Telecommunications without a Public Network: Deregulation and the Communications Act of 2034

by Eli M. Noam

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

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Eli M. Noam[1]

D R A F T

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I. Introduction

The most fundamental question for telecommunications policy, and among the least asked, is ***after deregulation, what?*** In the recent past, debates centered on the opening of telecommunications, television, and cable. Is competition sustainable? Is it advisable? Who gains? Who loses?

Regulation had been essential to the old system, partly to protect against monopoly, partly to protect the monopoly itself. In the transition to competition, what was left of regulation was seen as temporary, as shrinking reciprocally with the growth of competition. In time, it would diminish down to nothing.

At that point, what would happen? Advocates of competition were always a bit vague on that question, like old Bolsheviks who were not sure, as they were storming the Winter Palace, what communism might actually look like one day. Based on the experience of the past decade,

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[1] Professor of Finance and Economics, Columbia Business School; Director, Columbia Institute for Tele-Information; former Commissioner, New York State Public Service Commission, 1987-1990; A.B. Harvard 1970, A.M. 1972, Ph.D. (Economics)1975, J.D.1975.

it is reasonable to assume that networks of various categories — long-distance, international, mobile, specialized — will proliferate, and that equipment options will become abundant. Could one expect the resultant "network of networks" to be totally self-regulating, with no role for government?

The notion of an invisible hand mechanism, the idea that out of numerous decentralized sub-optimizing actions there would emerge, without any central direction, some overall and beneficial equilibrium, is perhaps Adam Smith's major insight as a philosopher.[2] Its importance goes way beyond economics.[3] Can electronic communications function in such a fashion, optimally arranging themselves in the absence of an overall plan or direction?

The mere notion is almost incomprehensible to telecommunications traditionalists. They argue that the more complex the technology and the network become, the more necessary it is to plan it in some centralized fashion. This type of argument was countered by the Austrian economist von Hayek half a century ago, when he pointed out that, to the contrary, the more complex and advanced an economy becomes, the less it is possible to guide it centrally. [4] Recent collapses in Eastern European economies seem to prove von Hayek right. Complexity is neither a necessary nor sufficient condition for justifying centralized control.

On the other hand, there is the also the opposite belief, equally simplistic, that more

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[2] Adam Smith, *An Inquiry into the Nature and Causes of The Wealth of Nations*. 2 vols. Edwin Cannan (ed.). London: Methuen & Co., Ltd., 1904.

[3]It has been observed for the evolution of species, as well as for the functioning of bee and ant colonies, for population migration, for organizational hierarchies, and many others. Nozick, Robert, 1974, Anarchy, State, and Utopia, New York,: Basic Books: p 20-21.

[4]Friedrich von Hayek, 1942, The Road to Serfdom, Chicago: University of Chicago Press.

advanced technology makes regulation unnecessary. But consider, as a counter example, nuclear power, a complex technology that is tightly regulated. Technology does not abolish negative externalities; it may in fact increase their threat by orders of magnitude.[5]

The purpose of this article is to analyze the remaining role of regulation in telecommunications by discussing the emerging network environment, tracing it into the future and identifying some of its problems. The article will describe how networks are being shaped by two contradictory forces, centrifugalism and integration, and identify the implications of those forces for the network system of the future. It will then discuss how physical interconnections can be structured (through a modularization of networks), and how information of interconnection can be maintain in a mixed public-private network system (through a system of common carrier "rights of way"). The article concludes with a set of proposed principles as a legal foundation for a future communications system.

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[5] Or consider air transportation, which is much more tightly regulated than horse carriages. It is often mistakenly believed that air transport has been deregulated. This is true only for entry and prices. In almost every technical and operational aspect, airlines are extremely tightly regulated.

II. CENTRIFUGALISM

The modern telecommunications network has grown into the central linking institution of the information-based economy. As it continues to evolve from a medium for point-to-point voice communications to a powerful structure which carries a broad range of information, it is shaped by two basic but conflicting tendencies: the trend towards technical integration, and the trend towards institutional and business diversity. Technologists tend to stress the first, and lawyers and economists the second. To overlook the one is as mistaken as to overlook the other.

Let us first understand what networks are in general terms, because they are a key concept in communications as well as in other fields. Networks are, on one level, physical facilities. Yet they are also relational systems, such as those of "old boys" or of political supporters.

The term "network" goes a long way back; it is used, in Exodus by the Supreme Regulator: "And God spoke unto Moses, saying..... You shall also make it a grating, a network of brass..."[6] In Hebrew, the word is "reshet," (net) similarly used today for telecommunications and other networks.

The term is used by most academic disciplines, and with a variety of meanings. Chemists apply it to arrangements of molecules.[7] Biologists to cell structures.[8] Mathematicians

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[6] *The Bible*, Exodus, XXVII, V. 4. King James translation.

[7] Zacharisen, W. M., "The Atomic Arrangement in Glass," October 5, 1932, Journal of the American Chemical Society, Vol. 54, No. 10, p. 38-42, Washington, D.C.

[8] Knox, Robert, 1830, Elements of General Anatomy (translated from Inst. edition of "Beclard's Anatomy" by D. A. Beclard, (Edinburgh, Scotland: Maclachlan & Stewart), p. 214.

to topology.[9] Electrical engineers to distribution systems (for high voltage), or for circuit configurations of components (for weak voltage).[10]

Operations researchers use a network terminology to solve shortest path problems, maximum flow models, and optimal routing.[11] Computer scientists apply the term for computer interconnections in hardware, and to implementation algorithms in software.[12]

In the social sciences, political scientists use the concept of networks in discussing, for example, hierarchies, interactions, gatekeepers, and policy communities.[13] Sociologists and social anthropologists[14] speak of network dyads — interpersonal linkage between two persons in which each is indebted to the other, and similar in some ways to the exchange relation of economics.

Economists and lawyers have paid little attention to networks in a conceptual sense.

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[9] Klingman, David J. and Mulvey, J. eds., Network Models and Associated Applications, Amsterdam and New York: Elsevier North, Holland, 1981.

[10] Karni, Shlomo, 1986, An Analysis of Electrical Networks, New York: Wiley, pp. 1-4.

[11] Elmaghraby, Salah E., 1970, Some Network Models in Management Science, New York: Springer, pp. 1-3.

[12] Klingman, David J. and Mulvey, J. eds., Network Models and Associated Applications, Amsterdam and New York: Elsevier North, Holland, 1981.

[13] Richardson, Jeremy John, Gunnel, Gustafson and Art Jordan, as cited in Rhodes, R.A.W., Power Dependence, Policy Communities and Intergovernmental Networks, Colchester, Essex; Department of Government, University of Essex, Wivenhoe Park, 1985, pp. 6-8.

[14] Barnes, J.A., 1954, "Class and Committees in a Norwegian Island Parish," Human Relations, Vol. 7, Lazarsfeld, Paul and Merton, Robert, 1954. Bott, E., 1957, Family and Social Network, London, 2nd Ed., 1971. Boissevain, J., 1979, "Network Analysis: A Reappraisal," Current Anthropology, Vol. 20.

Closest to speak to the subject are public choice economists dealing with theories of clubs.[15]

The purpose for this brief survey has been to underscore that one should not look at telecommunications networks primarily in terms of technical facilities. It is just as much a structure of relationships, and as such is a reflection of underlying group interaction in society and economy, subject to enabling technology. In that sense, it incorporates the conflicting forces of integration and centrifugalism common to many social processes. Wherever one looks, people break up all kinds of social networks of interaction and form new ones — public education, mass transit, public safety, dispute resolution, pension systems, health services, electrical power distribution, stock exchanges, department stores, or higher research. Telecommunications are not different. It once made sense for subscribers to the network to congregate within one monopoly network, largely in order to reap the benefits of cost sharing and of economies of scale and scope. But over time, with the successful spread of telecommunications across society, the conflicting interests of all of its members cannot be reconciled anymore within one network. Centrifugal forces are at work, and will continue to be. If one gives individuals the freedom of association, they will form various types of interlinkages which we call networks.

This is most apparent in the emergence of alternative transmission systems, starting after the FCC's *Above 890* decision permitting intra-organizational microwave private lines. Since

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[15] Noam, Eli, "The Next Stage in Telecommunications Evolution: The Pluralistic Network," Paper presented at the ITS Conference, MIT, June 1988, Working Paper #316, Columbia University CTIS. Heal, Geoffrey, "The Economics of Networks," Columbia University, unpublished paper, 1989. Economedis, Nicholas, "Desirability of Compatibility in the Absence of Network Externalities," American Economic Review, Vol. 79, No. 5, pp. 1165-1181, (Dec. 1989).

then, and pursuant to the regulatory proceedings, numerous facilities-based carriers offering new transmission capacity have entered internationally (Cable & Wireless, P-TAT, PanAmSat); nationally (MCI, US Sprint); regionally (RCI, Lexitel, Allnet); locally (Eastern Microwave, Metro Fiber, FiberLAN, Teleport, cable companies); intra-building (shared-tenant systems STSs).

These competitors to the traditional monopoly system are only the most visible part of centrifugalism. Private networks are at least as important. When discussing developments in telecommunications, one type of privatization receives much attention: the transfer of a national network into private ownership, as in the case of British Telecom (UK), Telmex (Mexico), and NTT (Japan). Use privatization - the rapid development of private and closed-user group networks - is a quieter process of greater long-term significance. Such networks are not necessarily privately-owned.[16] But they are private in the sense of being separate from the public or general network, either on separate physical facilities, or, more often, on leased segments of the traditional network. This type of privatization has evolved rapidly; as it grows it challenges traditional telecommunications arrangements.

An analogy may clarify the shift. Ownership privatization corresponds to transferring shares in a state-run railroad to private shareholders. Use privatization, on the other hand, is comparable to admitting private automobiles and taxis as means of transportation. Arguably, ownership changes in the Long Island Railroad or Conrail had but a minor impact on New York City, while mass marketing of the private automobile had an enormous impact on its cityscape,

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[16] They may be fashioned from state-owned segments (as in the ministry-run networks of the People's Republic of China), or they may be used by the state (as in the case of the US government's giant FTS-2000 system).

metropolitan growth patterns, employment distribution, demography and ethnic stratification.

While the trend towards private segmented networking has been gathering momentum, though largely outside the public view. Most observers still view them as special arrangements on margins of the regular system. But, the future may well see a reversal of what this 'regular' means. In 1980, for example, virtually 100% of U.S. network investment was made by public network carriers. In 1986 this had dropped to 66%, with large users and private networks accounting for the remainder.[17] Large organizations such as Citicorp and Boeing run network operations requiring several hundred employees. For Citicorp, telecommunications has become the third largest expense, following personnel and real estate.[18] The Federal Government recently issued contracts for its private network FTS-2000: valued at $25 billion, this was the largest federal civilian contract in U.S. history.

Private networks started out as intra-organizational operations, but have moved to group-networks. First to develop were clearing networks for financial institutions.[19] These were followed by horizontal and vertical networks for florists, travel agents, insurance companies and advertising agencies. Next to develop were industry networks linking frequent business contacts.[20] Such networks provide relatively secure, cheap and customized communications.

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[17] Robert W. Crandall, *After the Breakup*, Washington D.C.: The Brookings Institution, 1991.

[18] [cite Citicorp]

[19] E.g., FEDWIRE (payment network), CHIPS (US payment netting system, with UK and Japanese counterparts CHAPS and CHATS), and SWIFT (international).

[20] General Motors, for example, created a vast system uniting its far-flung operations, and linking suppliers, dealers, insurers, and financial intermediaries, both domestically and internationally.

They also tend to offer service features beyond simple transmission, 'adding value' such as electronic data interchange (EDI) and other software-enabling transactions. Similar services are offered by specialized value-added services networks (VANs) and by enhanced services providers (ESPs). The National Science Foundation, too, has actively supported the growth of research networks linking universities and other institutions.

Private networks began as dedicated voice circuits leased from the telephone company, but more complex arrangements rapidly evolved. Physical range increased into international connections, requiring collaboration with foreign carriers. Circuit-sharing on the public network allowed carriers to offer low-cost 'virtual' private network services that were often identical to the public networks in terms of technical facilities, though not in terms of legal status or economics.

III. IMPLICATIONS

Networks will become transnational, non-national and non-locational

As the cost of transmission continues to drop, private and group networks will not be territorially organized. Territoriality was based on the need for a network architecture that minimized cost by minimizing transmission distance. It led to the creation of the 'New York network,' or the 'French network.' This technological and economic territoriality suited governments everywhere, because they, too, were based on territoriality of jurisdiction, and could thus conveniently exercise control and even ownership over "their" network.

But now, territoriality becomes secondary. Many of these communities of interest transcend national frontiers. Their interests are continental and global, and so are their networks.

When the computers of brokers and investment banks in New York are interconnected by a continuous network and interact with those in Tokyo and London to trade and clear transactions, one cannot say anymore that there is a New York or Tokyo market. There is no physical locus for the transaction. It is located everywhere, which also means nowhere.

And why stop at networks for groups? If the trend is from national public networks covering the entire population to a pluralist system, why not expect still further disaggregation? This additional step means individualized networks, or personal networks, which may be called PNs, analogous to PCs. Before dismissing the notion of PNs as extravagant, remember that twenty years ago nobody expected personal computers PCs, and nobody expected computers to end up on everybody's lap, either.

What does a personal network mean? It means an individually tailored network arrangement that fits an individual's communications needs. It does not necessarily mean a separate physical system, except for inside wiring and maybe the last mile of circuits, plus some radio-mobile links, and terminal equipment. The rest consists of what is called virtual networks, provided by a whole range of service providers and carriers, not just one, and packaged together to provide easy access to an individual's primary communications needs: friends and family; work colleagues; frequent business contacts, both domestic and foreign; data sources; transaction programs; and video publishers frequently accessed; telemetry services such as alarm companies; bulletin boards scanned etc. Contact to and from these destinations would move with the individuals, whether they are at home, at the office, or moving about.

New Electronic Neighborhoods Emerge

A few years ago, it became fashionable to speak of communications creating the "global

village". There was something inspiring, to most, in this image, communal and peaceful. But there is nothing village-like in the unfolding reality. Instead, groups with shared economic interests are extending national group pluralism through the opportunity to create global interconnection with each other into the international sphere. **The new group network do not create a global village, they create instead the world as a series of electronic tele-neighborhoods.** In the past, neighborhoods had economic and social functions. In New York for example, there are Chinatown, the Garment District, Wall Street, Madison Ave., or the Theater District. Elsewhere, there are regions with specialized production. Solingen and Sheffield for cutlery; Lyons for silk; Hollywood for films; Silicon Valley and Route 128 for microelectronics.[21] Production clusters create economies of aggregation that substitute for the economies of scale and scope of the giant multi-product firm. Physical proximity was a key. But now, group networks can serve many of the functions of physical proximity. They interconnect specialized producers, suppliers, buyers, experts, and markets. They create new ways of clustering, spread around the world.

Some of these tele-neighborhoods will be nicer than others. They will perform better, faster, and often even cheaper. In developing countries, the networks of those transacting with the world are already becoming better than those of local people. In places like China of Egypt, a two-tier communications systems has in effect emerged.

Networks will assume political power as quasi-jurisdictions

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[21] Piore, Michael & Charles Sabel. The Second Industrial Divide: Possibilities for Prosperity. New York: Basic Books, 1984.

Historically, the nation state was at tension with cross-border allegiances — whether proletarian international solidarity, rebellious youth culture, international financial capital, or ethnic minorities. The new network environment weakens national cohesion. It strengthens particularism and internationalizes it. It is difficult for a state to extend its powers beyond traditional frontiers, but it is easy for the new networks to do so.

Furthermore, these network groupings possess and acquire powers of their own. They already may link powerful entities, and can bring their combined powers to bear.[22] And there is no reason to expect the power of network combinations to be directed only at communications issues. Once groups are in constant touch, they may as well get organized on other issues, too. The **communications network becomes the political network.**

They will coordinate in the economic sphere. The line between competition and cartel coordination has always been a fine one. In the 1920s, various American industries established so-called fair-price bureaus that gave each member of the industry a convenient look at what its competitors were charging. This practice was outlawed in a series of antitrust cases.[23] Imagine if one leaves instead information exchange to a series of artificial intelligence programs communicating internationally. One has a real problem of conceptualizing, detecting, and preventing international cartels. One person's collusion is another person's programmed trading. The **network becomes the cartel.**

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[22] For example, the combined weight of the members of the SWIFT banking network got the powerful national PTT monopolies to cave in on a number of crucial issues.

[23] See, for example, *American Column & Lumber Co. v. United States*, 257 U.S. 377 (1921); *Maple Flooring Mfrs. Ass'n. v. United States*, 268 U.S. 563 (1925); *Cement Mfrs. Protective Ass'n v. United States*, 268 U.S. 588 (1925).

The network groupings are also likely to become quasi-jurisdictions themselves. They have to mediate the conflicting interests of their members. They have to establish cost shares, sometimes creating their own de-facto taxing mechanism as well as redistribution. They have to determine major investments, to set standards, to decide whom to admit, and whom to expel. As a network becomes more important and complex, control over its management becomes fought over. Elections may take place. Constitutions, bylaws and regulations are passed. Arbitration mechanisms are set up. Financial assessment of members takes place. **Networks become political entities.**

Thus, we may be witnessing the creation of new and often extraterritorial forms of new quasi-jurisdictions that are not clearly subordinated to others.[24]

Networks will exercise power toward their members

The power of a network over its users and members becomes most obvious when it is operated by a dominant entity.

Examples:

• The network of a university such as Columbia, which provides telecommunications services to its students, faculty and staff, can be quite restrictive. It can and does limit terminal equipment options (only four proprietary models are permitted at Columbia), can charge unconstrained prices, and could refuse to serve political activist groups.

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[24] The optimal size of jurisdictions was always dependent on communications. French departments were based on the distance that a horseback rider could cover in a day. Transportation and communications technology changes the optimal size. It is hard to imagine a voluntary European integration without telecommunications.

• The National Science Foundation urged NSF sites to remove from computers networks scanned image files of arguably pornographic images.[25]

• Stanford University blocked access to a joke file on the University's computer system, because it contained humor offensive to some groups.

• Stanford also does not offer to its on-campus students the otherwise legally available lifeline telephone rates mandated by regulation on the public network to those who qualify.

• Employers frequently block the ability of their employees to reach certain numbers. While this is based on protections against running up telephone bills generated by dial-it services, the principle could be extended to an exclusion of messages of a type undesirable to employers, such as those of labor unions, competitors, newspapers, or government agencies.

• Telephone companies, which have traditionally operated as common carriers without discriminating among users based on the content of their messages, have begun to screen messages carried over their conduit, based on a desire to maintain their "business reputation." For example, some telephone companies, both local and long distance, have chosen not to provide billing and collection services for certain "900" services.[26]

• Prodigy, the large private videotext network owned by IBM and Sears, expelled

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[25] M. Rotenberg, communication.

[26] In 1991, U.S. Sprint had a staff of 22 enforcing its dozens of guidelines. Forty percent of all "900" applications are rejected by Sprint, based on its advertising, content, etc. guidelines. (It does not permit calls to children under 13, services involving giveaways, or any service that the company, in its sole discretion, believes does not "provide value [in] proportion to its price.") AT&T previews the programs of service applicants, for example, of dial-a-joke programs. Ethnic or off-color jokes need not apply. Governments, in response to some abuse, have weighed in with a heavy hand, for example setting maximum prices that can be charged by such information providers and setting bars to lawful "adult" messages.

customers who used the system to discuss subjects Prodigy excluded. When it relaxed its restrictions against political debates, it was subject to pressure by groups opposing certain bigoted messages on the system.

• Electronic mail, which carries personal messages over computer networks linked by telephone lines, raises questions about message ownership, and access, and gatekeeping.

• In so-called intelligent buildings, landlords provide communications to occupants. These "shared-tenant services" are largely under the control of the building owners, whose interconnection decisions determine which networks tenants can reach.

• Some group networks have been used to exclude competitors. As a consequence, the U.S. Department of Transportation has proposed interconnection and access rules on the computerized airline reservation systems. The Department's proposal would mandate, for example, that all computer reservation systems would have to be available from a single terminal, and that system vendors could not prevent users from adding their own compatible software or hardware designed to manipulate the information.

Networks are affected by disparate community standards.

Transmission technologies allow content to be distributed simultaneously over a continent. Yet indecency definitions are based on local community standards. Networks are creating tele-communities of geographically disparate individuals, some of whom may live in separate countries under different legal systems entirely. The legal character of these electronic communities is still unclear, and no one has yet developed a means to assess "community standards" in this environment. A network operator is likely to comply with the rules of the

most restrictive jurisdiction, in order to limit its liability.[27] As networks become global, the First Amendment might become little more than a "local ordinance", and in conflict with speech principles of other countries.

These examples show that the evolution of telecommunications into a system in which large segments of traffic is carried and controlled by private rather than a general "public" network bears the seeds for the emergence of petty monopolies, largely unencumbered by the protections built into the public network by law, custom, and regulation.

In other contexts, the exercise of speech rights is stymied by access problems, especially to the workplace or to the shopping malls that take today the role of public gathering spaces. By analogy, the access to networks might be foreclosed, and with it its free speech potential.

Are there freedom of speech rights for users in group networks? The scope of these rights is undefined. Constitutional First Amendment rights do not appear to exist, given the absence of state action. Regulatory impositions of such obligations are possible, but are limited by the rights of groups to substantially define their membership and the rules under which they operate, especially where a major purpose of the groups is communication, and thus the exercise of a fundamental right itself, i.e., of speech. In such circumstances group activities may have protection from restrictive regulation.

Unconstrained, network groups, even where they are organized democratically, may act restrictively. A major function of liberties, after all, is to protect minorities from unsympathetic majorities. In the public sphere, guarantees of free speech against governments are part of

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[27] Compare, for example, the experience of a cable program distributor originating in New York who was recently driven out of business by criminal charges for material found objectionable in Alabama.

constitutions. In the network environment, the granting of access and non-discriminatory content-neutrality is required of the general "public" networks by law or common carriage regulation. But common carriage does not necessarily apply to group networks. Groups may institute restrictions on the exercise of speech over their network. They can exclude certain subjects from being discussed, or certain speakers from having access to the network. This could become particularly an issue when telecommunications networks gain the ability to transmit video programs.

Group formation always had a double-edged aspect. On the one hand, they were an extension of individual rights. De Tocqueville noted that the "right of association . . . almost is unalienable in its nature as the rights of personal liberty." On the other hand, freedom of association led to situations inimical to individual as well as to a more general public interest. While many are agreed with the significance of pluralism,[28] others note the negatives.[29]

In this context, the exercise of freedom of association may lead to group formation that are restrictive of speech. Hence, the evolving pluralistic structure of telecommunications creates a new type of bottleneck to the free flow of information that did not exist on the traditional public network and its common carriage. The end users' remedies are largely limited to their

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[28] See, for example, Dahl, Robert A. Who Governs? Democracy and Power in an American City, New Haven: Yale University Press, 1961; Lasky, C. Foundations of Sovereignty, 1921; Lindblom, Charles E. The Intelligence of Democracy: Decision Making through Mutual Adjustment, New York: Free Press, 1965; Truman, David B. The Governmental Process: Political Interests and Public Opinions, New York City: Knopf, 1951.

[29] Nisbet, Robert A. The Quest for Community: A Study in the Ethics of Order and Freedom, New York: Oxford University Press, 1953; Lowi, Theodore J. The End of Liberalism: The Second Republic of the U.S., 2nd ed. New York: Norton, 1979; Kariel, Henry S. The Decline of American Pluralism, Stanford, Calif: Stanford University Press, 1961.

ability to move to another employer, university, hospital, etc. — often an unrealistic choice. If personal mobility would be sufficient to offset market power, no protection against public telephone companies would have ever been necessary. Where individuals could form or join alternative networks, market forces could help. Even then, the ability of any link in a chain of networks to institute content-based tests would impose transaction costs on the entire system. It is for similar reasons that society has adopted the use of the legal tender and of commercial paper to permit low-cost transactions. Common carriage has a similar rationale.

Speech and the free flow of information, discussed above, are not the only problems of the emerging network of networks. For example, the pluralistic network environment has experienced problems in terms of reliability, privacy protection, and in its ability to subsidize certain users and uses. As modern societies become dependent on reliable communications networks, they are greatly vulnerable to service breakdown, as evidenced by recent failures in parts of the American long-distance and local networks. While in many instances competition improves network quality and reliability, this is not always true. Users will not necessarily select higher quality, if they prefer a low price. Yet a low quality decision imposes a cost on other parties. For example, it may take party A four times as long to transmit a fax to a party B that has opted for a low-quality line. In a two-person world, the Coase Theorem would apply and transactions would yield the optimal quality. But in a network environment the number of participants is likely to be too large for such transactions. Furthermore, the network system becomes non-transparent to end users. In a transmission chain of several carriers, which one is to be blamed for faulty quality? This difficulty to identify the culprit can encourage "free

riding" by a carrier and to the lowering of the quality of its own link. This, in turn, can lead to a quality downgrading by other carriers, since it may make less sense to provide quality at a level higher than the weakest link of a transmission chain. Thus, competitive forces and the absence of an end-to-end responsibility may reduce quality.

Similarly, it becomes more difficult to protect informational privacy. A competitive environment may enhance privacy if it is possible for a user to select a service provider which offers the desired level of privacy protection. However, the greater openness of a competitive system and complexities of its multiple networks mean a greater openness of information. It is easier to restrict the dissemination of confidential information in a monopoly setting. This means that a pluralistic environment must include protections against the out-leaking of information.

A pluralistic network also makes it increasingly difficult to maintain the traditional system of internal transfers from one class of users to another. It took a monopoly to do so in the old way. But one can still assist some categories of users or uses if one wishes to do so, and all political signs point to a continuation of support, for example for the rural population. Yet in a pluralistic network environment this cannot be done through internal redistribution within the customers of one network, since they would migrate to other networks, in a process of "network tipping," similar to that experienced in some city neighborhoods, until only the poor are left. In the future, any subsidies will have to be raised and distributed in the normal manner of taxation and budget allocation, e.g. by a telecommunications value-added tax, a "universal service fund," and other devices. This, too, leads to various forms of regulatory involvement.

IV. INTEGRATION

So far, we have discussed centrifugalism in the telecommunication sector and its implications. We will now turn to issues of integration in the network system that are aimed at maintaining cohesion.

To reconcile the centrifugal pressures with the needs to inter-operate and inter-communicate represents the main challenge to policymakers for the next decade. This does not mean to recreate a monopoly system, but rather to provide the system with tools of inter-operation where they are not self-generating by market forces. The past decade has been preoccupied with market liberalization and the aftermath of the AT&T divestiture. This will continue, but it will also be inevitable to move beyond this agenda and to assure the functioning of a network based on diversity. This is a unique undertaking because it has never been done before. The two critical tasks are, first to assure **physical** interconnectivity; and, second, to assure informational interconnectivity across networks. We will begin with the first issue.

Modularizing the Network

As various discrete networks grow they must interoperate in terms of technical standards, protocols, and boundaries. Yet interconnectivity does not happen by itself; that is the lesson of decades of American experience. As part of the 1913 Kingbury Commitment, AT&T agreed to interconnect local independent telephone companies with the Bell System long-distance network.[30] The antitrust suit that ended in the break-up of the Bell System centered on MCI's

[30] U.S. v. AT&T, No. 6082, U.S. Dist. Ct. of Oregon, Original Petition, July 24, 1913. Nathan C. Kingsbury to James C. McReynolds, December 19, 1913 (Kingsbury Commitment).

interconnection problems with Bell-controlled local exchanges.[31]

This leaves a highly controversial and complex role for regulators, as they are asked to overcome barriers to interconnection.[32] These various interconnection arrangements establish a series of interface points and standards that create, in effect, a modularized network. This can be done in an ad hoc fashion, though this may impose over time major inefficiencies, or in a systematic fashion, though this may be too complex. Whatever the system, within each module people could do more or less whatever they wanted. But one could replace one module, and it could interact with the others and transfer into them, usually for a charge.

In the United States, steps have begun to provide tools for integration. For academics, policy makers, and industry strategists, the challenge for the future is to create such tools.[33]

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[31] *Unites States v. American Telephone and Telegraph Co.*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom., Maryland v. United States*, 460 U.S. 1001 (1983).

Interconnection problems also arose in the context of billing early in this century. There, a court required that telegraph companies offer the same favorable credit and billing terms to competing telegraph companies as to their other customers (*People ex rel Western Union Telegraph Co.*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom., Maryland v. United States*, 460 U.S. 1001 (1983)). The railroad industry faced similar issues when attempts by some carriers to exclude rivals or exploit bottleneck facilities attracted Federal scrutiny (see, for example, *Louisville & Nash. R.R. v. United States*, 238 U.S. 1 (1915) (upholding a decision finding discrimination in railroad facilities and requiring the affirmative action of interconnection); *United States v. Terminal R.R. Ass'n*, 224 U.S. 173 (1912) (requiring equal treatment of competitors.

[32] One recent example is the granting to interconnectors in New York State of so-called collocation rights to the public networks.

[33] When I was Commissioner on the New York Public Service Commission, we initiated several regulatory actions and proceedings in that direction: a multi-carrier ISDN trial; open network architecture principles and rules; common carriage rules that protect the flow of content in the federated network system; local interconnection arrangements known as physical collocation; billing and collection arrangements that permit a better financial integration of the system; privacy rules; and the beginning of dealing with quality issues in a federated system.

Thus, the pluralistic network is a modularized network. As the network becomes modular, the relation of the various modules to each other becomes paramount. Issues of interconnection include protecting technical compatibility, access charges, data privacy, service quality, and others.

To illustrate this it is helpful to graph a network schematically as a box in Figure 1. The horizontal dimension consists of hardware segments (such as inside wire, local loop, central office, etc.) and the vertical axis consists of the various layers of software.[34] In such a fashion we can map a network and every function in it. For example, terminal equipment (CPE) appears on the left of the upper box, while an interexchange carrier (IXC) is on the lower right, and a software module in a switch such as a voicemail box is up at the top. The entire area mapped in this box used to be the sole province of AT&T.

When rival newcomers emerged (lower box), their interconnection with the traditional network became essential. Their alternative service blocks lacked the connecting physical and software elements that are necessary for an end-to-end connection with users, and the incumbent monopolist was not about to offer such inter-connection to its rivals. Thus, while eventually the competitive islands will grow larger and fill the entire map, these islands can survive only if one assures the ferry service to them. This can be traced in the network map through the various

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[34]An example for modular software is the OSI hierarchy (Open Systems Interconnection). OSI is based on a hierarchy of seven layers, each of which has defined functional responsibilities. They are, in principle, independent modules, and in theory one can rewrite the software protocol for any layer, and replace it without having to change any of the other layers. The main point is that it is a hierarchy. On top of the OSI layers are software layers for economic transactions such as billing, and for content.

interconnection arrangements that were established by regulation. For example, the *Carterfone*[35] decision that allowed subscriber-owned terminal equipment to connect to the network can be shown in the left center of the map. The *Execunet*[36] decision, which allowed long distance carriers to interconnect into the local loop of the traditional network, is shown on the bottom right. Similarly, the map can illustrate ONA[37], the *Inside Wire*[38] decision, or New York State's collocation decision.[39]

The interconnection process that is mapped in this fashion will inexorably continue and will also have profound implications on Federal/state relations. In the past, states have opposed many interconnection arrangements such as those just described because they identified their interests with those of the monopoly.[40] As the modularization of the network increases, ever greater parts of telecommunications service will be composed of multiple blocks or modules: Notions of interstate and intrastate services will blur because the component modules of each

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[35] *Use of Carterfone Device*, 13 FCC 2d 420 (1968).

[36] *MCI Telecommunications Corp. v. FCC*, 561 F.2d 365 (D.C. Cir. 1977), (*Execunet I*); see also *MCI Telecommunications Corp. v. FCC*, 580 F.2d 590 (D.C. Cir.), *cert. denied*, 439 U.S. 980 (1978) (*Execunet II*).

[37] *Third Computer Inquiry*, 104 FCC 2d 958 (1986), *clarified on recon.*, 2 FCC Red. 3035 (1987), *further reconsid. denied*, 3 FCC Red 1135, *vacated and remanded, California v. FCC*, 905 F.2d 1217 (9th Cir. 1990).

[38] Detariffing the Installation and Maintenance of Inside Wiring (CC Docket No. 79-105), 51 Fed. Req. 8498 (1986), *on reconsideration*, 1 FCC Rcd. 1190 (1986), *on further reconsideration*, 3 FCC Rcd 1719 (1988), *remanded sub nom., National Assoc. of Regulatory Utility Commissioners v. FCC, 880 F.2d 422* (D.C. Cir 1989).

[39] Opinion No. 89-12, *Opinion and Order Concerning Regulatory Response to Competition*, Case 29469, issued May 16, 1989, at 24-29.

[40] See *North Carolina Utilities Commission v. FCC*, 537 F.2d 787 (1976); 552 F.2d 1036 (1977).

service will cross jurisdiction:[41] some of them will be interstate, some of them will be intrastate, some of them will be international, and others will exist nowhere physically.[42]

Analogous issues exist for television media. For example, a major controversy is the nature of interconnection of local broadcasters and cable distributors — so-called must-carry[43] and syndicated exclusivity[44] rules — and the connection of national television networks with

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[41] The traditional notion of jurisdictional separation found in the 1934 Communications Act was based on a linear, spatial concept of what a network was, borrowed from earlier railroad regulation: local was close, long distance was far, international still farther. This was based on network architecture, which was configured, within economic constraints, to minimize transmission distance. But today, transmission has become a much smaller portion of telecommunications costs and will continue to decline, making telecommunications relatively distance-insensitive. As a result, the nature of the architecture changes, which has consequences for the jurisdictional question.

[42] Network modularity and interconnectivity affects not only transmission, but also switching, including local switching, which traditionally was the essence of intrastate jurisdiction. The FCC's *Arco* decision, which allowed users to interconnect to the local exchange of their choice as long as it is "privately beneficial without being publicly detrimental," marked a significant step toward breaking the grip of state jurisdiction on switching. The FCC's decision, which in effect permitted one telephone company to interconnect into another telephone company's central office, suggests that just as one can plug a "Mickey Mouse" telephone or a PBX into the network, one can also plug an entire network into a network. And while in this instance it was one Texas-based local exchange company versus another (Southwestern Bell vs. GTE), there is no reason why interconnection on this scale could not occur across state lines. Once that happens, local switching may just as easily be interstate as intra-state.

[43] Must carry rules, which had been codified at 47 C.F.R. §§ 76.57-76.71 (1984), were held unconstitutional. *Quincy Cable TV, Inc. v. FCC*, 768 F.2d 1434 (D.C. Cir. 1985).

[44] *In re Cable Television Syndicated Program Exclusivity Rules, Report and Order in Docket Nos 20988 and 21284*, 79 F.C.C.2d 663 (1980) (FCC deletes its own syndicated exclusivity rules), *aff'd sub nom. Malrite T.V. of New York v. FCC*, 652 F.2d 1140 (2d Cir. 1981), *cert. denied*, 454 U.S. 1143 (1982).

program production — so-called financial interest and syndication rules.[45]

Traditionally, the TV box and the telecom box were fairly separated. Within each box diversification and integration was taking place, but there was not much interaction between them yet. But this will radically change, and soon.

The vision that the telecommunications network of the future is often expressed as a scenario of a single super-pipe in which there is no room for alternative communications carriers, or of rival transmission media such as cable television, because they have become technically "unnecessary". Yet such a disappearance of other carriers and media is highly unlikely, given the forces of diversification discussed above.

Instead, these different media, each increasingly complex on its own, and each operating on a different set of basic rules, controls, and ownership status, will first overlap and then integrate. In terms of the graph, one can think of the telecommunications box superimposed by a television box, with all their elements becoming potentially interconnected under arrangements that must still be established. And on top of that, these changes will cut across national boundaries. The pathways of change lead beyond the particular technologies they employ to a network system that might be called the "triply integrated" digital and modularized network, or ISDN. It is integrated across services (such as voice, data and video), carriers, and frontiers. For example:

- Cable companies will carry voice and data traffic normally associated with telephone regulation over a combination of stationary and mobile communication

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[45] 47 C.F.R. §73.658(j). See *Network Television Broadcasting, Report and Order in Docket No. 12782*, 23 F.C.C.2d 382, *modified on recon.*, 25 F.C.C.2d 318 (1970), *aff'd sub nom., Mt. Mansfield Television, Inc. v. FCC*, 442 F.2d 470 (2d Cir. 1971).

networks;

- Telephone companies are pressing to deliver video programming, creating the likelihood that video signals in the future will be sent over upgraded telephone lines;
- The success of cellular and development of other "tetherless" telephony is leading a growing portion of local voice traffic onto the air;
- Computer-based videotext, audiotex, as well as broadcast electronic mail and broadcast fax services provide telecommunications networks with mass media functions;
- Personal computers and CD-ROMs are now being developed that will integrate video and text, putting "television" through computer networks, and permitting new forms of informational roaming;
- Video-by-demand, based on video libraries and switched service, makes some of television from a mass-medium into an individualized medium;
- Interactive computers and video create "virtual realities" of total media tailored to the individual user;
- Libraries move from traditional concepts of storage to those of access and networking;
- Books and documents move from static and individualistic concepts to those of dynamic update and group interaction
- Computers, tele- and video-conferencing become new forms of public fora;
- Individualized fax-newsletters based on an individual's particular interests

fragment the concept of the mass newspaper audience;

- In fast-packet networks, information travels across multiple simultaneous pathways, routing itself and recombining itself at the destination, thus putting into question the very concept of a communications conduit.

This, too, has major consequences, on the free flow of information just as centrifugalism has. New and "hybrid" media, with aspects drawn from many sources, will proliferate. When the drafters of the Bill of Rights guaranteed Americans freedom of speech, they could not foresee the many electronic means through which information would be carried and extended. As those media developed, different treatments of speech emerged. Broadcasting, cable television, telephony, video recordings, satellites, computer communication, and other technologies came to operate under separate regulatory regimes.

But today, as Ithiel de Sola Pool noted, "the one-to-one relationship that used to exist between a medium and its use is eroding."[46] Media that traditionally operated under one set of regulations will soon be carrying traffic normally associated with other regulatory schemes. In a world of integrated digital networks, where voice, data and video are intermingled streams of bits that interact in an electronic realm of numerous networks, the different regulations now associated with different media will be unworkable. A bit is a bit is a bit, whatever traditional regulation says.

V. Common Carriage

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[46] Ithiel de Sola Pool, *Technologies of Freedom*. Cambridge, Mass.: Harvard Univ. Press, 1983.

The new system challenges a free flow of information across the various parts of the network. If some of the elements of the network federation restrict use for certain kinds of content, in the way described in Section III, the entire information flow is being restricted, because at each interconnection point of the modular system one may have to institute content tests. Physical interconnection of transmission conduits goes hand in hand with content flow. In the centralized monopoly network system, content neutrality had been established Content neutrality had been established under rules of "common carriage."

We should distinguish the notion of common carriage from several other intertwined concepts that are frequently but inaccurately used as synonyms.[47] A common carrier need not be a "public utility" or a "regulated monopoly," and vice versa; for example, public buses operating as common carriers are neither utilities nor necessarily monopolies; conversely, public utilities in electricity provision are not common carriers.[48] Common carriage may exist under common law rules even in the absence of statutory classification as a public utility. Another concept, "universal service obligation," is the requirement of a carrier to reach every willing user and desired destination, wherever located, while in contrast, common carriage refers to service obligations toward users *given* a physical plant, however small or extensive. Finally,

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[47]Parts of this section originated in a discussion memo by the author when he was a member of the New York State PSC, as part of Case docket [89-C-099] initiated by him and resulting in common carriage rules adopted by the PSC [February 20, 1990]. *(Opinion and Order Adopting Regulations Concerning Common Carriage, Opinion No. 90-9)* He was assisted in its drafting by Tom Aust.

[48] Some common carriers have been also regulated as public utilities, and have been given, by statute, powers of eminent domain, use of public rights-of-way, and protection against some competition, while being subject to price and service regulation.

"affordable rates," though often tied to common carriage, are a monopoly and utility issue; where common carriage is concerned with price, it is not with absolute price levels, but rather with relative ones, to prevent undue differentiation among users or uses.

For centuries, common carriage principles have played an important role in the infrastructure services of transportation and communications. For one hundred years these principles, despite their often confused application and interpretation, have aided telecommunications users' access, and thereby also stimulated the development of networks. In return, for reduced discretion, the network operator obtained certain benefits, including limited liability for the consequences of its own actions.

As with other efforts to balance private and public interests, common carriage is at times burdensome, by proscribing discriminatory actions. And over the years there has been some confusion produced by inconsistency in its definition and application. Yet the common carrier system has served telecommunications participants well: it has permitted society to entrust its vital highways of information to for-profit companies, without the specter of unreasonable discrimination and censorship by government or private monopolies; it was an important element in establishing a free flow of information, neutral as to its content; it reduced the administrative cost and the burden of liability of the network operator, since it needed not, at least in theory, inquire as to a user's background (beyond credit-worthiness) and intended use; and it protected the telephone industry from various pressure groups who would prefer to have it not deal with their targets of protest or competition.

As an institutional arrangement, common carriage encouraged usage and benefitted the transportation and communication sectors in a fashion similar to that of free speech protection

for the press, limited liability for corporations, legal tender for currency, and negotiable instruments for commercial transactions.

A common carrier has traditionally been defined as one which holds itself out as being ready, upon demand and without discrimination, to carry goods for the public at large, for hire or reward. The concept goes back for centuries, even to the Roman Empire which established law on the duties of shipowners, innkeepers and stable keepers. In England early common law placed certain duties on businesses which were considered "public callings," such as bakers, brewers, cab drivers, ferrymen, innkeepers, millers, smiths, surgeons, tailors and wharfingers.[49]

> In 1701, an English Court found in an important case that
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> "If a man takes upon him a public employment, he is bound to serve the public as far as the employment extends; and for refusal an action lies, as against a farrier refusing to shoe a horse...Against an innkeeper refusing a guest when he has room...Against a carrier refusing to carry goods when he has convenience, his wagon not being full." [Lane v. Cotton, 1Ld.Raym. 646, 654 (1701, per C.J. Holt].

The concept of common carriage crossed the Atlantic and became part of the American legal system. In the United States, in the 19th Century, common carriage was broadly applied to railroads and later other transportation and distribution mediums. In 1848, New York state required telegraph companies to provide non-discriminatory service to competing telegraph companies as well as to individuals. In 1901, after many states had reached the same conclusion, the U.S. Supreme Court affirmed the Nebraska supreme court holding that at common law a telegraph company is a common carrier and owes a duty of non-discrimination.

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[49] See, C. Phillips, Jr., The Regulation of Public Utilities, 2nd ed., p.83, Arlington, Va., (1988). See Aust, t.

Western Union Telegraph Co. v. Call Publishing Co., 181 U.S. 92, 98 (1901).[50]

Importantly, a user's right of service from a common carrier are not dependent on statute or public utility regulation. Statutory public service regulation has augmented common law common carriage rather than supplanting it.

In 1934, Congress established the Federal Communications Commission. Title II of the Communications Act (47 U.S.C. sections 201-221) describes common carriers in a circular fashion, as "any person engaged as a common carrier for hire" (47 U.S.C. 153(h)).

A court later opined that,

> "The common carrier concept appears to have developed as a sort of **quid pro quo** whereby a carrier was made to bear a special burden of care, in exchange for the privilege of soliciting the public's business."[51]

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[50]Local, state, and federal governments took an active role in prescribing and enforcing common carrier type duties on various businesses. State and federal public utility regulation usually extended common law concepts by also regulating entry, exit, prices, industry structure and competition. Many of these efforts were designed to ease or distribute the burden of enforcing users rights at common law, as well as attain broader social objectives not necessarily embraced by common law common carriage, such as universal service.

The states' earliest approaches to public utility regulation involved legislative decision-making with implementation by specific statutory enactments. The New York state legislature began setting railroad rates as early as 1855. State regulatory boards soon replaced legislative regulation notably in Illinois and Massachusetts. The first independent, broadly empowered regulatory Commissions were set up in 1907 in New York and Wisconsin. And as telephone use increased, more states began to regulate it.

The New York Public Service Commission's authority was expanded to include communications by telephones and telegraph in 1911. By statute, telegraph and telephone corporations were regulated and given the responsibilities of common carriers (such as non-discrimination, reasonable service availability, etc.), although there was no reference made to common carriage of communications. Public utility concepts of price and entry regulation were also applied.

[51]NARUC v. FCC, 525 F.2d 630, 640-42 (D.C. Cir. 1976), cert. denied, 425 U.S. 992 (1976) (NARUC I).

Another court declared that "[w]hether a carrier is a common carrier ... does not depend upon whether its charter declares it to be such, ... but upon what it does."[52] Self-determination is still an important element of common carriage. In NARUC I, the court pointed out that while regulators cannot create a common carrier by simply defining them as such, they do have the power to compel carriers to act as common carriers.[53]

Reasonable opportunities for interconnection are an essential element of the common carrier's duty of service. Railroads, for example are required to interconnect at the point of choosing of the tendering carrier, unless otherwise specified by the shipper. [54] Furthermore, common carriers have an obligation to provide service to any and all comers, except where service is clearly being used for illegal purposes.[55]

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[52] United States v. Brooklyn Eastern Distr. Terminal, 249 U.S. 296 (1919).

[53] See NARUC v. FCC, 525 F.2d at 644, n. 76 ("it is clear that the Commission had the discretion to require [the service provider] to serve all potential customers indifferently, thus making them common carriers"). Telecommunications carriers offering services only to a limited group of users have been held to be still common carriers for that limited group of users. For example, common carriers have provided service which they legally made available only to: theater owners, Theater Television Serv., 9 P&F Rad. Reg. 1528, 1538 (FCC 1953); stock exchange members, Western Union Tel. Co. Sicom Serv., 11 FCC 2d 1, 9 (1967); television broadcasters, TelePrompter Corp., 13 Rad. Reg. 111 (FCC 1955); the U.S. Postal Service, Graphnet Sys. Inc., 73 FCC 2d 283, 298 (1979).

[54] 49 U.S.C. 10742 & 10763 (1983). See also McKinney's Consolidated Laws of New York, Transportation Law, sections 97, 106 112 which require interconnection with shippers and other railroads. And see Louisville & Nash. R.R. v. United States, 238 US 1 (1915).

[55] Movietime Inc. v. New York Telephone Co., 277 App. Div. 1057, 101 N.Y. Supp.2d 71 (2d Dept. 1950). However, these grounds are very limited. In Nadel v. New York Tel., 170 N.Y.S.2d 95, (1957) petitioner's phone service was disconnected because of the carrier's suspicion that the telephone would be used for illegal gambling transactions. The court directed that service be reinstated, finding that the telephone company "is not at all qualified, in the absence of evidence of illegal use, to withhold (sic) from the petitioner, at will an essential and public utility." 170 N.Y.S.2d at 98.

And in a similar case, Shillitani v. Valentine, 53 N.Y.S. 2d 127 (1945), the court stated

Today's application of common carriage is constantly shifting and requires continuous updating.[56] Telecommunications, after a long period of gradual change, are presently in an extraordinarily dynamic phase in terms of technology, applications, and industry participants. New uses, configurations and players in the telephone network have emerged which raise the question how principles going back to the Elizabethan Age should be defined to apply today and for the future. This will be discussed in the next section.

VI. NEW PRINCIPLES

When it comes to rules, it is perhaps best to think in terms of a hierarchy, just like in the world of computers, where there exists a hierarchy of control instructions — assembly

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that absent illegal use, "a telephone company may not refuse to furnish service and facilities because of a mere suspicion or mere belief that they may be or are being used for an illegitimate end; more is required." 53 N.Y.S. at 131 (citations omitted). The court went on to quote approvingly of a California case (People v. Brophy, 49 Cal.App.2d 15, at 33, 120 P.2d 946, at 965) where the police exercised veto power over telephone installations. The California court, found the arrangement unenforceable and stated, "[p]ublic utilities and common carriers are not the censors of public or private morals, nor are they authorized or required to investigate or regulate the public or private conduct of those who seek service at their hands." 53 N.Y.S. at 134.

See also Hewitt v. New York, N.H.& H.R.R. Co., 284 NY 117 (1940) (involving discrimination charges against a rail carrier), and Trailways of New England, Inc. v. C.A.B., 412 F.2d 926, 931 (1st Cir. 1969) (regarding an air carrier), where the court stated, "not only is the right to be treated fairly and non-discriminatorily by a common carrier an expression of the pervasive precept of fairness between government and governed that runs through American jurisprudence, it is one derived from the common law of common carriers."

[56]Individualized tariffs filed by AT&T have been very recently examined by the FCC and rejected as being too narrowly drawn. The Commission however, decided to allow the tariffs to be reformed and refiled so as to allow any similarly situated user to make use of the services offered. FCC NEWS, press release regarding action on AT&T Tariff 12 (CC Docket 87-568), 4/12/89.

language, machine language, and programming languages. One can have *rules of detail*, such as the maximum number of seconds to get a dial tone by a subscriber, or the exact rate that can be charged by a carrier for a local call at 3 p.m.. At the other extreme, there are *fundamental societal tenets* such as freedom of speech, property rights, or freedom to travel. In between there are intermediate *rules of principle*, often codified by statutes of varying specificity.

In the U.S., rules of detail are well-developed, it being a pragmatic society. It is also surprisingly good about the fundamental tenets, a legacy from brief but creative historic periods in which big-picture issues were taken very seriously. The weak link in the hierarchy of rules is the intermediate range. In telecommunications, that means primarily the 1934 Communications Act, and the assorted state public utility statutes. These laws persist largely unchanged because various interest groups, including state regulators themselves, fear losing out by change. Buf self-interest is only one part of the reason. The other is that we are not really sure what such a set of intermediate rules would include, if one could write it.

The 1934 Communications Act was written before TV was out of the labs; before microwave; transmission before satellites; before micro-electronics; before computers; before coaxial cable; before real data communications; and before most intercontinental telecommunications. Title II of the 1934 Act, which deals with telephony, is basically the ICC's 1910 Mann-Elkins Act provisions of railroad regulatory principles, which themselves date back to 1887.[57]

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[57] An excellent book, *A Legislative History of the Communications Act of 1934*, (Max Paglin, ed., New York: Oxford University Press, 1990), with academic experts as interpreters of various chapters of the Act, documents that there seems to have been very little in the way of principles. The Act is largely a string of provisions, with several implicit or explicit values.

Its major problem is that it deals with separate transmission media differently. In other words, it is not transmission-path neutral. Entirely different regulatory models exist for the different segments of the communications system, such as common carriage, private network status, cable television regulation, or the publishing model. This was fine in the past, but it is not where technology and applications are taking us. The difference in status is sustainable only as long as the underlying media are kept apart. As they grow together and interconnect, these differing rules must be reconciled. What are needed therefore are some basic rules that tie together common carriage, private carriage, cable television and broadcasting status, and publishing.

In order to develop such rules, we must rethink the way we build regulatory policy. Rather than think of it as a mixture of the pacification of interest groups and the maximization of the agency's budget, which seems to be the cynical orthodoxy, let us think of ourselves as drafters of an original social contract. Suppose telecommunications were only an idea on the drawing board, and we were starting a network system from scratch, though with today's technology at our disposal. Do not think in terms of the traditional "public network" with peripheral networks attached to it. There is no such thing as a "public network." Furthermore, do not think in terms of telecommunications, broadcasting, cable, wireless, etc. Instead, a variety of providers of conduit and content are likely to participate in offering content and conduit. None of us knows if he is going to be a user or a provider. None of us knows if he is going to be large or small. Let us think of ourselves as a kind of electronic constitutional convention, as the Founding Grand-children. What should the principles that integrate across media and services look like?

1. **Freedom of content is technology neutral. Government shall not prohibit the free exercise of communications or abridge the freedom of electronic speech, or of content provided by the electronic press, or of the right of the people to peaceably assemble electronically.**

This is basic 1st Amendment, applied to electronic communications. Prof. Lawrence Tribe has recently suggested the need for a 27th Amendment to say something like that.[58] But it might be enough to persuade courts to read such neutrality into the 1st Amendment.

First Amendment protection directly addresses governmental restriction. It does not deal with private restriction. Here, common carriage conduits are the foundation of free speech. It means non-discriminatory conduit service, neutral as to content, users and usage. FCC Chairman Alfred Sikes' concept of the video dial tone has such a common carrier orientation.

At present, common carriers are basically the providers of the "public switched telecommunications network." But with competition, one cannot maintain over the long run a system of "official" public networks with special rights and burdens. Or designating some new networks as public networks and not others. Alternatively, one would have to abolish all private carriage. Yet that would violate principles of property, freedom of association, and encouragement of innovation. What is needed is the establishment of a mixed private-public network system. Instead of the present system of some carriers being public and others private,

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[58] Lawrence H. Tribe, "The Constitution in Cyberspace: Law and Liberty Beyond the Electronic Frontier." Keynote address at the First Conference on Computers, Freedom & Privacy, March 26, 1991.

a system of *partial* common carriage would apply to all carriers who participate in an interconnected network of networks. There would be no such thing as the public network.

2. **All electrons and photons are created equal. Carriers operating as a common carrier must be neutral as to content, use, and users. The transmission of lawful communications shall not be restricted by a common carrier. Common carriers are not liable for the use to which their conduit is put.**

3. **Where no competition exists in a conduit, it must be offered on a common carrier basis on at least part of the capacity.**

This would cover telephone carriers, and that part of the capacity of cable companies offered along the lines of today's "leased access" and "public access."

4. **Competitive transmission segments need not be common carriers. But if a transmission segment interconnects with or accesses other networks by taking advantage of common carrier access rights, it must offer such rights reciprocally on part of its capacity.**

A purely private network which does not demand interconnection with a common carrier may refuse to carry the signals of any user or of other network. It is not a common carrier. However, once it chooses to make use of common carrier access to another carrier, it must reciprocally open up part of its own capacity to others. Where common carriage is used in a downstream direction, it must also be offered in a upstream direction. For example, where a private carrier is connected to a common carrier, and its users have no alternative conduits, it must not abridge access to a common carrier and communications carried over it. In such a fashion, one creates common carriage "rights-of-way." Such rights-of-way would function like

public roads and highways that pass private property, or like easements that allow public passage through private land. They would permit the unimpeded transmission of content and services across the various interconnected networks and enable end-to-end connectivity, although not necessarily on the entire bandwidth of a transmission. Some rights-of-way would be quite wide superhighways, while others could be narrow but otherwise unobstructed lanes.

5. **Any party complying with a conduit's reasonable technical specification may interconnect into, access, or exit any common carrier conduit segments at interface points, which must be provided at technologically and economically reasonable intervals.**

This is, in effect, an open network interconnection provision. It creates a modularity in the network.

6. **A conduit may offer carriage of any type of service over its conduit, and interconnect with any type of carrier. Monopolistic conduit segments can be accessed by their own content services only where adequate capacity is available for common carrier access and subject to antitrust principles.**

This provision provides for open entry and a level playing field.

7. **Government shall make no law establishing a network privileged in terms of territory, function, or national origin (as long as there is reciprocity). Nor shall it burden any network more than its competitors, except with compensation.**

This provision removes barriers between carriers based on assignment for particular tasks. It also protects against restrictiveness by carriers.

8. **Financial support for some users (e.g., universal service), and to content providers, content, or technologies, where instituted by government, must be generated and allocated**

explicitly, and the burden of such support be placed on general revenue or equally on all competitors.

This is one of the more sensitive issues. At present, redistribution operates inside the public network, across its customers. But this system cannot be stable over time. Instead, any subsidies would have to be generated explicitly by a tax, or a charge on all forms of telephone service.

9. **Information must move freely across interstate and international borders, without unreasonable burdens by state or national jurisdictions. No content or carrier should be treated in a country more restrictively than domestic providers are. But the right to equivalent treatment in another country requires reciprocity at home.**

10. **The federal jurisdiction sets basic national telecommunications policy where it deems national solutions to be clearly necessary. It may delegate flexibility in application and implementation to lower-level governmental bodies, who may also set policy for functions of clearly local nature.**

This is the jurisdictional division.

None of these principles is especially earth-shaking. But in the aggregate, they provide a framework that integrates common carriage with private carriage and carriers such as cable television, and it does so without the used for an official public network.[59]

VII. CONCLUSION

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[59] These principles need not be strictly read, but more in the nature of rebuttable presumptions, subject to differing applications depending on circumstances. Furthermore, we obviously do not start with a clean slate. Established interests exist. It would not be fair to change the rules on some people in mid-stream.

The task of constructing a post-deregulatory policy will be a much harder task than the initial revolution of liberalization. We have already noted several trends in telecommunications that such a policy must address. First, the success of the public network in creating broad-based communications undermines its own foundation by creating forces of centrifugalism. These forces both allow and encourage network pluralism — the growth of diverse private networks outside the bounds of the traditional public network. Second, the exercise of that pluralism, while creating greater diversity, undermines the traditional openness of telecommunications that network users have come to expect. Third, traditionally separate networks for telephony, video and data will merge technologically. And fourth, in response to these conflicting trends, network architecture will have to become more modularized to permit interoperability.

In this environment, one needs a compass, and "competition," as successful a policy as it has been, is not enough of a direction finder anymore, just as a magnetic compass does not help much when one reaches far north. The new lodestar for government is to remember the need to keep the network system together — to become the **national systems-integrator** of last resort.

Similarly, deregulation, conventionally understood as a reduction of rules of detail, is unidimensional. Traditionally, it is believed that if one had 20 little rules, and now only 10, that is deregulation. But it may be more useful to think of deregulation as moving *up* the hierarchy of rules — from details towards principles.

As a consequence, after deregulation there will still be regulation. That is, the liberalization of entry will not eliminate all need for government. Competition will take care of many of the problems that led to regulation — especially on prices and entry. But because

telecommunications is a network system, it gains from interoperability, access, and information flows. Hence, telecommunication regulation will not likely go away any more than it did for airlines. But it will be a different type of involvement, and it will require individuals and institutions who can think in an integrative fashion across services, media and frontiers.

The success of deregulation and liberalized entry, and the technological and economic trends it has unleashed, demand that we establish coherent principles of interconnection and informational free flow as an effort to reconcile the forces of integration and diversification. In the past decade, policy was correctly focused on creating *openness* by reducing barriers and permitting entry. Now, with fragmentation of the network environment proceeding apace, the primary issue is to create points and rules for *interconnection* that permit the continued interoperability of a "network of networks." If properly accomplished, the result will be the network of the future — pluralistic, modularized, flexible, and transnational. In the end, a global pluralistic network will be created to provide the technological options needed for a diverse and open world and an information-based economy.

Telecommunications will operate as an invisible hand mechanism only on a foundation of a set of basic rules of the road. As communications media merge, the invisible hand must ultimately be connected to a body of law. We need a superstructure to the infrastructure.

Network Interconnection