, the cable operator will choose not to offer competing ISP services in order to sell more of its own service.

The flaw in this explanation is that it assumes the number of broadband customers of the cable operator is fixed when, in fact, the number of such customers is likely to be determined by the array of ISPs made available by the operator. By offering its customers a wider variety of ISP services, the operator increases the number of customers

that it serves, and therefore the profits it earns from the subscribers attracted by the unaffiliated ISPs. The opportunity to capture these profits offsets any incentive the cable operator may have to exclude unaffiliated ISP rivals. Indeed, if a wider variety of ISPs is available on other broadband platforms, the cable operator's loss of customers, and thus the lost profits from subscribers preferring unaffiliated ISPs, will be especially great.

2.b The complete analysis.

2.b.i. The cable operator loses profits by offering only its proprietary ISP service.

Much of the debate surrounding multiple ISP offerings on cable systems seems to presume that cable systems have a monopoly (or near monopoly) of the broadband platform. Such a characterization is far-fetched. But even if cable systems did possess monopoly power, excluding rival ISPs from a cable system would not likely generate the most profits for the cable operator. [5] This is because some customers will not subscribe to the cable operator's broadband service – or will be only willing to pay a lower price for it – if their only option is to use the cable operator's proprietary ISP. As Whinston has generally observed:

> The key point is that with complementary products used in fixed proportions, the monopolist can actually derive *greater* profits when its rival is in the market than when it is not because it can benefit through sales of its monopolized product from the additional surplus that its rival's presence generates (due to product differentiation). [6]

The intuition behind this result is the following. The cable operator can earn profits either by providing retail ISP service directly to customers or by selling broadband

[5] While the incentive to exclude may be greater for providers that face some competition, the availability of non-cable broadband alternatives to which the ISPs can turn in the event of exclusion is likely to be sufficiently widespread that cable operators will lack any incentive to engage in exclusionary behavior. We discuss this in greater detail below.

[6] See Michael D. Whinston "Tying, Foreclosure, and Exclusion," *American Economic Review* 80, 4 (1990), p. 850, emphasis in original. Whinston's statement is more restrictive than it need be since the conclusion does not require fixed proportions. The statement is true whenever the cable operator can earn as much profit by offering unaffiliated ISPs to its subscribers as it earns by selling its proprietary ISP service.

service in conjunction with unaffiliated ISPs that serve those customers. If, for any given number of cable modem customers, the cable operator earns the same profit from the sale of unaffiliated ISPs as from offering its customers only its affiliated ISP, then the cable operator will be indifferent between these alternatives. Moreover, because we have assumed, counterfactually, that the cable operator controls the sole broadband platform, it will have the ability to strike deals with unaffiliated ISPs that ensure this outcome. However, if, as is certainly the case, carrying additional services increases the number of customers that purchase cable modem service – because different customers prefer different ISPs – then offering unaffiliated ISPs to its customers necessarily increases the operator's profits.

The premise that a cable operator will be the sole or most important provider of a broadband platform is inconsistent with both the current and future state of high-speed competition. When facing competitive access providers such as DSL and satellite, the cable operator's incentives to include unaffiliated ISPs are much stronger than if it were a monopoly provider of broadband Internet access to consumers. If customers are relatively indifferent about whether they receive their service over cable, DSL, satellite, or some other medium – that is, they care more about which ISP they use than they do about how that ISP provides broadband access to them – then the cable operator will have no incentive to anticompetitively choose not to offer unaffiliated ISPs to its subscribers. This is because these customers will tend to follow their preferred ISP to some other broadband platform if that ISP is not available via cable. Indeed, a cable operator that can earn greater profits by giving subscribers a choice of ISPs has an affirmative incentive to offer the services of unaffiliated ISPs to its customers.

The idea that a cable operator that offers only a single ISP will lose customers relative to the customers it would serve if it offered more than one ISP, and thus reduce its profits, has been noted by economists for some time.[7] More recently, Professors Riordan and Salop have observed that

> The impact on profits from lost input sales is relevant to evaluating the incentives for the integrated firm to attempt input foreclosure...The upstream division [of the integrated firm] may

[7] See Richard A. Posner, *Antitrust Law: An Economic Perspective*, Chicago: University of Chicago Press, 1976, p. 198.

> lose so many input sales that the input market revenue lost exceeds the higher revenue on input sales retained plus the increased profits to the downstream division [resulting from foreclosure].[8]

The economics of this situation are straightforward. Suppose that there are multiple providers of broadband services to residential customers. These may include the cable provider offering cable modem-based access, several competing DSL providers, and satellite-delivered and terrestrial wireless services. Suppose, in this situation, that the cable operator were to limit the services available to its customers by choosing not to offer other ISPs, and that customers (as noted above) care more about the availability of a particular ISP than they do about the nature of the "pipe" over which they receive the service. In this case, a customer deciding from whom to purchase high-speed access will choose the service that provides the best value. Since, by assumption, the cable operator offers only its proprietary ISP service, it will tend to serve only customers who prefer that service. Customers who prefer other ISP services will tend to purchase them from a competing platform provider, such as a DSL operator using telco facilities, or a satellite operator. Thus, offering only its own ISP service likely will reduce substantially the number of high-speed access customers that the cable operator can serve, and thus likely will reduce substantially the profits it can earn from selling high-speed services.

The important point is that in choosing not to carry unaffiliated ISPs, cable operators cannot force cable customers to purchase the cable operator's proprietary ISP service. Rather, if customers have no strong preference for the method by which they obtain high-speed access, many customers will forsake the cable system in favor of another provider that offers the ISP they desire.

The incentive to offer unaffiliated ISPs is even greater if we consider that the competition a cable operator faces extends beyond Internet access. The principal source of cable operator revenue is, and will remain for the near future, the sale of video programming, and cable operators face increasing competition from satellite providers and overbuilders in the provision of this service. Attracting additional high-speed access

[8] Michael H. Riordan and Steven C. Salop, "Evaluating Vertical Mergers: A Post-Chicago Approach," *Antitrust Law Journal* 63, 2 (1995) p. 532.

customers provides cable operators with an additional opportunity to attract new video customers (or deter existing video customers from switching to a competitor). Specifically, a customer who is currently purchasing programming from a satellite operator and high-speed access over DSL might be persuaded to subscribe to cable if the cable operator could provide a one-stop shopping combination of cable programming and Internet service that better meets his needs than does the service he is currently purchasing. The cable operator would have a better chance to win such a customer if it were to offer the customer access to his favorite ISP, rather than limit its offerings to its proprietary ISP. The incentive to win such a customer is likely substantial since winning new customers (or retaining existing customers) means that the cable operator not only earns its margin on the sale of services of unaffiliated ISPs, but also its margin from providing the video service. The same argument holds for other services that the operator might wish to offer, including cable telephony.

2. b. ii. Forecasts indicate that other delivery mechanisms will provide viable alternatives to cable access.

The incentives for cable operators to allow unaffiliated ISPs onto their systems are most apparent when there are competing high-speed access suppliers. As we noted above, the provision of broadband access to consumers is at an early stage of development and, therefore, there is no firm historical data upon which to compare the relative acceptance levels of DSL, cable modem service, and other types of broadband access. However, there are strong reasons to believe that DSL and other access methods will provide sufficient competition to eliminate any incentives cable operators might have to limit ISP availability in a way that harms customers.

Most importantly, a number of independent studies forecast that both DSL and satellite will provide competing alternatives for Internet access to residential customers. An average of the forecasts from these studies indicates that by the year 2002, virtually the same number of customers will obtain their high-speed access through DSL and satellite service combined as will receive it via cable modem service. [See attached Table 1.] Moreover, these forecasts indicate that the combined share of customers

obtaining high-speed access over DSL and satellite will exceed the share that employ cable modem service in subsequent years.[9]

The implication of these forecasts is clear. First, as the use of broadband access expands in future years, cable operators will face even stronger competition from other providers of Internet access and content than they do at present. Thus, cable operators are unlikely to be able to restrict artificially the availability of ISP services to their subscribers without losing substantial numbers of customers to competing broadband providers that offer superior service.

Second, even in 2002, when it is predicted that roughly 16 million customers will employ some form of high-speed Internet access, some 46 million customers will continue to receive access though traditional dial-up modem service. The existence of these potential high-speed access customers provides a strong incentive for a cable operator not to discriminate against ISPs in a way that harms these customers. This is because offering a variety of ISPs to its subscribers will increase the operator's profits. Specifically, dial-up service customers are those who do not currently find the benefits of high-speed Internet access sufficient to warrant its expense. An important way for a cable operator to attract more of these customers to its cable modem service is to increase the benefits that customers enjoy from taking the service. By offering a wide variety of unaffiliated ISPs, a cable provider can increase the benefits from using cable modem service and therefore the likelihood that it will attract dial-up customers to its high-speed service.

The Commission reached the same conclusions as the forecasts cited above on numerous occasions. In evaluating recent license transfers involving cable operators, the FCC declined to impose open access on AT&T as a condition of the AT&T/TCI merger in large part because of "increasingly rapid deployment of alternative high-speed Internet platforms."[10] Similarly, when evaluating the AT&T/MediaOne merger, the Commission found "insufficient evidence to support the imposition of an 'open/forced access' requirement on the merged entity at this time, given the potential for competition from

[9] Of course, the ability of cable to meet these forecasts depends on the services it offers to its customers.
[10] NOI, para. 12.

alternative broadband providers and the potential for unaffiliated ISPs to gain direct access to provide broadband services over the cable infrastructure."[11]

The Commission reached similar conclusions when reporting on the deployment of broadband facilities. In the *First 706 Report*, the FCC found that there are "a large number of actual participants and potential entrants in this market."[12] In the latest 706 report, the Commission "conclude[d] that the deployment of advanced telecommunications capability to all Americans is reasonable and timely at this time. Providers are rapidly building out the infrastructure for two major types of advanced services—DSL services and cable-based services. Large scale entry by other providers deploying fixed wireless and satellite technology is also likely."[13]

2.b.iii. The forecasts that other high-speed Internet access technologies will compete effectively with cable modem service are consistent with the cost structure and regulatory environment of these alternate technologies.

The forecasts and conclusions reached by the FCC cited above that there will be multiple competitive high-speed platforms are consistent with the current cost and regulatory structure for DSL service. ILECs themselves can sell DSL service to rival ISPs. Alternatively, data CLECs can acquire the necessary broadband facilities from the ILEC at regulated prices. As long as regulation is sufficiently effective, data CLECs can provide themselves with DSL functionality at cost and so compete with ILECs in providing access services to ISPs which, in turn, can compete with cable-affiliated broadband service.

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[11] *Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from MediaOne Group, Inc., Transferor, To AT&T Corp., Transferee*, 15 FCC Rcd 9816 ¶ 127 (2000) ("*AT&T/MediaOne Merger Order*").

[12] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, 14 FCC Rcd 2398, 2449 ¶ 48 (1999) ("*First 706 Report*").

[13] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, *Second Report*, FCC 00-290, ¶ 204 (rel. Aug. 21, 2000) ("*Second 706 Report*").

In addition to the availability of DSL to broadband ISPs, analysts' forecasts that wireless operators will also provide an alternative means of high-speed access are consistent with current developments in LMDS and MMDS delivery. For example Winstar, Teligent, Advanced Radio Telecom, and XO Communications are all providing high-speed access to consumers via LMDS "wireless loops," while Sprint and MCI have invested billions of dollars in facilities to provide high-speed access via MMDS. Together these firms have facilities that reach about 72 million homes.[14]

Recent developments in satellite services are also consistent with such forecasts. In February 2000, EchoStar signed a deal with Gilat to provide a two-way broadband service to the home via satellite dishes called StarBand. Hughes Network Systems also offers consumers its DirecPC service for high-speed Internet access.[15]

Finally, in the absence of any significant content especially tailored for broadband delivery, dial-up access will continue to impose a significant constraint on broadband pricing. That the provision of dial-up access is available to all ISP entrants is evidenced by the thousands of small ISPs that continue to offer access to the Internet across the country.

The point of these examples is that there are many ways for ISPs to reach customers. Thus, there is no need at this point to single out cable technology for regulatory restraints. The business of providing high-speed access is still nascent, and the competitive effectiveness of alternative access technologies is unlikely to be accurately reflected in current market shares. All forecasts indicate these alternatives will become even more competitively significant in the near future.

2.b.iv. Access to the Internet does not exhibit network effects that would impede the development of these alternative access technologies.

Neither high-speed access to the Internet, nor access to any specific ISP, exhibits any significant network effects that would impede development of broadband platform

[14]See *The State of Broadband Competition*, March 2000, Kagan Media Appraisal, p. 16.
[15] Id, p. 18.

competitors. Network effects occur when the value to one customer of purchasing a service increases as additional customers purchase the same service. [16] This can occur for two reasons. The first is that customers of the same service want to interact directly with each other, and the more potential customers with whom to interact, the better off is each customer, as in the case of telephone service. The second is that, if many customers purchase a service, third parties will be more inclined to produce complementary products for the service, as in the case of applications programs produced for users of the same computer operating system.

Neither of these conditions exists with respect to either cable modem service or subscription to a specific ISP. Although there may be network effects associated with Internet access (such as email and chat rooms), these effects are not associated with a specific ISP or technology used to access the Internet. For example, regardless of the ISP a consumer selects, he can still send and receive emails from anyone with an Internet email address, and even if the ISP does not offer email, portal sites on the Internet (such as Yahoo! and MSN.com) do. Similarly, the viability of small ISPs suggests that chat is not a major generator of network effects, perhaps because there are so many Web sites that permit users of any ISP to create or participate in a chat room with other users of any ISP.

There is also no reason to believe that applications will be written especially for the cable modem platform, as opposed to DSL, wireless, or satellite platforms. It is our understanding that broadband content, like narrowband content, will be provided using the TCP/IP protocol. If this is true, then broadband applications will be equally available for all platforms.

2.b.v. Switching costs are unlikely to be a significant factor in the development of broadband competition.

Some have alleged that there are "lock-in" effects with respect to cable modem service that could limit the development of alternative access technologies to home premises. A lock-in effect occurs when a customer has purchased one good or service

[16] See the Symposium on Network Externalities, *Journal of Economic Perspectives* 8, 2 (1994), pp. 93-150.

and will have to incur a large cost in order to switch to a competing good.[17] Applying this to cable modem customers, a lock-in would occur if, once a customer chose cable modem service, he would incur significant additional costs if he then chose to switch to another platform, such as DSL.[18]

However, as noted above, since relatively few Internet users currently purchase broadband service, either from cable operators or other providers, there are currently very few locked-in customers even if a lock-in effect were important *ex post*.[19] Because the vast majority of potential broadband access customers will be "in play" for a long time, cable operators would not be able to exploit their putatively locked-in customers without severely reducing their ability to compete for customers that are not locked-in. In short, consumer lock-in cannot be an important consideration in this early stage of broadband development.

3. Cable operators are now beginning to offer multiple ISPs as more certainty develops about technology and demand.

The previous discussion explains why cable operators have a financial incentive *not* to limit the number of ISPs offered. The availability of DSL and other broadband distribution platforms will very likely deter any attempts by a cable operator to use an exclusionary strategy to disadvantage ISPs that rival a cable operator's "favored" ISP. In addition, because of the very limited amount of broadband-specific content, narrowband distribution is likely to remain a significant competitive constraint on the pricing of cable modem service for the near term. Thus, there is no anticompetitive reason for a cable operator to exclude ISPs from its system.

Until recently, of course, @Home and Road Runner were the only broadband ISPs offered to many cable subscribers. The MSOs that provided financing to these two

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[17] See Paul Klemperer, "The Competitiveness of Markets with Switching Costs," *RAND Journal of Economics*, 18, 1 (1987) pp. 138-150.

[18] Note that a cable subscriber would not be locked-in by the initial cost of a cable modem. Rather, lock-ins are caused by additional costs of switching away from cable modem service to some other service.

[19] To be clear, we are not saying that lock-in effects in a more mature broadband service would be substantial. We are saying that, even if they were, so few customers are currently purchasing broadband service that whatever lock-in effect might exist cannot have significance for the competition between cable modems and other forms of broadband delivery.