

Pluralism of Networks and
Pluralism in Regulation:
The Next Issues in Network
Interconnection

Eli M. Noam

Do not quote without permission of the author.
c May, 1988. Columbia Institute for Tele-Information

Columbia Institute for Tele-Information
Graduate School of Business
809 Uris Hall
Columbia University
New York, New York 10027
(212) 854-4222

Eli M. Noam is a Commissioner on the New York State Public Service Commission. He is on leave as Professor at the Columbia University's Graduate School of Business School, where he also served as Director of the Center for Telecommunications and Information Studies.

The author is grateful to Bruce Egan, Larry Darby, Mark Jameson, Sanford Levin, Robert Pepper, Ken Robinson, Lee Schmidt, Ernest Ting, and especially to Thomas Aust for their assistance. No views expressed in this article should necessarily be attributed to their comments, their institutions, or to the New York State Public Service Commission.

Introduction

Two basic forces shape change in today's telecommunications' networks:

- a) the integrative forces of technology which push towards ISDN and integrated broadband networks, and which raise barriers to entry;
- b) the social and economic forces of pluralism, which move the network towards a decentralized and segmented federation of sub-networks.

The tension between these forces is most pronounced on the front where they intersect: the rules of interconnection of the multiple subnetworks into the integrated whole. Such interconnection is an extension of traditional common carrier principles from users to networks. In coming years policy makers must structure ways in which network interconnection is granted, defined, policed, priced, and harmonized. Specifically, "Open Network Architecture" rules must be formulated in proceedings presently before the FCC and several states. A host of questions must be dealt with, involving technical standards, national uniformity, international collaboration, and the nature of the decision-making process in telecommunications policy itself.

Regulatory structure in telecommunications has paralleled the stages of the industry itself. The monopoly stage of industry structure was accompanied by the regulatory stage of price and profit regulation. The breach of monopoly was tracked and sometimes facilitated by regulation focusing on industry

structure. We have now reached the next stage, in which the network is rearranged from a centralized star-like structure into a matrix of interconnected but decentralized networks. This moves the focus of regulation to encompass, besides traditional consumer protection, also a networks-protection -- mediating, where necessary, the interaction of the various carriers, network operators, users, and equipment manufacturers. The key regulatory issue of this new network system is interconnection. Over the next few years, the main regulatory decisions that will shape the network of the future will be in this area. "Open Network Architecture" is the main regulatory battle ground on which the rules of interconnection will be set.

This chapter argues that pluralism is the key concept of future telecommunications -- both in terms of the shape of the network itself, as well as for the process of policy formulations. It discusses the reasons why the traditional centralized network system is disintegrating; it then identifies interconnection as the key regulatory issue of a pluralist network; specifically, it discusses problems associated with Open Network Architecture interconnection; and it shows how the states must be intimately involved in these issues, unless one wants to do away altogether with meaningful state regulation of telecommunications. Finally, it proposes a framework for decision-making for interconnection issues, both on the inter-governmental and the inter-industry levels.

Background

Interconnection was a policy issue from the moment that the original Bell patents expired in the late 19th century and rival carriers emerged. AT&T re-established control by preventing interconnection of rival local networks into its own local networks as well as longlines. It took a strong Justice Department challenge and its resolution in the so-called Kingsbury Commitment of 1913 to resolve these issues and assure interconnection. The system was stable until the late 1960s, when its restrictiveness to change was successfully challenged, first for equipment interconnection (Carterfone, 1968) and later for the interconnection of rival long-distance companies (Execunet, 1977). AT&T dragged its feet in assuring easy interconnection to its competitors, and this became a major factor in the government anti-trust law suit and At&T's subsequent dismemberment. At the same time, issues of software network interconnection were being considered in the FCC's Computer Inquiries I (1971), II (1980), and III (1985). Critical issues were, among others, the conditions under which AT&T and later its successor companies could provide enhanced telecommunications services. A policy emerged which required them to provide non-discriminatory interconnection to other enhanced service providers as a condition for their own right to supply such services. The companies were also required to establish fully separated subsidiaries. This condition was relaxed in Computer III, but the Bells and AT&T had to establish

Open Network Architecture (ONA) arrangements (to be preceded by a preliminary stage of Comparably Equal Interconnection, CEI) that specified interconnection arrangements to the core of local networks, the local exchanges. To make such arrangements meaningful, they had to provide for the unbundling of the elements of these exchanges, such as basic switching, call forwarding, etc. ONA, in concept, aimed at permitting separate access, interconnection, substitution, and competition with each of the basic elements of the exchange. It sought to provide greater ease in establishing layers of software defined networks superimposed on the basic transport functions. ONA Draft plans had to be submitted by February 1988.

The entire 20-year policy sequence of opening the network was virtually totally controlled by the federal level of government -- FCC, Justice Department, Judge Greene, and the D.C. Court of Appeals. The states, through their public utilities commissions (PUCs) fought a long string of losing defensive battles.

Now, with Open Network Architecture on the policy agenda, two interrelated questions were raised:

(a) What kind of rules should there be for local exchange interconnection?

(b) Who should set such rules?

These questions are interrelated, because an allocation of regulatory competency to a particular governmental level can be outcome-determinative in terms of policy. For example, leaving

corporation statutes to the states has led to some inter-state rivalry for incorporations, led primarily by Delaware, and over time this has brought about a marked relaxation of restrictions on corporate management. But the two questions -- substance and jurisdiction -- are also philosophically interrelated. Open Network Architecture as a concept of liberal local exchange interconnection is a continuation of strengthening the values of decentralization, openness, and reduction of hierarchy. As a regulatory concept, it was not demand-driven, but was put on the agenda as a conscious philosophical choice by the FCC, though essentially correctly in line with anticipated change. Yet this decentralizing philosophy is not accompanied by the FCC's acknowledgement of similar decentralization on the level of policy formulation. To the contrary, the FCC and various industry groups often believe that industry diversity must be accompanied by a policy monopoly of the central government. The problem with this dichotomy will be outlined below. But first, the nature of pluralism in the network will be discussed.

Pluralism

Perhaps the greatest failing of the traditional telecommunications policy analysis is that it centers on what may be called "supply-side" telecommunications. That is, it looks at the subject from the angle of production and producers: AT&T vs. MCI; long-distance vs. local companies; enhanced vs. basic service providers, etc., etc.

It is not surprising that this would be the natural way to look at things. After all, regulators deal primarily with carriers, technologists with networks, economists with competitors, and journalists love a horse-race angle to their coverage. But this supply-oriented perspective obscures its flip side, what could be called a demand-side telecommunications analysis. We should not think of telecommunications as a service produced by carriers, but as an interaction of groups and subgroups in society, facilitated by service vendors called carriers. The supply structure, if left to its own devices, is a reflection of the underlying interaction of communication users with each other, whether in an all-encompassing user coalition, or in several user groupings.

Thus, one should not see deregulation as a policy of primarily liberalizing the entry of suppliers. Just as importantly, it is the liberalization of exit, by some partners, from a previously existing sharing coalition of users which has become confining.

It is a process that might be called "the tragedy of the common network," because it is not the failing of the traditional system, but rather its very success which undermines it. The success of communalism creates the forces for particularism. At the early stages, the existing first network participants affirmatively seek additional participants to share costs and enhance their reach. In time, however, they will pay a price for this, because democratizing participation leads to democratizing

the control of cost-sharing in a re-distributory direction, and this re-distributory burden grows as the last participants get on the network. Perhaps more importantly, the largest of users increase their electronic communications at a faster rate than the small ones, and their technical requirements are increasingly differentiated from those of average users. Because the combined volume of large users has risen so much, they can account for much of cost savings of sharing just between themselves. They form alternative networks for large parts of their communications needs, first in-house, then with their closest suppliers, customers, or market partners.

The driving force for restructuring of telecommunications has been the phenomenal growth of user demand for telecommunications, which in turn is based on the shift toward a service based economy. The shift towards such activity in highly developed countries was partly due to their loss of competitiveness in traditional mass-production vis-a-vis newly industrialized countries. It also was partly due to a large pool of educated people skilled in the handling of information. Information based services, including headquarters activities, are therefore emerged as a major comparative advantage of developed countries. Manufacturing and retailing, at the same time, became far-flung and decentralized.

The growth of technological and operational alternatives have undercut the importance of economies of scale and scope once offered by the centralized network. Economic and technological

development have lead to an increased specialization and to a divergence rather than convergence of options. Application options have increased considerably with technology.

By their very nature and tradition, network operators provided standardized and often nationwide solutions, carefully planned and methodically executed. For the large users who depend on telecommunications, this was not enough. In the old days, sharing a standardized solution was acceptable to users, because the consequential loss of choice was limited and outweighed by the benefits of the economics of scale gained. As the significance of telecommunications grew, the costs of non-optimal standardized solutions began to outweigh the benefits of economies of scale, providing the incentive for non-public solutions. Furthermore, some users aggressively employed differentiation of telecommunications services as a business strategy to provide an advantage in their customers' eyes, and therefore affirmatively sought a customized rather than general communications solution.

Another factor contributing to more pluralism in telecommunications networks is the growing number of groups in society that inter-link via telecommunications. Their communications needs as collectives become more specialized, and private user clusters emerge. Early examples were travel agents and airlines, automobile parts suppliers, and financial institutions.

We are merely at the beginning of what will be a lengthy process of change. The future network system is one of great institutional, technical, and legal complexity. It includes national and regional carriers, local exchange companies, specialized service providers, cable television companies, domestic and international satellite carriers, LANs and WANs, private networks, shared tenant services, and value-added networks. The network environment will be, essentially, a pluralistic network of user associations, a network of networks which are part overlapping, part specialized along various dimensions such as geography, price, size, performance, software value-added, ownership status, access rights, specialization, etc. This is not to say that economies of scale and scope will become irrelevant: there will still be broad-based public networks, and powerfully integrated networks with broadband capability. But just as important will be the economies of group specialization and of clustering. These differentiations will permit users with similar needs, or with frequent interaction, to operate on more efficient networks. It will also permit public networks to be more efficient for their clientele, since they need not be all things to all people. Whereas in the traditionalist model standardization was a key element, the new pluralist model is characterized by a stress on interconnectivity.

The notion that networks can interconnect into other networks, even if they are competitors, is the key requirement

for the functioning of such a system. That is, a quasi-common carrier principle is extended from users to networks. Both in the United States and the United Kingdom, the establishment of interconnection of new networks into the existing and predominant one turned out to be critical.

Jurisdiction Over Interconnection

In such an environment, the rules of interconnection of newcomers to the public network becomes perhaps the most important tool of structural regulation. Whoever controls the rules of interconnection controls the network system itself. The question is who controls the rules for interconnection: the FCC, the states, or both. For the FCC to establish a federal predominance over interconnection to local exchanges is to establish federal control over local networks themselves, since the contradictions in treatment of largely identical service elements would not permit a stable dual regulatory system to coexist over time.

This leads to four major options for jurisdictional power:

(a) an expulsion of the states from area, which would create major political battles, deprive the policy field of a major source of innovation and experimentation, and eliminate an important element of policy stability.

(b) a full federal withdrawal, which could lead to the U.S. as a telecommunications-Lebanon facing a world of telecommunications-Japans.

(c) non-cooperative coexistence characterized by continuing litigation, delay, uncertainty, and manipulation by various industries' forum-shopping, and ultimate instability. Or

(d) an institutionally collaborative approach, as outlined further below, which establishes a balance between national uniformity and regional and local diversity.

There are, of course, important industry groups, in particular the ESPs, which desire policy uniformity to complement technical standardization. Those arguing for either or both are usually counting their obvious benefits but not considering their more hidden cost in terms of innovation, flexibility, and process. A more careful analysis establishes the need for a system in which uniformity and diversity coexist, as is true for much of the economic system of this country.

State regulatory commissions have only recently begun to explore ONA. New York and Maine have proceedings, California has a task force, and several others are studying the subject. All eyes are on the FCC because of its ongoing rule-making, and some states harbor suspicions reserved for ideas initiated by the FCC. Others view ONA primarily as an attempt to unchain the BOCs. The FCC, for its part, sent out mixed messages to the states. These perspectives, supplemented by mutual incantations of jurisdiction, will not get the issues developed. States must be involved in the substantive policy analysis of ONA issues beyond the jurisdictional question if they are to have a constructive role to play in the potentially far-reaching interconnection

developments that are affecting their traditional role in exchange services. And the FCC must recognize that they are part of the process.

There was a time, only in 1985, when several of the Regional Holding Companies embraced ONA as a vision of the future. Some of their Computer III filings before the FCC showed innovative thinking: They combined the opening and disaggregation of the central office functions with deregulation and entry into information services. Perhaps for the first time they proposed making it easier for their competitors to access the network. They seemed to understand that the network was their most important asset, and that its intense utilization was in their own best interest.

But now, in their February 1988 ONA plans, a more cautious spirit has taken over. Partly because the FCC gave the Bell companies little time to plan or implement, the plans, while a step in the right direction, concentrated on the here and now, and largely repackage existing offerings or those features already contemplated. Possibly, Judge Greene's initially more negative holdings on RHC participation in information services also had an impact by reducing the quid of new deregulated opportunities for the quo of opening the network to further interconnection. Possibly, too, the RHCs wanted to keep down the cost of the unbundling process. Whatever the reason, the filings did not deal with several of the longer-range implications of ONA.

These long-range effects include:

- * a future competition in exchange services, including potential incursions across franchise territories by other LECs' exchange services and even facilities.

- * a major enhancement in the possibilities of bypass and of private networks.

- * built-in strains between the main elements of LECs -- local transport and exchange -- that could lead in the future to a full-scale structural separation.

- * a move towards a "distributed" rather than centralized physical architecture of public central office functions, analogous to the computer industry's evolution into distributed processing.

Interconnection and Local Competition

Discussion of ONA often centers on access for Enhanced Service Providers, thus giving the impression that the issue revolves around software networks. But the principles of interconnection and unbundling really go much further. The FCC has already decided that interstate ONA elements, while based on expressed ESP needs, should be available to anyone, not just to ESPs. This could -- now or later -- include also a wide array of interconnectors with interstate traffic, such as AT&T, the OCCs, long-distance re-sellers, facilities bypassers, private networks, independent telcos, cellular operators, RCCs, other BOCs, and even international or foreign carriers.

This has major ramifications. For example, bypassers could transport interstate traffic (on their own or on leased lines) to the LEC's exchange, have it switched there, and take at least the interstate part (depending on state rules) of the rearranged traffic to its destination. Similarly, they could use the LECs' subscriber lines and switches as a feeder system for their own trunks to major destinations, including to interexchange companies. The distinction between private fixed networks and public switched ones would blur further. Competitive regional and local exchange companies could rapidly emerge, in particular if states adopt intrastate rules similar to the federal ones. And LECs may start to compete with each other for the business of switching the traffic of bypassers, independent telcos, or cellular operators. Interexchange carriers, similarly, could in effect enter local distribution.

In the absence of assured regulatory protection, the BOCs established an in-house containment strategy, which seems to avoid, if possible, the rental of pure switching functions. The FCC intended ONA as an aid to competition and innovation. A fundamental direction was that local exchange companies unbundle exchange services into discrete Basic Service Elements (BSEs) that could be bought separately and as needed by users. However, apparently to prevent pure transport interconnection, or to avoid ESP exchange access through other carriers that would permit the piece-mealing and bypassing of their networks and challenge the existing pricing structure, the RHCs now uniformly seek to

establish something called BSAs, (Basic Serving Arrangements). BSAs consist of two or three elements: an access link from the interconnector to the central office; basic central office functions; and transport between central offices. Different types of BSAs are offered, analogous to present access line arrangements, such as circuit and packet switched service or private-line circuits. By establishing BSAs the RHCs in effect side-step an important part of unbundling. To mix metaphors, they unbundle the bells and whistles, but not the meat and potatoes. Basic switching is not considered a BSE, only the feature add-ons are. And in order to get a BSE, one first needs a BSA, too. Sometimes BSEs require a particular BSA, such as a private line.

Unbundled access, however, is what some users desire. This is what the contentions issue of "collocation" is about. Briefly, some carriers such as New York's Teleport Communications wish to terminate directly in the physical location of the LEC's exchanges themselves, and locate the necessary equipment on the latter's premises, rather than reaching the exchanges via LEC-provided lines. The LECs resist, arguing that physical access by any other carrier could create operational and logistical problems. Collocation raises a whole host of pricing and technical issues that are too lengthy to consider here. One response has been to suggest "virtual" collocation, the "virtual central office," "mid-air meets" or some other surrogate access to LEC premises. The FCC, so far, has refused to mandate

physical collocation because it believes there may be other and more cost effective ways to minimize access costs, and it did not want to chill their development or the establishment of contractual arrangements.

These are ONA scenarios for the future, though not a very distant one. They continue trends begun by the emergence of powerful PBXs and private networks, shared-tenant services, and bypassers. But they make further entry more readily possible for small users. These changes must not be viewed as necessarily negative if they would lead to substantial technological innovation and cost efficiencies, and if the new networks, too, would have to support basic service for the poor. In any event, if the experience of two decades is a guide, such developments cannot be prevented in the long run by regulatory means; but they can be channeled to affect an orderly transition. To deny states a role in this issue is to deny them a substantial part of their ability to affect the nature of local service. Conversely, to leave ONA interconnection entirely up to each state could create problems of incompatibility. Local service is traditionally a state concern. Here, this responsibility overlaps with a federal policy of assuring unobstructed interconnection. Reasonable federal-state accommodations must be worked out.

How Much Unbundling?

The ONA plans of the Bell companies indicate that only about

40% of the requested BSE requests will be met in the near future. Many requests will never be satisfied. Still others may have never been made, because ESPs expected them to be denied, or they did not wish to tip off competitors -- including the RHCs themselves -- to ESP business plans.

The RHCs wish to reject requested BSEs because they are technically infeasible, impractical to unbundle or to bill; uneconomical to provide; requiring excessive customization; or out of bounds under the MFJ. Some RHCs plans consider as a potential factor for rejection a negative revenue or technical impact of a BSE on their already existing or forthcoming features and services. Several RHCs, having recognized the business opportunities of some BSEs, find a requested BSE feasible while others do not, or not yet. All of these road-blocks to a BSE require regulatory attention if ONA is to provide access as of right.

It is important to recognize just how complicated these questions are. How finely unbundled should BSEs be? How fast should they be deployed? Who should pay for their development? How standardized should they be across the country and across customers? How customized can they be, and if so, how should the costs be distributed? Can BSEs be resold? What should the extent of facility unbundling be, when at the same time technological forces strengthen the importance of integration, such as in ISDN and integrated broadband networks? What about interconnection to telcos' software programs, data bases, storage

capacity, signalling channels, network management functions, billing arrangements, technical specifications, or customer information?

Pricing

How to charge for ONA-type services is one of the critical questions for suppliers and users. The telephone companies seem to accept the prospect of state regulation of ONA pricing, i.e., of decentralized and non-uniform prices. On the other hand, most ESPs maintain that they want nationally uniform rules and rates, service definitions, interfaces, installation, even administrative procedures -- at least for "standard" BSEs -- and such uniformity requires FCC preemption. This is an understandable interest on the part of ESPs, many of whom are fledgling firms which desire compatibility and portability around the country. The need for national uniformity in pricing of BSEs and BSAs is not as compelling as, e.g., for basic protocol standardization, as long as pricing is not used to manipulate the competitive environment. It makes no sense to have uniform prices or pricing rules across the country without regard to local costs, conditions of demand, alternative offerings, technological state of the network, demographic and economic characteristics, etc.

No doubt, the desire for national uniformity will lead to calls for a Federal preemption of conflicting state pricing regulation. But such preemption will not work, because it

cannot be limited to ONA. Federal preemption would establish prices for BSEs or BSAs that are, as likely as not, different from those of comparable services presently tariffed by the states for intrastate use. This creates the potential for arbitrage and conflict. One can therefore have uniformity only if one preempts state tariffing of most services, and not just of BSEs, i.e., if state rate regulation is largely cut off. To do so would be an unprecedented challenge to federalism in telecommunications regulation, and this would be unwise in almost any respect. Furthermore, because price determines the quantity of demand, taking pricing out of states' hands also denies them an essential tool for another of their traditional goals, that of assuring universal service. Instead, the FCC and the states should agree on a framework of broad guidelines that prevent confusion and incompatibility.

Thus, state regulators will soon have to deal with the nuts and bolts of BSE charges. One basic question will involve the principles for pricing BSEs. Few would disagree that the costs of new service should be borne by those who cause them. But this is a cliché without much analytical content. Besides, what are the costs of implementing ONA, and what are the revenues it will generate? It would be helpful to have an estimate of how much the ONA interconnection regime is going to cost, in particular net costs, i.e., those over and beyond costs that would be incurred anyway, e.g., for the introduction of the signalling channel system, CCS-7. Nynex, in a filing to the New York PSC,

estimated ONA-related revenues to exceed \$1 bil in 1994. (It is not clear, however, if these are "new" revenues, or whether they include previously bundled services.)

At this point, the Bell companies anticipated pricing policies are quite diverse, reflecting variations in monopoly power, regulatory regimes and business strategies.

* Some RHCs state that their BSEs will be cost-based. (Ameritech, US West).

* Others talk about market pricing, i.e., they will try to charge what the market will bear. (Nynex, Bell South, Bell Atlantic).

* A related approach are negotiated rates which permit price differentiation among users. (SW Bell, US West).

* Several plans imply that some ONA services could be a source of subsidy for the rest of the network. (SW Bell & Bell South).

* Others could be ready to consider subsidizing BSEs, at least in the beginning, in order to promote new services. (PAC Tel).

* Some seem to prefer a "parity pricing" in which they cannot charge their own ESPs less than their competitors, but where these charges are above cost.

* No carrier advocates a classic rate-of-return-based pricing, although some will follow pricing for similar services which may be based on it.

From the state perspective, tracking and recovery of ONA

implementation and ongoing costs will be difficult. The integrated structure of regulated BOCs and BOC-ESPs, together with the complexities of joint and common cost allocation make it difficult to detect cross-subsidies or unfair competition. The FCC views the Part X accounting rules as a major non-structural safeguard against cross-subsidization. Many states are currently involved in establishing such rules for their own jurisdictions. The provision of adequate data is essential for any regulatory regime in ONA. It is also necessary to separate the interstate and the intrastate elements of ONA-type services.

A large number of questions need to be resolved. Who should bear the risk of developing and introducing BSEs (and BSAs, if approved)? States do not wish to see ratepayers become involuntary venture capitalists. Must each BSE/BSA be priced according to the same principle, or depending on market conditions? Some BSEs/BSAs may face competitive offerings, while others do not. In a dynamic environment, there are no easy answers, and the implementation requires the messy task of separating cost and revenues of BSEs tariffed under different principles, and of regulated BSEs from various unregulated functions such as billing. Must each BSE/BSA's revenue cover its own cost, or only in the aggregate? And if not, could there be cross-subsidization that would distort competition? Conversely, could BSEs be defined so finely as to permit undue price discrimination between users? How much flexibility should there be in the rates? Can users be charged according to negotiated

rates, making price discrimination possible? Or are such negotiated rates helpful in ensuring that needs for customized BSEs are met or that later entrants are not overcharged? Similarly, should it be possible for an ESP to obtain exclusivity to a BSE in return for its special development? Which cost definition is used -- average, incremental, fully distributed, etc.? A large number of BSE requests were for voice analog services such as voice-mail. It seems that segments of sophisticated data service usage has already left the public network. Should there be pricing incentives to bring them back?

Another set of questions relates to what happens to existing services. Are they to be unbundled into oblivion? Who then is to pay for such "stranded" services? Some, presumably, will disappear. Others will be repriced, or their BSE/BSA aggregate counterpart will lead to a different price than before. Could this affect some users negatively? The answer is yes. It is easy to proclaim a principle that no interconnector should be worse off than before, but this is a promise hard to deliver. In a wide-ranging restructuring of rates such as ONA may cause, there are not enough degrees of freedom to keep everybody ahead while avoiding all inconsistencies.

A Level Playing Quagmire?

ONA is designed to equalize competitive conditions for the broad array of interconnectors such as ESPs, and to permit the BOCs to enter activities from which they had been either

precluded or subjected to complicated forms of organizational structure. Some of the advantages of a "home field" have been addressed by the FCC and the RHC plans, including unequal access to technical standards, provisioning biases, etc. But other questions remain. As discussed, there is a controversy over physical access. The RHCs, in response to FCC guidelines, are willing to charge their own unregulated ESP activities the same as they would unaffiliated ESPs. This sounds good. But to make this parity meaningful they would have to maintain it, even where the BOC-ESP is collocated while its competitors are not. In some circumstances, therefore, the RHCs could end up paying themselves more than cost would require, in order not to undercut the non-affiliated ESPs. Thus, there are situations of a policy trade-off between competitive parity and economic efficiency. States are affected by the trade-off, because BOC revenues are.

Another bump in the level playing field is the extent of access by ESPs to network functions that the BOC-ESP may utilize. Mentioned earlier were telco software programs, data bases, storage capacity, signalling channels, network management functions, billing arrangements, technical specifications, or customer information. On the one hand, many of these functions are needed for a full interconnection and a level playing field. On the other hand, there must be some limits to a "creeping socialization" of privately owned and managed carriers by extending the common carrier principle into its management functions. Furthermore, a full disclosure of technical

information may have its cost in terms of innovation, since it may reduce the incentive to develop proprietary technology.

Billing functions and Customer Proprietary Network Information (CPNI) is particularly important, given its potential marketing value, and BOCs have superior access to it under the FCC Computer III decision. If CPNI is available to Bell product developers and marketing managers, they will be able to sift through computerized records in order to develop or market new products. Other ESPs, however, would have access to CPNI only with approval of a customer. To level the playing field either means severely intruding into telephone customers' privacy, or precluding a BOC from otherwise reasonably available information. Partly to deal with the competitive problem, Judge Greene, imposed in March 1988 restraints on the use of CPNI information. Adding to the injury, the BOCs are requiring ESPs to provide supporting marketing information in order to assess demand for a new BSE. Thus, the ESPs could alert the RHCs to potential market opportunities. (To their credit, some RHCs have identified this possible conflict and have established BSE reviewers separate from ESP-BOC product managers.) And if BOCs undertake their own studies of the feasibility of BSEs, rate payers as well as non-affiliated ESPs must be protected, as in Part X rules, from bearing the cost of developing information that may benefit the BOC-ESP.

Related problems deal with timing. A BOC should not be able to hold off approval and deployment of a BSE until its own

affiliated ESP is ready to enter that particular service. BSEs also should not be defined and priced in such a way as to make price-discrimination possible. Nor should departure from national BSE definitions, or the sequencing of introduction, be aimed to give BOC affiliated ESPs a regional advantage over national services.

The BOCs' long-range interest is in a smooth ONA system. It would be a historic mistake for them to stall ESPs. AT&T dragged its feet on OCC interconnection, and eventually the political-legal process became frustrated enough to seek the meat-cleaver approach of divestiture. If the BOCs were to use interconnection as a strategic tool to repress competition, they may be threatened, in a decade or two, by a similar fate, and their exchange operations may become organizationally separated from their transmission functions.

Other Consumer Protection and Universal Service Issues

Regulatory policy must consider the likely effects of ONA on residential users. These customers, many of whom have little use for ONA services, could end up paying more, because unbundling may reduce revenue that has previously subsidized residential service, or because it could permit bypass and other revenue diversions. On the other hand, the volume of traffic and of revenues could pick up. At present, a residential phone is used only about 25 minutes/day. An increase of usage by only 5 minutes/day could thus, increase the revenue-flow from usage-

sensitive charges by 20 percent. ONA could make it possible to provide small users with services which in the past may have only been available on large users' private networks. New and useful services are likely to emerge, and the cost of central office switching could go down as a result of competitive incentives. Positive effects, however, are likely to take some time, while costs are more immediate. In the meantime, it would be hard to defend rate increases to the general ratepayers that are due to a restructuring of interconnection if their service is not directly and appreciably improved.

An easily agreed upon policy goal is that ONA should not interfere with the provision of universal service. ONA is primarily an aid for access to the network by software or hardware networks and by voice services; it does not directly affect the access of the individual subscriber to the public network. However, the ability to be reached is as much part of universal service as the ability to originate a call. Thus, if ONA results in the emergence of a system of regionally specialized protocols of exchange carriers that preclude access to or from subscribers in other areas, then universal service is affected. This, of course, is an argument for some basic national standards. But it is also an argument for a relatively even geographical spread of ONA-capable exchanges. Clearly, ONA will be implemented first and foremost in major business centers. If introduction to rural or depressed areas is slow, a further long-range differentiation in service spectrum from one region to

another would become unavoidable. For many states this would not be acceptable on public policy grounds. They would want to have a say in any arrangement that creates an intra-state service gap that is not temporary. Other states may wish to engage in an industrial policy in which they differentiate themselves in the capabilities of telecommunications services. A related issue is the ability of small independent telcos to provide ONA interconnection. Should they be required to implement ONA, or to mirror the scheme adopted for the BOCs? If the smaller independents are required to offer ONA interconnection, they may have to farm out their exchange services to larger independents or to the BOCs, and this reliance on sub-contractors would ultimately reduce their role and their net revenues. To deal with these questions, states may opt for a subsidy mechanism. Again, there should be room for local choice.

The Need for a Mechanism of Policy Coordination and Dispute Resolution

Unavoidably, friction will develop in the process of setting ONA rules. States must be involved in the process of BSE definitions, for example, because many problems deal with services which they approve and tariff. A key element to ONA is therefore a system of dispute resolution. Otherwise, courts, commissions, lawyers and expert witnesses will be extremely busy. It should be in the interests of all parties to create an effective, fast-moving, broad-based, and independent mechanism of

coordination with undisputed legitimacy. Such a mechanism should include regional sub-groups. A BSE essential to the Manhattan financial community may make no sense for Wyoming. On the other hand, e.g., remote meter-reading by utilities may be more important in a rural environment than in a suburban one. To establish uniformity would hence burden those states where demand is low, or retard others where it is high. A compromise may suit neither. There is room for regional bodies to support the national one, reflecting the diversity of regions. On the other hand, some common principles can also be in the interest of the states, since their policy goals could otherwise be undermined by competition among themselves -- a "race to the bottom" -- to attract large users.

To some orderly minds any variation from uniformity is heresy. But total uniformity looks better on paper than in reality. Uniformity has its trade-offs in terms of flexibility and choice. A uniform system, like a convoy, moves at the speed of its slowest or most obstructionist participants. Without belittling the value of uniformity, one should also recognize that there can also be value in some inter-Bell rivalry, since diversity can give an impetus to innovation or efficiency, while economic rationality can lead in a competitive system to some convergence and coordination even in the absence of a regulatory requirement.

Also, uniformity should not be equated with preemption by the FCC. Agreements among the states or between the state and

federal levels can achieve the same result. Nor is preemption the less time-consuming procedure, since it could lead to endless and divisive jurisdictional disputes that would spill into other areas. Preemption should only be resorted to after a solid evidentiary record establishes clearly that serious nationwide harm is unavoidable otherwise.

States do not favor the Joint Board arrangement, because it leaves the FCC in the driver's seat. Given their view that local exchange issues are part of their traditional jurisdiction under the 1934 Act, they insist on parity at the least. A coordinating mechanism could have a form such as the following dual system:

(a) An inter-governmental ONA forum of FCC and the states, which would be charged with coordinating the various jurisdictional policy interests. It could, for example, establish a hierarchy of uniformity, by defining certain basic functions whose national uniformity is deemed essential, and establishing others where regional or local uniformity is desirable as possible. State regulators may wish to constitute themselves into regional forums, again with FCC representation.

(b) A private sector ONA forum which would include a balanced representation, including LECs, ESPs, equipment manufacturers, as well as telecommunications users, both large and residential. The T-1 Committee is one model. This body would be responsible, in the first instance, for technical coordination, standards, BSE definitions, and dispute resolution. It would operate in a flexible and informal fashion rather than

be bound by traditional regulatory process. Agreements would be reviewed by the inter-governmental ONA forum and certified to the FCC and the States for their adoption, if the respective regulatory bodies so choose. In those cases where the private-sector ONA forum cannot reach agreement within a specified and fairly short period, mandatory arbitration would govern. On issues of great importance the inter-governmental ONA forum may choose to make a determination instead of an arbitrator.

Outlook

Because several of the major changes in telecommunications policy originated in the United States under a conservative political regime, they are often viewed as the product of particularly American business interests, wrapped in a Chicago economic ideology. But more recently, several other industrialized countries have begun to adopt similar policies, or at least to discuss changes that previously seemed unthinkable. This raises the question whether the changes go deeper than the nature of the respective governments in power, and whether they reflect a more fundamental change. The policy changes are indeed part of a broad transition in which the traditional notion of the public network -- centralized, closed, and public spirited -- is evolving into a new one that is decentralized, open, and private spirited. This evolving network resembles a loosely interconnected federation of sub-networks, much like the system prevailing in transportation.

The Telecommunications of the future will resemble much more the rest of the economic system. It will be much more complex, and perhaps less efficient in some ways than the old system, but it will be a truer reflection of an underlying pluralist society.

Where does this leave future regulators? It would be naive to expect less regulatory tasks. Many disputes become less intramural and more regulatory in nature. The main regulatory tasks which pluralism raises are:

1. Protection of interconnection and access.
2. Establishment of new mechanisms of redistribution.
3. Establishment of global arrangements to match the global scope of networks.
4. The prevention of oligopolistic behavior and of cyclical instability.
5. The role of telecommunications policy as economic development policy.
6. Regulatory treatment of telephone carriers in their capacity as mass media.

Open Network Architecture is a sensible concept to deal with the forces of centrifugalism; moreover, ONA-type interconnection is unavoidable in the long-term, and within the historical trend of opening the network to new entrants. To defend centralism from these forces of pluralism is quixotic. Interconnection of hardware and software networks becomes a central issue, and control over interconnection a key element of regulatory supervision. To attempt policy centralization by squeezing the

states out of this area is hence to deny them participation in the control of future telecommunications structure, and they will not take to it kindly. On the other hand, for states to fight the principle of open interconnection is to be tilting at wind mills.

ONA interconnection is a much more complicated affair than the earlier opening up of access for CPE or for long-distance carriers. There is much work to be done in a process that will not stand still. Hence, it would be a costly mistake for public policymakers to leave the substantive issues and retire to the jurisdictional battlegrounds. Nor would it be sensible to try to resolve the myriad issues in advance. What is needed is a collaborative effort, based on agreed upon institutions, that can adequately reflect the amalgam of state and federal interest and come up with a consistent set of ONA policies.

The logic that leads to ONA is also the logic of federalism. If diversity and pluralism is the FCC's goal -- of services, competitors, and options -- it must also view pluralism of policy approaches as a source of strength rather than of weakness. And if non-interference by government underlies deregulation, the FCC should be very careful in denying leeway to others. To be result-oriented in seeking preemption is extremely short-sighted. Presidents, Commissioners, and policy preferences come and go, but the Federal system with its balances must continue.