The Race for Value-Added Services: Challenges and Opportunities in the U.S., Japan, and the U.K.

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Program on Information Resources Policy

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Executive Summary

- The markets for enhanced services and value-added networks are expected to grow more rapidly than those for basic services, and the development of new communications services may be limited only by the prolific imaginations of the service providers. Yet several fundamental uncertainties hold interlaced opportunities and threats for value-added service providers (VASPs) and may thus be critical for communications policymakers. These are uncertainties in the technological development of hardware and software in terminals and computers, uncertainties in the development and regulation of advanced common carrier networks, and uncertainties in evolving customer demand.

- Several major changes in regulatory frameworks in the U.S., Japan, and the U.K. aim at securing fair competition and liberalizing value-added service provision. Equal access can be seen in terms of four alternative configurations among carriers, value-added service providers, and users, for accessing communications facilities: Type A equal access would put carriers, VASPs, and users on an equal footing for accessing communications facilities. Type B equal access would put long-distance common carriers on an equal footing in the provision of customer services. Type C equal access puts common carriers and VASPs on an equal footing for accessing basic transmission services for VAS provision. Type D equal access uses standard network interfaces to put value-added networks or users on an equal footing.

- The proliferation of technologies, products, and services has produced a shared need -- how to maintain interconnection. Because communications and computer technologies, industries, and markets have evolved differently, common carriers, value-added service providers, and computer and other equipment manufacturers tend to hold competing positions on the question of who should provide interconnection and how. Standardization efforts raise such questions as whether the proposed new standards of ISDN and OSI would be competitive against de facto standards and installed bases, what problems standardization would pose for the different players, and, finally, who should provide interconnection.

- In the U.S., "comparably efficient interconnection" (CEI) and "open network architecture" (ONA) have been the most controversial of the safeguards stipulated by the FCC in Computer Inquiry III for provision of basic and enhanced service by AT&T and the BOCs. Indeed such CEI requirements as the unbundling of basic service and the resale structure imply the new concept that the carriers would at least partially hand over control of network utilization to the public. Most major players accept CEI/ONA as providing necessary safeguards for fair competition in the enhanced-services market; in fact the major controversy is likely to be over how, rather than whether, to implement such a standard.

- In Japan, the structural separation of NTT's Data Communications sector has raised such controversies as whether NTT is still dominant in the Type 2 market and whether the new company should be regulated differently. It is also controversial whether structural separation would be more efficient than integrated operation, especially in an ISDN environment. For the U.K., two key issues are whether restrictions on simple resale of leased circuits should be eliminated, and what the nature of the relationship should be between the two dominants in computers and communications -- IBM and BT.

- The International Telecommunication Union is struggling to define value-added services; thus there is a question of whether proposed international service definitions would be congruent with existing

domestic regulatory service boundaries. That these boundaries are also changing raises another question -- of how new national regulations can be made congruent with traditional international regulatory frameworks. The ITU agreement allows national governments to approve service providers as registered private operating agencies (RPOAs), but in fact designation of enhanced service providers as RPOAs is new, initiated by the U.S., and may not fit easily into other countries' regulatory frameworks. And finally, there is a question of how to accommodate the battles between liberalized and traditional national regulation within new international regulations under discussion at the World Administrative Telegraph and Telephone Conference (WATTC).

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Introduction

The markets for enhanced services and value-added networks are expected to grow more rapidly than those for basic services; in fact, the development of new communications services may be limited only by the prolific imaginations of the service providers. Yet several fundamental uncertainties hold interlaced opportunities and threats for value-added service providers and may thus be critical for communications policymakers. These are uncertainties in the technological development of hardware and software in terminals and computers, uncertainties in the development and regulation of advanced common carrier networks, and uncertainties in evolving customer demand.

Constantly changing definitions and regulatory frameworks complicate the race for value-added service provision. It is called a race here because of the pervasive competition -- for domestic and international service provision, for defining standards, for providing interconnection, and for influencing the regulatory process. These definitions and frameworks also differ from country to country and between nations and international organizations in an increasingly international arena. Accordingly, this paper begins by laying out the differing and fundamental definitions and structures for those decision makers who may not be accustomed to considering, together and in an international context, technological and market development and regulatory issues for value-added services.*

This paper is intended for readers with a developed communications vocabulary and some basic familiarity with value-added services. For communications policymakers and industrial decision makers, the study examines a broad spectrum of domestic and international regulatory issues for the communications and computer industries in the U.S.,

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* VAS, or value-added services, are roughly defined as telecommunications services that include some processing or information storage in addition to basic transport service. Although there is in reality no generic form of this service -- it is defined differently in different countries -- occasions arise when one needs to discuss, broadly, enhanced services in the U.S., value-added network services (VANS) in the U.K., and Type 2 carrier services in Japan. Hence the use of this acronym in this paper.

Japan, and the U.K. These include questions about how to attain fair competition between common carriers and service providers without unnecessary regulation on common carriers, how to maintain public access to an international advanced infrastructure, and how to develop interconnection standards. An examination of these issues is timely: Regulation of value-added services is becoming more controversial in national and international forums because conflicts between the computer and communications industries, which are looking for emerging growth opportunities, have become more conspicuous.

Several major changes in regulatory frameworks in the U.S., Japan, and the U.K. aim at securing fair competition and liberalizing value-added service provision. To analyze these changes, Chapter 1 defines four types of "equal access" as alternative configurations among carriers, value-added service providers, and users for accessing communications facilities.

Chapter 2 outlines the regulatory frameworks in the U.S., Japan, and the U.K. These frameworks differ in their treatment of telecommunications services in general as well as in their treatment of value-added services. For example, in the U.S., if the service includes any protocol processing, the FCC has at least in the past defined it as enhanced service, but enhanced service has not included simple resale. In Japan, a Type 2 carrier provides any service including simple resale, because there is no definition of VAS. In the U.K., "value-added network services" include significant protocol processing, but simple resale is prohibited. Yet later chapters will suggest that international cross-effects are discernible.

Thus Chapter 3 explores a related problem: The proliferation of technologies, products, and services has produced a shared need -- how to maintain interconnection. Because communications and computer technologies, industries, and markets have evolved differently, this chapter delineates interconnection issues from both the communications and computer technology viewpoints, putting into perspective the competing positions taken by common carriers, value-added service providers, and computer and other equipment manufacturers on the question of who should provide interconnection and how. Chapter 3 also considers the problems underlying domestic and international standardi-

zation efforts, whether proposed new standards of ISDN and OSI would be competitive against de facto standards and installed bases, what problems standardization could pose for the different players, and, finally, who should provide interconnection.

Different regulatory, competitive, and technological environments have created different market and policy alternatives in the three countries. Chapter 4 capsules each country's market conditions and treatment of value-added services. While the British government may regulate British Telecom's value-added network services, at the federal level in the U.S. the FCC's efforts aim at deregulating AT&T and the BOCs with safeguards to maintain fair competition. In Japan discussions on fair competition could change the market structure. This analysis finds that competing and complementary changes in the intelligence and versatility of terminals and in the development of network intelligence, as well as standardization of network architecture, may create opportunities and challenges -- or obstacles -- for value-added service development. Such uncertainties could also be of concern to policymakers.

Communications policy, in turn, faces a task of balancing among competing needs. In the U.S., the FCC stipulated in Computer Inquiry III what have been highly controversial safeguards -- "comparably efficient interconnection" (CEI) and "open network architecture" (ONA) -- for AT&T's and the BOCs' basic and enhanced-service provision. Indeed such CEI requirements as the unbundling of basic service and the resale structure imply the new concept that the carriers would at least partially hand over control of network utilization to the public. Most major players willingly or unwillingly accept CEI/ONA as providing necessary safeguards for fair competition in the enhanced-services market; in fact the major controversy is likely to be over how, rather than whether, to implement such a standard. The concept of ONA raises other questions, for example, about use of innovative technologies, opportunities for non-carriers, problems for tariffing, economic burdens on common carriers, and possible efficiency problems. Chapter 4 also explores possible impacts of alternative proposed amendments to the basic service definition that would have fewer restrictions on protocol processing.

For Japan, Chapter 4 discusses conflicts over the structural separation of NTT's Data Communications sector. It is controversial whether NTT is still dominant in the Type 2 market and whether the new company should be regulated differently. It is also controversial whether structural separation would be more efficient than integrated operation, especially in an ISDN environment.

For the U.K., two key issues discussed are whether restrictions on simple resale of leased circuits should be eliminated, and what the nature of the relationship should be between the two dominants in computers and communications -- IBM and BT.

Beyond the individual countries' current controversies, similar issues are likely to be of concern for future communications policy. For example, what policy alternatives would promote both an advanced infrastructure and competitive benefits in an ISDN environment? And second, how might ONA be applied to structures in countries other than the U.S., such as to NTT's network architecture?

Conflicting regulatory structures and interests meet head on in international communications markets because international communications, a sort of cooperative business, cannot be achieved by a single authority in a single country. Chapter 5 looks at each country's regulatory and market structures and specific concerns. For international value-added service development, it also considers the impacts of blurring boundaries between domestic and international markets, between voice and non-voice communications, and between carriers and non-carriers. The ITU has been struggling to define value-added services; thus there is a question of whether proposed international service definitions would be congruent with existing domestic regulatory service boundaries. That these boundaries are also changing raises another question -- of how new national regulations can be made congruent with traditional international regulatory frameworks. The ITU agreement allows national governments to approve service providers as recognized private operating agencies (RPOAs), but in fact designation of enhanced service providers as RPOAs is new, initiated by the U.S., and may not fit easily into other countries' regulatory frameworks. And finally, there is a question of how to accommodate the battles between liberalized and traditional national regulation within

new international regulations under discussion at the ongoing World Administrative Telegraph and Telephone Conference (WATTC).

As telecommunications becomes more important for businesses and government, telecommunications regulations involve more industrial and foreign policy elements. Chapter 6 summarizes and further discusses how the evolution of technologies and markets have affected and will continue to affect regulatory issues domestically and internationally. Further deregulation in the U.S., Japan, the U.K., and the European Community is likely; the study closes by considering what the impacts might be.

This paper describes the issues based on the information available through February 1987. Major decisions and rulings since that time are briefly discussed in the appendices, although these events do not necessarily affect the substance of this paper.

Chapter One

The Telecommunications Market, Technology, and Regulation: Overview of Changes

The evolution of telecommunications technologies and of customer demand has brought about both dramatic regulatory changes and rapid changes in the telecommunications market worldwide. Following this chapter's overview of the changing telecommunications market, later sections discuss issues in the development of new services, especially value-added services (VAS), focusing on regulatory frameworks and technological development in the United States, Japan, and the United Kingdom.

1.1 The Changing Market

There have been several broad types of changes in the telecommunications market: changes in the variety of basic services, in the sophistication of functions, and in the availability of global interconnections.

1.1.1. Variety of Basic Services

Traditional non-voice services, such as telegraph and telex, have been giving way to new non-voice services, such as computer, facsimile, and videotex communications. These new types of communications still use the traditional but most widely available conduit, the "analog" telephone network, although some switches and transmission facilities are already digital. Some of the new services use high-capacity, high-quality new conduits -- public data networks, such as packet-switched and circuit-switched networks, which are based on digital-switching and digital-transmission technology. Others control their own networks, leasing a variety of pipelines from the common carriers and creating customized services, such as video conferencing and security control. The diversification of these services has been accelerated by the competitive business environment, the spread of home terminals, and technological development in networks. The major players offering new basic services are the common carriers.

1.1.2. Sophistication of Functions

Traditionally, the telephone network was used for person-to-person, real-time voice communications, but enhanced functions have changed traditional communications. Examples follow.

First, personal computers (PCs) or data terminals usually communicate with mainframe host computers, but machine-to-machine communications has spawned a variety of artificial protocols, codes, and formats. To overcome what is similar to a language barrier in human voice communications, the communicating parties or third parties need new types of translation capabilities.

Second, the pace of today's activities calls for one-time or at least easy call completion, while the probability of a busy or absent called party is also increasing. Therefore storage functions have become popular, even though they are not necessarily in real time. These include mailbox capabilities for voice, data, facsimile (fax), and videotex, and repetitive call or re-dial functions. Portable terminals will increase the importance of these functions.

Third, needs for on-line access to databases, because of the complexity of high-volume data and the urgency of data requirements, have created another market for interconnection between man and machine.

And fourth, needs for interconnection among different media, such as telephone, telex, data, facsimile, videotex, and video-phone, call for additional functions.

These sophisticated functions could be provided either by terminals, private computer software, value-added service providers (VASPs*), or common carriers. Competition among these players could become fierce in this field.

1.1.3. Global Interconnection

Interconnection needs begin inside the office; the major portion of information exchange in business occurs there. Local area networks (LANs) and private branch exchanges (PBXs) help form this interconnection. Efficient operations among diversely located offices also

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* A VASP, or VAS provider, primarily provides value-added services, although VAS can also be offered by common carriers.

require intra-corporate networks, which in turn may increase the need for gateways for public networks, private leased circuits, or VASPs. Inter-corporate networking can be supported by VASPs and common carriers. Needs for worldwide networking have emerged because corporations are investing more abroad while databases remain concentrated in the U.S. With users facing the constraints of high communications costs and time-zone differences, the enhanced functions described here are as pivotal internationally as domestically.

1.2. Changing Technologies

Technological changes in networks and in terminals compete with and sometimes supplement one another.

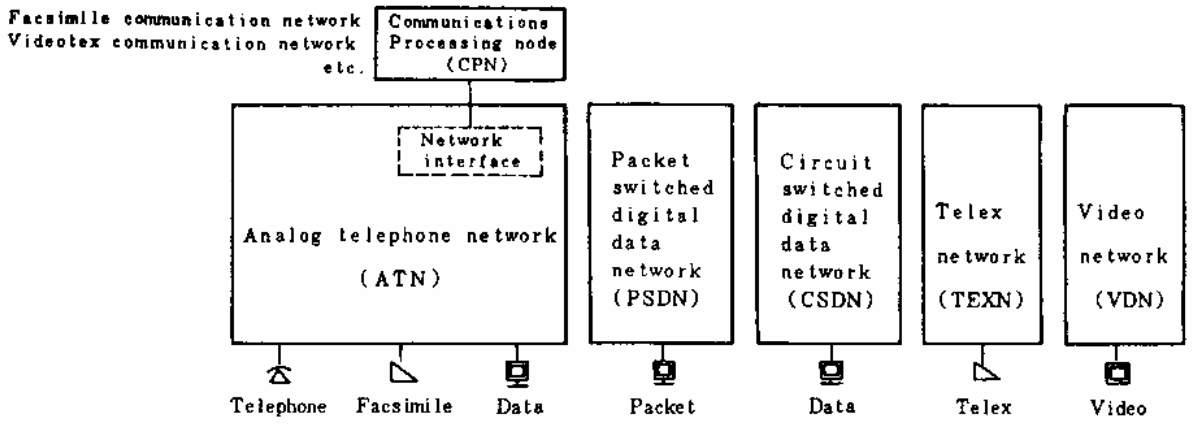
1.2.1. Changes in Network Technologies

Cost-Effective Communications Technologies

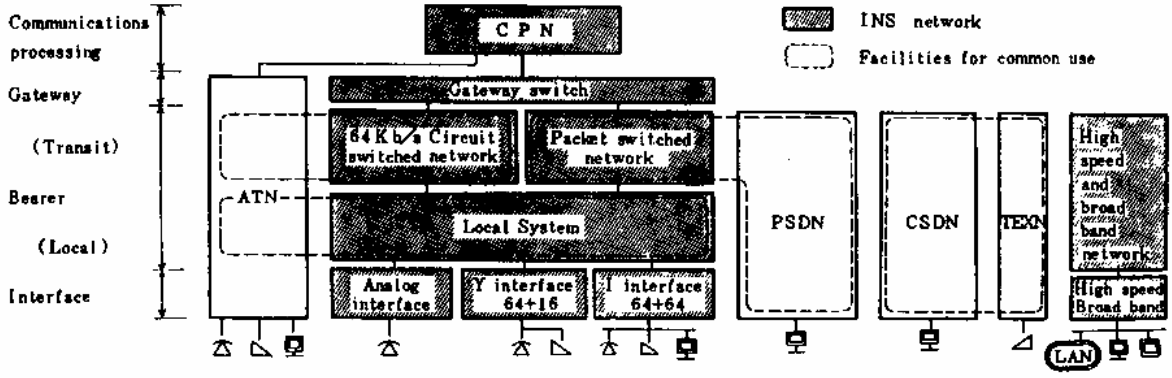
Digital transmission technologies provide cheaper communications services with lower error rates, especially in long-distance data communications. Digital switching, such as packet switching and circuit switching, would be widely available in an ISDN (integrated services digital network) environment. Virtual private networks, which are defined as virtually customer-dedicated but physically public-switched networks controlled by network-management processors and signalling channels, could also save communications costs. Digital leased circuits, as well, could provide cost-effective communications for integrated private networks.

Network Architecture and Competition

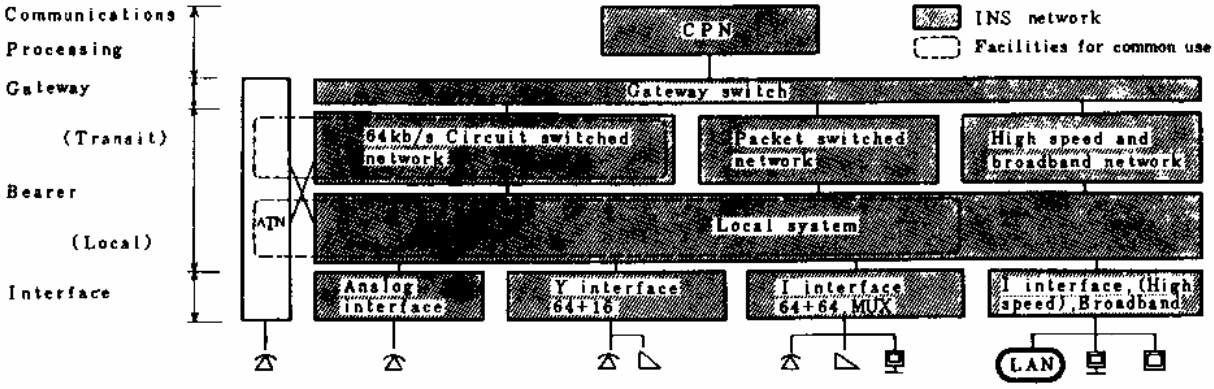
The strongest impetus behind change in network technologies is the effort to bring about ISDNs. The name, however, may be misleading, because ISDN architecture is characterized more by logical and physical segmentation than by integration[1] (see Figure 1-1). This unconventional view of ISDNs is based on observations of the current network architecture in advanced countries, observations of some ISDN experiments, and observations of the development of standardization in the International Telecommunication Union (ITU). The following can be seen as more specific examples of segmentation.



(a) PRESENT (SERVICE ORIENTED NETWORKS)



(b) EXPANSION STAGE



(c) MATURE STAGE

Source: Shin Hashimoto, et al., "Total Digitalization of Telecommunications Network Toward INS," Telecommunications -- Asia, Americas, Pacific: Pacific Telecommunications Council '86 Proceedings (Honolulu: Pacific Telecommunications Council, 1986), p. 191, Figure 2. Reprinted with permission.

Figure 1-1

Transition Process Toward the INS Network

First, ISDNs will begin as dedicated networks similar to existing networks, until some time in the future when all telephone switches could be replaced with ISDN switches.

Second, there would be several different levels of information transmission: 64Kb/s for narrowband ISDNs, 1.5Mb/s for some broadband ISDNs, and hundreds of Mb/s for other broadband ISDNs.[2]

Third, packet-switched networks would be different from circuit-switched networks.

Fourth, a separate signalling channel, the so-called CCIS#7 (common channel inter-office signalling no. 7), creates another network switched by signal transport processors (STPs).

Fifth, network intelligence is also separated from telephone switches. Intelligent functions may be provided through CCIS#7 and processors for network management -- for example, network communications processors (NCPs). NCPs are used for 800 service and for virtual private network service, such as AT&T's Software Defined Network (SDN).[3] Intelligent functions can also be provided through gateways. VAS, such as electronic mail and voice mail, would be provided by the processors interconnected by gateway functions.

In contrast, integration may happen only in terms of physical interconnection between subscribers and ISDN switches, and in terms of physical transmission among ISDN switches. Thus, customers would make use of the ISDN switches as integrated gateways to various services. Segmentation, on the other hand, may be a more critical aspect than integration in regulatory discussions of network architecture for fair competition, treated in depth in Chapter 4.

Enhanced Communications Capabilities

Several processing functions, such as protocol processing, media conversion, storage and forwarding of messages, image, and voice, and database access have been developed by common carriers and VASPs for the enhancement of their network intelligence.[4] For most functions, carriers and VASPs will compete with terminal capabilities, but some protocol processing functions may be provided most economically by common carriers.

Open Interconnection for Computer Communications

Computer communications network architecture has been dominated by IBM's proprietary System Network Architecture (SNA). The old version of SNA was a closed system using private leased circuits, designed for vertical communications between intelligent hosts and dumb terminals, such as IBM's 3270s.[5] A late '80s version of SNA allows communications through public packet-switched networks, and between intelligent terminals. In local area networks SNA has already opened interconnection with non-IBM computers; open interconnection between IBM computers and non-IBM computers through public data networks may be provided by SNA in the future.

Since the early 1980s, the International Standardization Organization (ISO) and its supporting manufacturers have been trying to develop open system interconnection (OSI) standards. The message-handling system (MHS) based on OSI has already been standardized in the ITU's International Telegraph and Telephone Consultative Committee (CCITT).[6] Additionally, common carriers and VASPs may increase their provision of standardized electronic mail services.[7] Evolving OSI standards and de facto standards, such as SNA, may compete with and supplement one another for global communications.

1.2.2. Changes in Terminal Technologies

Terminal Technologies Competing with Networks

Enhanced functions in PBXs and LANs, such as electronic mail and voice mail, may compete with these services offered by the public networks.

Although digital networks may provide new high-capacity digital conduits, high-speed modems with sophisticated data-compression capabilities may be able to use existing analog conduits effectively. Thus, for example, the large installed base of high-speed analog facsimile terminals[8] might be an obstacle in the promotion of facsimile use of the digital network in the short run.

Supplemental Technologies for Networks

Common carriers and customer premises equipment (CPE) manufacturers have supported the development of terminals with such new interfaces as packet-switched networks and ISDNs.

In addition, manufacturers could develop cost-effective, less intelligent terminals in cooperation with common carriers, assuming that the networks would provide enhanced functions. For example, NTT and other manufacturers have offered inexpensive facsimile terminals that do not duplicate the functions of NTT's Facsimile Communication Network.[9]

1.3. Regulatory Changes: Four Types of Equal Access

Several major changes in regulatory frameworks in the U.S., Japan, and the U.K. have been put into effect or discussed, aimed at securing fair competition and liberalizing VAS provision. Figure 1-3 will suggest basic changes in the relationship among carriers, VASPs, and customers, describing these relationships in terms of four types of equal access that reflect what can be seen as a distribution system for telecommunications services. Distribution systems encompass manufacturers, wholesalers, retailers, and end users; this analysis recasts the telecommunications distribution system in terms of carriers' carriers, common carriers, value-added service providers, and users.

The introduction of competition and of equal access has begun to restructure the originally simple distribution system as shown in Figure 1-2.

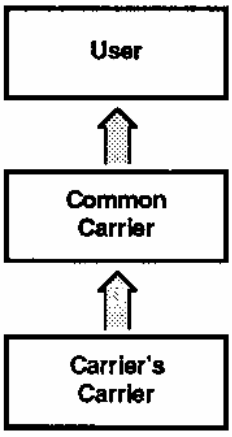
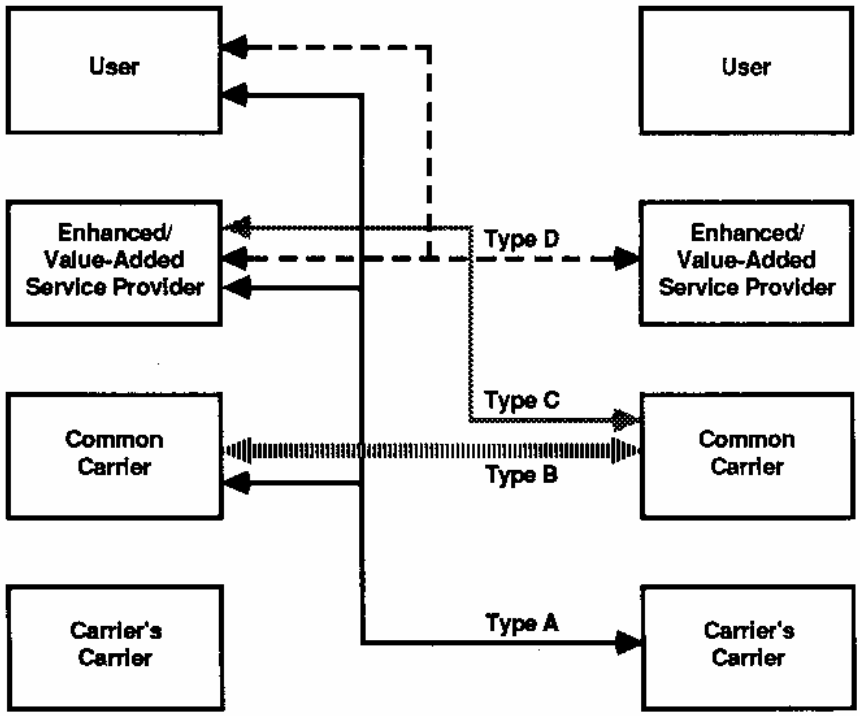


Figure 1-2

Original Structure of Telecommunications Distribution System



Type A equal access: Authorized User decision on COMSAT

Type B equal access: MFJ

Type C equal access: ONA in Computer Inquiry III

Type D equal access: OSI requirement in U.K. 1987 License

Figure 1-3

Evolving Telecommunications Services Distribution System
with Four Types of Equal Access

Type A (carrier's carrier) equal access. This equal access would put carriers, VASPs, and users on an equal footing for accessing communications facilities. In the U.S. during the last decade, there have been two major policy changes concerning the right to access communications facilities. First, parties who are not common carriers, such as enhanced-service providers and end users, can lease satellite communications circuits from the Communications Satellite Corporation (COMSAT).[10] These circuits were originally accessed only by common carriers. Second, enhanced-service providers, although not common

carriers, became eligible for rights to access international cables, known as indefeasible rights of users, or IRUs.[11]

Type B (carrier-to-carrier) equal access. This equal access would put long-distance common carriers on an equal footing in the provision of customer services. Registration of customers' first choice of interexchange carriers in the local switches is intended to secure their non-discriminatory access to local networks. This equal access is mandated by the Modification of Final Judgment (MFJ),[12] with a deadline extended from 1986 to 1988.[13]

Type C (carrier-to-VASP) equal access. Common carriers and VASPs would be put on an equal footing for accessing basic transmission services for VAS provision. The CEI/ONA (comparably efficient interconnection/open network architecture) concept, initiated by the FCC's Computer Inquiry III,[14] envisages this type of equal access. The concept is based on the segmented nature of ISDNs and aims at opening up portions of common carrier bottleneck functions formerly closed to the public.

Type D (VASP-to-VASP) equal access. Incorporated as part of the U.K.'s 1986 revision of licensing requirements for value-added network services (VANS), this equal access requirement uses standard network interfaces to put VANs (value-added networks, or value-added network providers) or users on an equal footing. To avoid a single company's dominance, all large-scale VANs are required to meet OSI standards.[15]

These four types of equal access have significant implications for the telecommunications market and will be discussed in the chapters that follow.

1.4. Differences in Market Structure and Regulation in the U.S., Japan, and the U.K.

1.4.1. Market Structure Comparison

Despite differences in the U.S., Japanese, and British marketplaces -- differences created by the historical development of services and by the newly liberalized regulatory frameworks -- in all three nations dominant carriers still control some market segments. However, the markets are segmented differently, divided in the U.S. into

intraLATA and interLATA (local access and transport area); divided in Japan into domestic and international; and in the U.K., based on duopoly in basic services. The current market structure, shown in Figure 1-4, will be briefly described here.

U.S.A.

The traditional boundaries, such as domestic/international and voice/non-voice have been abolished, although the intraLATA/interLATA distinction remains. Most of the market is subject to stiff competition, although competition in the intraLATA market is limited to network bypass. Common carriers do not dominate the enhanced-services market or the packet-switched network, primarily because of judicial restrictions[16] and because of the strict definition of basic service in the FCC's Computer Inquiries I, II, and III. Packet-switched networks have been dominated by VANs such as Telenet and Tymnet.

Japan

Two dominant carriers share the basic service market, which is divided at the domestic/international boundary. Although new carriers enter certain market segments, such as local, long-distance, mobile, enhanced, and international service markets, NTT and KDD still dominate.

As of November 1986, more than 200 Type 2 carriers, mainly providing value-added services,[17] are registered or have notified the Ministry of Posts and Telecommunications (MPT). NTT also provides value-added services through several divisions and subsidiaries.[18] The value-added services market may grow rapidly during the next decade.

U.K.

A new carrier, Mercury, is trying to catch up with the dominant British Telecom (BT), and its market coverage has expanded from local, long-distance, and international, to packet-switched services. Duopoly will be maintained at least until 1990.[19]

Several hundred value-added services are available, including electronic mail, protocol conversion, and videotex. BT is a major competitor in the VAN market.

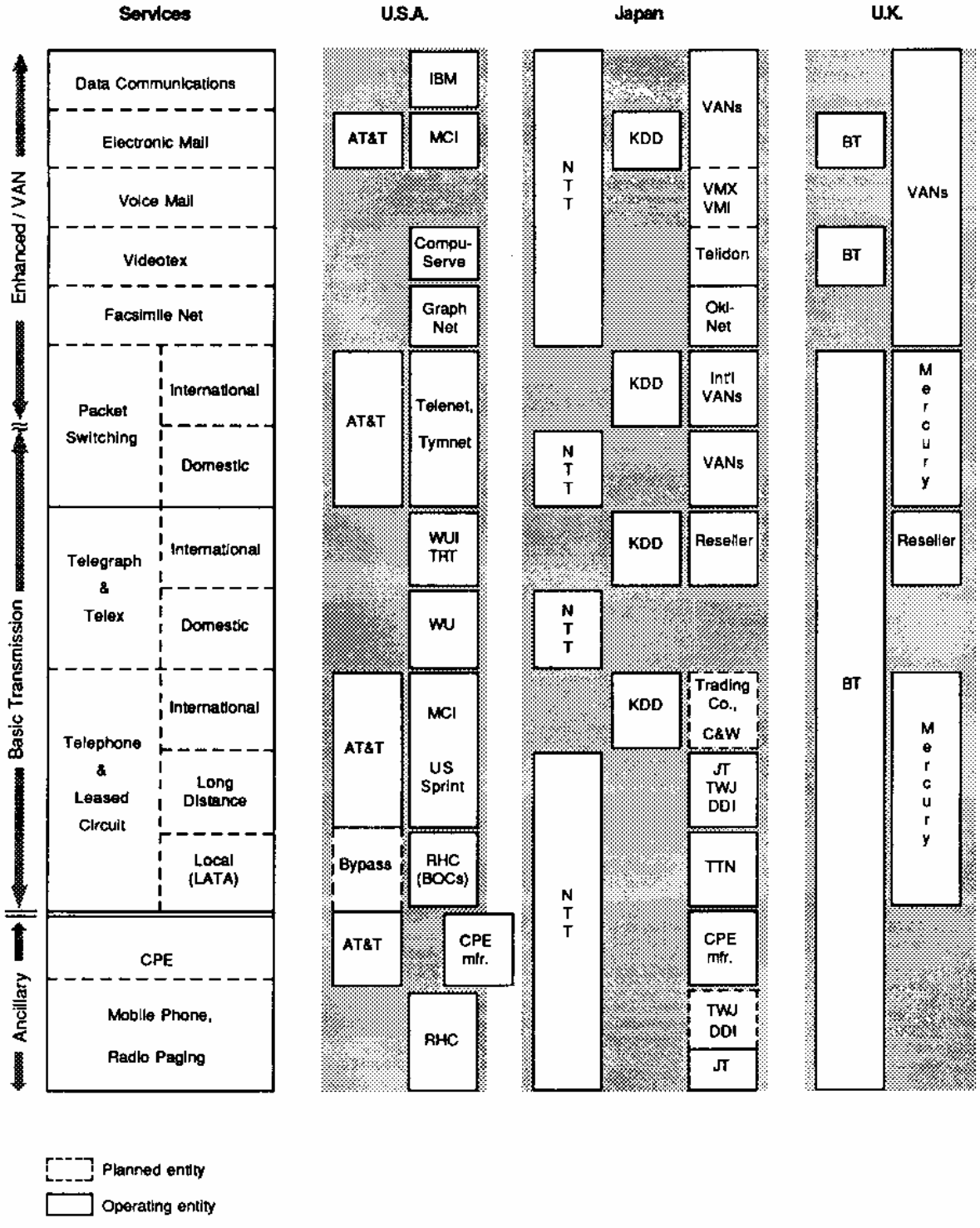


Figure 1-4

Market Structures of the U.S.A., Japan, U.K.

1.4.2. Differences in Regulation and in Communications Policies

U.S.A.

Regulation of dominant carriers is relatively strict, although gradual deregulation has been implemented. Regulation is dual structured, with the Federal Communications Commission (FCC) at the federal level and the public utility commissions (PUCs) at the state level. The FCC's Computer Inquiry III relieved AT&T and the Bell operating companies (BOCs) from the structural separation requirement for providing enhanced services. In addition, the Modification of Final Judgment (MFJ) restrictions on the BOCs, such as the prohibition against providing information services, have been reviewed by the Department of Justice. The State Department has authority over foreign communications policies, in concert with the FCC and other government agencies.

Japan

The MPT is the only regulatory agency and is one of the major communications policymakers. Although competition was introduced into every market segment, the number of entries into the market is sometimes controlled. Regulation is based on the Type 1/Type 2 (line-owned/not-owned) dichotomy, and generally both types of carriers can provide any services.

As of early 1987, the key issues for Type 2 carriers are, first, how should international Type 2 services be set up and, second, what are the conditions for fair competition between NTT's Data Communications sector and other Type 2 carriers. These issues are treated in Chapter 4, section 4.

U.K.

The Department of Trade and Industry (DTI) oversees basic communications policy as part of its role in industrial policymaking. The Office of Telecommunications (OFTEL) licenses telecommunications carriers and VANs and controls overall tariff changes rather than overseeing individual services. Regulation of VANs is nominal.

More detailed discussions of the regulatory frameworks follow.

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1-14 FCC, In re Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), etc., CC Docket No. 85-229 [hereafter cited as Computer Inquiry III], Report and Order, 51 Fed. Reg. 24410 (July 3, 1986).

1-15 U.K., Department of Trade and Industry, Draft Class Licence for Value Added and Data Network Services, July 1986, condition 9.

1-16 U.S. v. Western Electric and AT&T, Civil Action No. 17-49, 13 R.R. 2143; 161 U.S.P.Q. (BNA) 705; 1956 Trade Cas. (CCH), sec. 68246 at p. 71134 (D.C.N.J. 1956) [hereafter cited as 1956 Consent Decree].

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1-18 NTT, Annual Report, 1986, pp. 6-10.

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Chapter Two

Regulatory Frameworks for Communications in the U.S., Japan, and the U.K.

In the U.S., Japan, and the U.K., new services have been developing within changing regulatory frameworks. These frameworks differ from country to country in their treatment of telecommunications services in general as well as in their treatment of VAS. This chapter outlines the regulatory frameworks as a starting point for a discussion of the development of new services. After reviewing each country's regulatory framework for telecommunications services, we will explore in greater depth the regulation of VAS. Finally, the three countries' regulatory structures will be compared.

2.1. U.S.A.

In the U.S., complex regulations have been implemented by numerous parties, including the FCC, the PUCs, some departments of the government, and Congress. Here we will review major FCC decisions on computer/communications boundary issues and will consider other regulatory and judicial roles.

2.1.1. FCC

The FCC conducted three investigations to clarify the boundaries between computer and communications services -- boundaries that also distinguish between unregulated and regulated services.

Computer Inquiry I

In the final decision of the First Computer Inquiry (Computer Inquiry I) in 1971, hybrid service was defined as "an offering of service which combines Remote Access data processing and message switching to form a single integrated service."[1] Hybrid service was seen as a bridge between communications and computer services, with the actual demarcation point further defined within the description of hybrid service.[2] If, in a given hybrid service offering, data processing was ancillary to communications, then the service was defined as a "hybrid communication service" and regulated under Title

II of the Communications Act of 1934.[3] If, on the contrary, communications was ancillary to data processing, then the service was defined as an unregulated "hybrid data processing service," and "maximum separation"[4] requirements were applied to any common carrier offering the service. Such judgments under Computer Inquiry I were rendered on a case by case basis, with the attendant uncertainty.

Computer Inquiry II

Service definitions. The Second Computer Inquiry (Computer Inquiry II)[5] was initiated in 1976 to redefine the boundary between computer and communications services. After several rounds of public comments and reconsiderations, the FCC issued the final decision of Computer Inquiry II in April 1980. This final decision adopted the basic/enhanced services dichotomy for the boundary definition. Basic service was defined as "the common carrier offering of transmission capacity for the movement of information." Enhanced service was defined as the combination of:

> basic service with computer applications that act on format, content, code, protocol or similar aspects of the subscriber's transmitted information, or provide the subscriber additional, different, or restructured information, or involve subscriber interaction with stored information.[6]

Maximum separation requirements applied only to AT&T and GTE, although GTE was later exempted from them.[7]

Because the definition of basic service excluded most applications of computer processing, regulated services in this Inquiry were narrower in scope than in Computer Inquiry I. In other words, structural separation requirements for AT&T and GTE became more strict than before, even though other common carriers were relieved of them. Battles over the boundary between computer and communications services continued on the subject of protocol conversion.

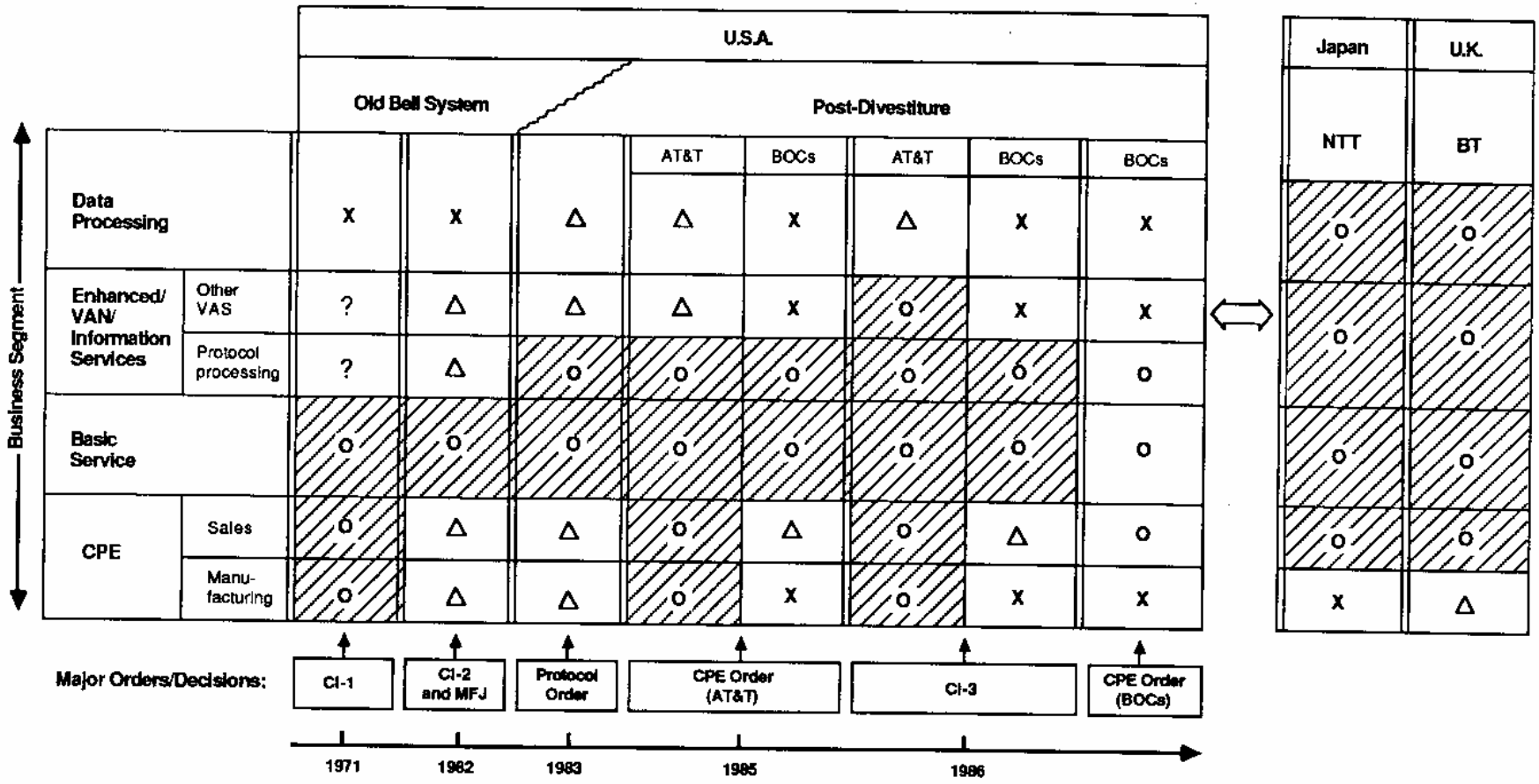
Protocol conversion. Certain types of protocol conversion gradually came under a waiver of structural separation requirements for AT&T and the BOCs. In November 1984, inter-network protocol (X.25/X.75) conversion between packet-switched networks was approved under certain conditions, such as separate pricing of protocol

conversion.[8] In March 1985, interconnection (asynchronous/X.25 protocol conversion) between non-packet-interface terminals and packet-switched networks using packet assembler/disassembler devices (PADs) was approved with some conditions, such as non-discriminatory provision of transmission capacity by BOCs.[9]

CPE. At the same time, the boundary between networks and terminals was clarified. The sale of CPE was defined as an unregulated service, which is subject to structural separation requirements. However, these requirements were removed in September 1985 for AT&T[10] and in November 1986 for the BOCs on the condition that non-discriminatory safeguards would be applied.[11]

Computer Inquiry III

The Third Computer Inquiry (Computer Inquiry III) was initiated in July 1985.[12] After review of 4000 pages of comments from more than 100 parties, the First Report and Order was issued in May 1986.[13] In this Order, the basic/enhanced dichotomy remained intact, but several decisions, such as those concerning protocol processing and network channel terminating equipment (NCTE), were deferred to the Supplemental Notice of Proposed Rulemaking[14] issued on the same date (see Figure 2-1).



O - can be provided without structural separation

△ - can be provided with structural separation

X - prohibited

Figure 2-1

Changing Regulation in the U.S. vs. Stable Japan, U.K.

First Report and Order

Structural separation requirements. The structural separation requirements placed on AT&T and the BOCs for enhanced-service provision were abolished, conditional on the establishment of several non-structural safeguards.[15] These safeguards are separate accounting, comparably efficient interconnection (CEI), open network architecture (ONA), network information disclosure, and customer proprietary network information (CPNI). Separate accounting was to follow the December 1986 order on cost allocation.[16] Discussion of network information disclosure and CPNI took an approach similar to that in the CPE orders for AT&T and the BOCs.

CEI. The FCC proposed the newer CEI concept in the Notice of Proposed Rulemaking in July 1985.[17] The basic objective of CEI (discussed more fully in section 4.3.1, below) is "to ensure that the basic service available to a carrier's enhanced services is available to other enhanced service providers in an equally efficient manner."[18] Two fundamental ways to accomplish this goal are "new forms of interconnection to basic service"[19] for the other providers and co-location of their equipment. Because the actual implementation of CEI would vary depending on the carriers involved, the FCC set several general guidelines,[20] such as unbundling of basic service and provision of end-user access, as well as setting pricing principles for transmission costs and interconnection costs, for example.

ONA. ONA, which might establish a standard network architecture, is a general way to achieve CEI,[21] or what we have labeled as type C equal access (see Figure 1-3). Most players have commented favorably on this concept, even though it lacks a concrete design. Its major advocates are some regional holding companies (RHCs) and the Department of Justice (DOJ), although some RHCs are neutral on the establishment of ONA. Although the concept of ONA has not been clearly defined and might apply differently in each entity, an introductory framework may be relevant here. The DOJ has stated the goal of ONA as "to provide service on the basis of relatively equal costs of interconnection to the bottleneck."[22] US West, on the other hand, has argued that a key element of ONA is "the unbundling of network services in accordance

with market demand."[23] Furthermore, Ameritech's Feature Node/Service Interface (FN/SI)[24] architecture has proposed a technical perspective to ONA. This innovative concept may materialize in an ISDN environment. The implication of FN/SI is that enhanced-service providers would be able to control the elements comprising common carriers' basic service capabilities through an ISDN interface which would include CCIS#7 signalling. Chapter 4 will further explore the implications of ONA.

Supplemental Notice of Proposed Rulemaking[25]

Several topics were deferred to this Notice: protocol processing, nonstructural safeguards for the BOCs, application of CEI/ONA rules to independent telephone companies, NCTE, and applications of Computer Inquiry III to the international arena.

Because the protocol processing issue deals with the blurring boundary between computer services and communications, it needs further clarification of the FCC's position. The FCC offered three alternatives in the Notice:[26] Protocol processing could be offered as part of basic service; it could be offered initially as an enhanced service, subject to any future definitional change by the FCC; or it could be offered as enhanced service. The first two alternatives could change the definition of basic/enhanced services (see Figure 2-2).*

Other FCC Decisions

In the Packet Communications, Inc. decision of November 1973, the FCC wrote that "a 'value-added' service . . . will take channels leased from other carriers and combine them with computers and software to transmit data more efficiently and with less error."[27] VANs were defined as common carriers at that time. Unconditional use of leased circuits, which is fundamental for VANs and resellers, was approved in the July 1976 decision on resale and shared use of leased circuits.[28]

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* See Appendix A, phase II decision of Computer Inquiry III.

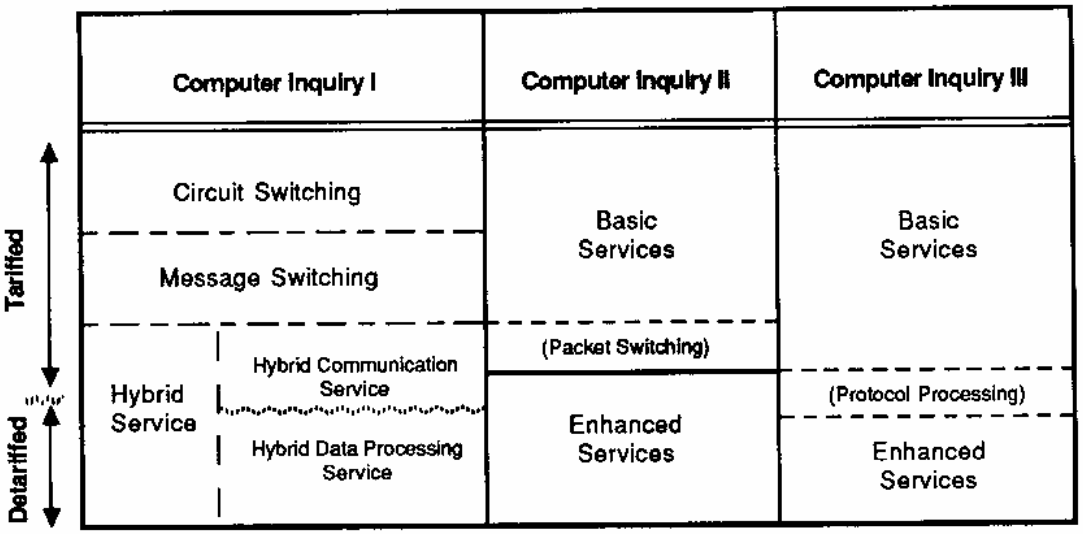

Figure 2-2

Differences among Service Definitions
in Computer Inquiries I, II, and III

2.1.2. Court

Courts were active in the AT&T and IBM antitrust issue. Two pairs of important consent decrees were issued in 1956 and 1982. In 1956, AT&T and its affiliated companies were prohibited from engaging in any business other than the furnishing of regulated common carrier services.[29] Separately in the same year, IBM was forced to establish a subsidiary for service bureau business.[30] In 1982, each company was relieved of its respective 1956 Consent Decree requirements,[31] but in the MFJ Judge Greene imposed other restrictions on the BOCs, most notably prohibitions against manufacturing and against offering information services and interLATA communications services. Information services were defined as

> the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information which may be conveyed via telecommunications, except that such service does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.[32]

Although the BOCs are relieved of some of the FCC's regulations, the MFJ restrictions still apply.*

2.1.3. Other Parties

Assuming a role as communications policy advisor, the DOJ reported to Judge Greene on general market conditions after divestiture in early 1987. Based on the Huber report submitted to the DOJ in November 1986, the Justice Department recommended removal of some BOC restrictions.[33] Specifically, the DOJ recommended approval of manufacturing and provision of information services with some restrictions, and recommended removal of the prohibition on provision of interLATA communications in exchange for the BOCs' giving up their monopoly on intraLATA communications services.

The National Telecommunications and Information Agency (NTIA)[34] of the Department of Commerce (DOC) may recommend policies similar to the DOJ's.

2.2. Japan

In Japan, several players have been involved in communications policymaking. Before liberalization, two common carriers provided basic telecommunications services, which were controlled by the Japanese Diet, the MPT, and the Ministry of Finance (MOF). During the transition to liberalization in 1985, other parties, such as the Ministry of International Trade and Industry (MITI), the Ad Hoc Commission on Administrative Reform (Ad Hoc Commission), and the Federation of Economic Organizations (Keidanren), became very vocal. The following section describes the major players concerned with communications regulation and summarizes the new laws for liberalization.

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* See Appendix B, Judge Greene's decision.

2.2.1. Players Influential in the Regulation of Communications

The Diet. Before liberalization in 1985, the Public Telecommunications Law (PT Law) stipulated that NTT in the domestic market and KDD in the international market were the only entities authorized to conduct "public telecommunications business,"[35] but the Diet controlled, for example, NTT's investments, finance, wages for workers, and even basic telephone and telegraph tariffs. After passing the liberalization laws, such as the Telecommunications Business Law (TB Law), the new NTT Law, and the revised KDD Law, effective in 1985, the Diet transferred most of the regulatory authority to the MPT. However, the Diet still watches over telecommunications regulations because of its legislative responsibility for reviewing the TB Law[36] and the NTT Law[37] three and five years after April 1985, respectively.

MPT. The MPT traditionally regulated the activities of NTT and KDD, such as the setting of tariffs and the development of business plans, except for the areas in which the Diet had authority. The MPT succeeded in revising the PT Law in 1971 for the first liberalization of circuit use and in 1982 for the second liberalization (see Figure 2-3). In 1971, a special service category of leased circuits for computer communications was established with fewer restrictions on use than for other leased circuits.[38] Time-sharing service (TSS) and other data processing services between mainframes and terminals became possible. In 1982, restrictions on shared use or third-party use of leased circuits were loosened, especially for computer communications. Computer service bureaus of small and medium-sized companies were allowed to offer computer communications services even without changing information content.[39] Traditionally, such services were offered only by common carriers. In 1982, the MPT still favored gradual liberalization.

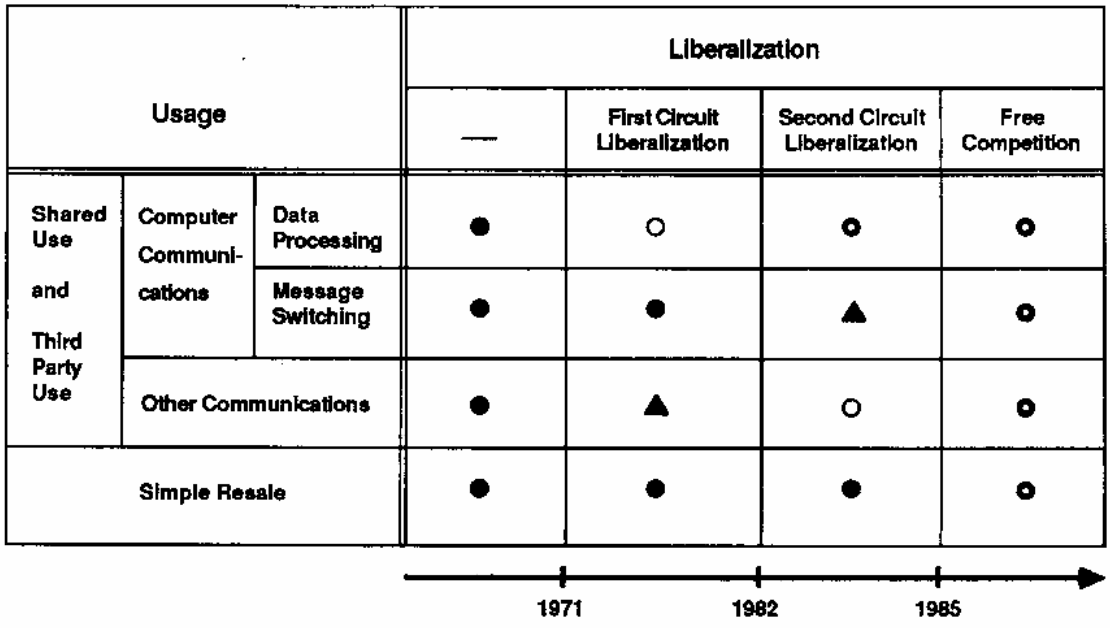


Figure 2-3

Restrictions on Leased-Circuit Use in Japan

Because of the change in the business environment after the report of the Ad Hoc Commission in 1982, however, the MPT changed its policy direction toward total liberalization. In 1984, the report of the MPT's Telecommunications Council, entitled "Long Term Vision of Telecommunications toward the 21st Century," disclosed a prototype of liberalization. The report advocated competition in every field with the regulatory distinction between carriers owning their own lines (line-owned carrier) and those who did not (line not-owned carrier).[40] This framework became the basis for the TB Law.

Ad Hoc Commission. The Ad Hoc Commission's 1982 report not only influenced the Diet and the MPT's policy at that time, but also remains a viable policy alternative for further liberalization. Its two basic recommendations were, first, divestiture of NTT and, second, structural separation of NTT's businesses, such as its Data Communications and

Customer Premises Equipment (CPE) sectors.[41] MPT discussions in early 1987 especially concerned the second point.

MITI. MITI has been struggling with the MPT because of the blurring boundary between its turf -- the computer industry -- and the MPT's turf -- the telecommunications industry. At the time of the second circuit liberalization in 1982, MITI blocked the MPT's attempt to pass a restrictive value-added service bill.[42] In 1984, regulation of large-scale Type 2 carriers in the draft TB Law were modified after opposition by MITI and the U.S. government.[43] Two kinds of government projects have been supporting the development of information networks in local communities: the MPT's Teletopia project and MITI's New Media Community project.

Federation of Economic Organizations (Keidanren). As a representative of business users, the Keidanren has continuously argued for several liberalization measures, such as complete liberalization of leased circuits, and fair competition between NTT's Data Communications sector and other businesses.[44]

2.2.2. New Laws, Effective in 1985[45]

TB Law. The TB Law introduced competition into all areas of telecommunications. Telecommunications business was defined as intermediating others' communications using telecommunications facilities. Carriers were classified into Type 1 with telecommunications facilities and Type 2 without those facilities.[46] There are no fundamental service boundaries, as with basic/enhanced in the U.S., or basic conveyance/ value-added in the U.K., except as required for Special Type 2 carriers that do not own the facilities but do offer international service. In practice, most of the parties, even the MPT, refer to Type 2 carriers and VANs interchangeably, although Type 2 includes "pure" resellers.

Although the MPT has the authority to mandate interconnection between Type 1 carriers,[47] "equal access" is not obligatory in this law as in the U.S. The MPT also has the authority to control the entry of new carriers if inappropriate circumstances, such as significant excess capacity, are likely.

This law will be reviewed by April 1988.

NTT Law. NTT as a domestic common carrier has such major obligations as operating properly and efficiently, providing universal service, and promoting and disseminating R&D.[48] A major change introduced by the NTT Law is the importance placed on R&D, which was not essential in the abolished NTT Public Corporation Law.

Although NTT attained some freedom on investment, finance, and wages, its annual business plan[49] and tariffs are still subject to MPT approval.

The NTT Law will be reviewed by April 1990.

The Diet's ancillary liberalization decisions. Ancillary decisions related to NTT included statements that NTT's position on structural separation would be respected, that simple resale of leased circuits for telephone use may be restricted, and that manufacturing is banned. The issues involved here are similar to issues under debate in the U.S. and U.K.

2.3. United Kingdom

The basic regulatory framework was established by several parties including Parliament, the government, an independent regulatory organization, and academics.

2.3.1. Players in the Regulation of Communications

Parliament. Deregulation of telecommunications in the U.K. began in 1981 with the Parliament's passage of the British Telecommunications Law in July, separating telecommunications business from postal business, and shifting regulatory authority from the Department of the Post Office to the Department of Industry.[50] Although BT public corporation held a monopoly in basic communications services, competition was introduced into CPE provision and VAN service.

The next step in deregulation was proposed by the Minister for Information Technology to the Standing Committee on the Telecommunications Bill in November 1983, as follows: 1) The government pursued a duopoly policy in basic communications, not licensing anyone other than BT and Mercury to run national public telecommunications networks until

November 1990 at the earliest. 2) Simple resale of leased circuits will not be licensed before July 1989.[51] The Telecommunications Bill, which passed the Parliament in April 1984, privatized British Telecommunications public limited company as an integrated entity with the obligation of universal service provision.[52] The Bill also deregulated CPE provision and established the Office of Telecommunications (OFTEL) as a regulatory body.

Academics. In 1981, Professor Michael Beesley of the London Graduate School of Business Studies called for dramatic changes in his report entitled "Liberalization of the Use of the British Telecommunications Network."[53] He recommended to the Department of Industry that the use of leased circuits be completely deregulated both domestically and internationally, because the benefits to business and society would surpass the loss, or cost, to British Telecom.

Regulation of BT has been minimized based on the 1983 report by Professor Stephen Littlechild, titled "Regulation of British Telecommunications Profitability."[54] Currently only telephone charges for monthly basic service and domestic calls are regulated by the "basket method," which requires that the rate of price increases be at least three percentage points below the current Retail Price Index (RPI), or:

$$\text{Rate of increase} < \text{RPI} - 3\%$$

Rates for other services are not regulated unless there are cross-subsidies between profit centers.

BT. BT strongly opposed Beesley's proposals, especially the introduction of simple resale. It accepted deregulation for value-added services that do not directly affect BT's revenue.

Government. The Department of Industry proposed the principles and schedule for liberalization of leased circuit use, seeming to accept BT's stance and only approving value-added use of leased circuits in the domestic market. This was liberalization's first step toward the separation of communications facilities ownership from service provision. The Department of Trade and Industry (DTI), which is a reorganization of DI, governs major communications policymaking.

Regulatory organization. OFTEL's major objective is to issue the licenses of public telecommunications operators or VANs, and to monitor market conditions to maintain fair competition. In an historical move during October 1984, OFTEL, with DTI, refused to approve a joint venture between IBM and BT.[55] These firms planned to provide a data-management network based on System Network Architecture (SNA). These services, which provide network management facilities, security services, and traffic analysis, were beyond the scope of the 1982 General Licence for VANS.

2.3.2. Regulation of Value-Added Network Services (VANS)

1982 Licence. A "General Licence" or formal regulatory framework for value-added network services was issued in October 1982. It defined value-added service as service that, first, uses common carriers' services and, second, may convey messages only with the provision of an additional service, such as the following, paraphrased from the 1982 Licence:

- message storage, not including temporary storage such as packet switching;
- significant change to format, code, content or protocol during the message conveyance;
- conveyance of the message to at least two persons, although not outside the U.K.[56]

Examples of value-added services, also paraphrased from the 1982 Licence, are:

- automatic ticket reservation and issuing
- teleconferencing
- customer data service
- deferred transmission
- long-term archiving
- mailbox
- multi-address routing
- protocol conversion
- speed and code conversion between incompatible computers or terminals
- storage and retrieval message systems
- telephone-answering using a voice-retrieval system
- telesoftware storage and retrieval
- word processing
- user management packages
- viewdata
- word processor/facsimile interfacing.[57]

Each licensee was required merely to notify the secretary of state with his name, address, and a brief description of the services to be provided. Delineating such specific examples of VANs did not work well because VANs' constantly changing nature soon made simple service examples obsolete. Consequently, the British government had no way to maintain a concrete definition of VANs, and was led to revise the Licence.

1987 Licence. The new license,[58] under discussion since June 1985, became effective in April 1987. Its major points are:

1) Simple resale of leased circuits will not be approved until 1989 as originally scheduled, even for data communications.

2) Telecommunications services are roughly defined as those falling between basic conveyance and other services (VANS). Basic conveyance is defined as "the conveyance of a Message . . . delivered . . . without any additional services having been provided in respect of the Message; or any deliberate removal of or addition to the information content of the Message in the course of conveyance. . . ."

3) Telephone and telex service should not be provided except as no-charge services within the network.

4) Additional safeguards applied to larger operators, to promote competition through establishment of fair trade conditions, such as Open System Interconnection (OSI) standards for access to services.

Requiring larger operators to meet OSI standards aims at establishing what we have termed type D equal access (see Chapter 1) between VANs and users. It may facilitate the future development of VANs through protocol standardization and is expected to provide a safeguard against monopolistic practices by IBM.[59] Other European countries, such as France, are likely to consider OSI a key element in liberalization.

2.4. Similarities and Differences in Regulation and New Service Development

To summarize and to set the stage for discussing communications policy issues in the chapters that follow, this section clarifies similarities and differences among the three countries considered here.

Monopoly vs. Competition

Similarities between Japan and the U.K. are that NTT and BT retained a monopolistic structure and the universal service obligation, and competition was introduced into every market segment. Japan and the U.K. differ in that duopoly reigns in the U.K. while in Japan there are many competitors, and that simple resale of leased circuits is prohibited in the U.K. while its restriction is minimal in Japan. In the U.S., competition in the intra-LATA market and inter-LATA market entry by the BOCs are likely to be introduced as part of further deregulation.

Equal Access

In the U.S., regulatory agencies are trying to establish what we have called type B equal access (see Chapter 1) among all carriers, as well as type C equal access for enhanced service providers. In the U.K., DTI has not mandated type B equal access for BT and Mercury, nor has it yet discussed type C equal access for VANS, although DTI has mandated type D equal access between VANs. Mercury does not pay extra access charges for NTS costs. NTT and other long-distance carriers will be interconnected on an almost equal-access basis, but access charges are still pending in Japan as of this writing.

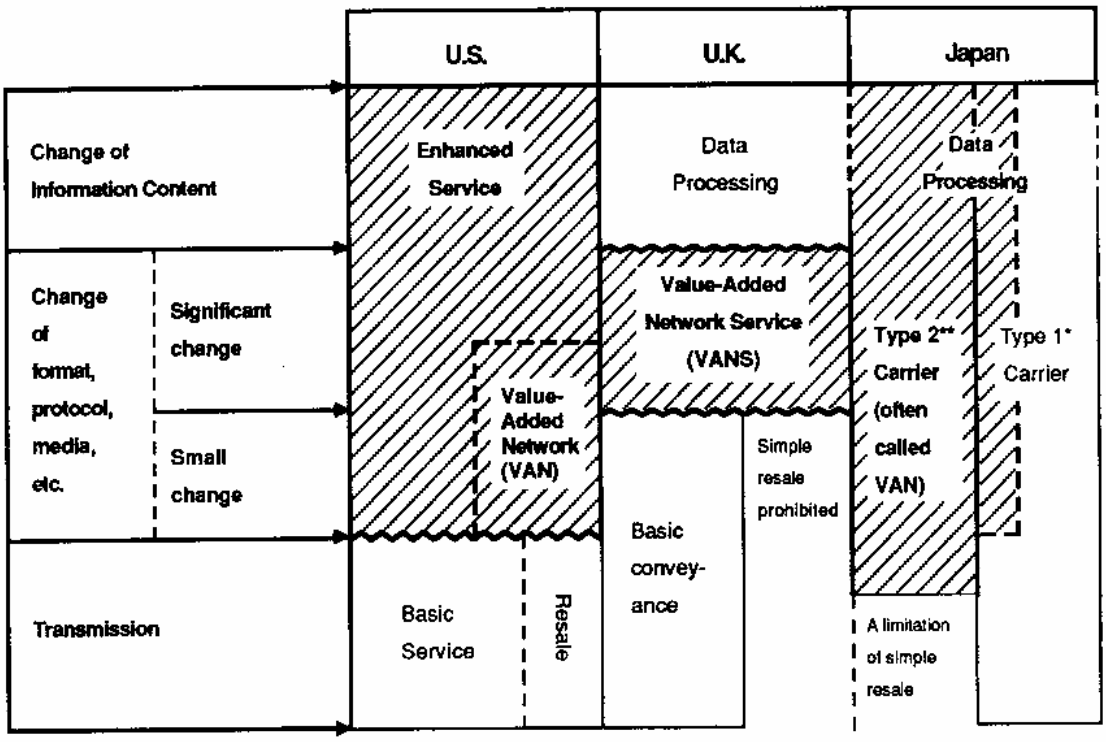
Regulatory Agencies and Their Methods

The U.K. and Japan each have a centralized regulatory body, although OFTEL is fairly small and its regulation is designed to be minimal. In contrast, the FCC has broader powers but it is challenged by changing technologies and markets, as well as by other regulatory agencies. In the U.S. and Japan, federal tariff regulation is based on carriers' rate of return, while in the U.K. it is based on carriers' proposed price increases.

Definition of Value-Added Services

The three countries treat value-added services differently. In the U.S., if the service includes any protocol processing, the FCC defines it as "enhanced service," but enhanced service does not include simple resale. In Japan, a "Type 2 carrier" provides any service including simple resale, since there is no definition of VAS. In the U.K., "value-added network services" include significant protocol processing, but simple resale is prohibited. Thus unregulated "enhanced service" in the U.S. is defined more broadly than is "value-added network service" in the U.K.

These definitional differences are confusing and complex, but are roughly pictured in Figure 2-4 and will be discussed in detail in chapters 4 and 5.



Rough definition of value-added services (VAS)

* Facilities owned
** Facilities not owned

Figure 2-4

Rough Definition of Value-Added Services

Notes

2-1 FCC, In re Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities, Docket No. 16979 [hereafter cited as Computer Inquiry I], Final Decision and Order, app. A, 28 F.C.C.2d 267 at 287 (released Mar. 18, 1971).

2-2 Computer Inquiry I, Tentative Decision of the Commission, 28 F.C.C.2d 305 (released Apr. 3, 1970).

2-3 Communications Act of 1934, tit. 2 (47 U.S.C. s. 201).

2-4 Computer Inquiry I, Final Decision and Order, 28 F.C.C.2d 269.

2-5 FCC, In re Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), Docket No. 20828 [hereafter cited as Computer Inquiry II], Final Decision, 77 F.C.C.2d 384 at 385 (adopted Apr. 7, 1980, released May 2, 1980).

2-6 Ibid., at 387.

2-7 Ibid., Memorandum Opinion and Order, 84 F.C.C.2d 50 (released Dec. 30, 1980).

2-8 FCC, In re Communications Protocol under Section 64.702 of the Commission's Rules and Regulations, Gen. Docket No. 80-756, Memorandum Opinion, Order, and Statement of Principles, 95 F.C.C.2d 584 (adopted Nov. 8, 1983, released Nov. 21, 1983).

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Chapter Three

Maintaining Interconnection

Communications and computer technologies have been developed and have converged rapidly, but the industries and markets have evolved differently. The proliferation of technologies, products, and services has produced a shared problem: how to maintain interconnection. This chapter attempts to delineate the issues related to interconnection from both the communications and computer industry viewpoints.

3.1. Importance of Interconnection

Historically, the importance of interconnection has differed for communications and computers. However, the industries have tried to solve similar, and sometimes the same, interconnection problems, either cooperatively or independently of one another. This section overviews the historical differences and converging similarities between both sides of this world.

3.1.1. Communications vs. Computers: Different Histories

Communications technology and services were always based on the network's economy of scale: Communication is inherently an interrelationship among more than two entities; therefore, the larger the installed base, the greater the subscriber benefits, at least potentially. That is why the telephone business was called a "natural monopoly," and why a region usually has had only one local telephone company. Because an isolated system is less valuable, every company or country-owned monopoly has favored universal standards, and open interconnection among terminals has usually been sought.* Most of the world's telephone companies still provide most CPE, usually as plain old telephones. Thus, communications historically maintained a stable

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* For readers interested in the history of interconnection, see Carol L. Weinhaus and Anthony G. Oettinger, Behind the Telephone Debates. Norwood, NJ: Ablex Publishing Corp., 1988.

universality. The International Telecommunication Union played a leading role in worldwide technical standardization.

On the other hand, computers were originally a substitute for counting devices. The computer not only typically performed some scientific functions by itself, but it also integrated intelligence (flexible software) and hardware. Because this system was designed to meet independent customer needs, a variety of software -- varied in terms of operating system, language, code, format, and so on -- and hardware has been produced by many vendors. Product innovation has been so rapid that the same company's products often lack compatibility. Severe competition and rapid innovation precluded coordination efforts for standardization, except for the de facto standard of IBM. Companies such as IBM tried to establish their own proprietary standards as a strategy for making distinctive products, and thus attempted to lock customers into their system.

Communications is a relatively new application in the computer world. Because the computer is operated by digital signals, communications requires conversion to and from analog signals. In addition, data transmission requires extreme accuracy; accordingly, many efficient error-finding and data-correction methods have been invented. Communication between an intelligent host computer and a dumb terminal in a single-vendor environment is rather simple. However, a multi-vendor environment has made communications across industries very complex.

3.1.2. Changing Communications Networks

Innovations in network technology and the sophistication of customer demand have brought about the creation of several dedicated networks, including telegraph networks, telephone networks, telex networks, digital data networks, facsimile networks, and so on. At the same time, various types of terminals have been created for different communications purposes. Communications technologies have also created several new types of information exchange,[1] such as multiple-address delivery, designated-time delivery with storage functions, and concurrent voice/data communication.

Common carriers may wish to develop interconnections among networks and terminals to restore the economies of scale and scope achievable by networking. Extensive segmentation of the communications market by the development of different products and services has been degrading these economies. Telephone networks already maintain a large installed base of customers around the world, but new types of networks to accommodate new services have yet to reach widespread development. Network users may also want improved interconnection between different terminals or networks.

Means of Interconnection

Facilities for interconnection. Facilities can be offered either by common carriers, value-added service providers, or users' terminals. For example, interconnection between a telephone network and a packet-switched network can be provided by packet assembler/disassembler devices (PADs), which can be installed anywhere. Common carrier ISDNs could facilitate interconnections among networks, while VASPs and terminals could also compete to provide interconnection.

Real-time vs. store-and-forward interconnection. Voice and visual communications as well as urgent database accesses require real-time interconnection, which would usually be more costly than other types of interconnection. Packet-switched networks are close to real-time, but are slightly delayed. Storage functions, such as mailboxes, can provide interconnection capabilities in combination with multiple network interfaces.

Functional differences among types of interconnection. Lower-level interconnections only support information transport between terminals and networks, while higher-level interconnections support several functions, such as code conversion, protocol conversion, media conversion, speed conversion, and so on.

3.1.3. Changing Computer Systems

Communication between computers has become essential for business operations for several reasons, including:

- The number of computers, especially PCs, and intelligent terminals, such as point-of-sale (POS) terminals, have dramatically increased.
- Control of changing information, such as customer orders, inventory, and stock exchange data, could both reduce costs and increase sales.

On the other hand, the proliferation of computers and intelligent terminals manufactured by many vendors has created incompatibility problems even within a single office or company. Vendor proprietary network architecture,[2] such as IBM's System Network Architecture (SNA) and DEC's Digital Equipment Network Architecture (DNA), have added further difficulties to interconnection.

Means of Interconnection

Incorporation of de facto standards. To interconnect two different computer systems, one of them can incorporate the other's network architecture which thus serves as a de facto standard. Software and hardware may be supplied by various companies.

Establishment of an interconnection system. Another means of interconnection could be provided by a third-party system, usually set up for interconnection among intra- or inter-industry systems.

Standardization of interconnection. Yet another approach would be the standardization of network architecture, business protocols, coding methods, and other functions. Accordingly, the International Standardization Organization (ISO) has developed open systems interconnection (OSI).

3.2. Conflicts within the Industries

3.2.1. Communications Industry Players

Common carriers and VASPs have taken opposite positions on the question of how interconnection should be maintained.

Common Carriers

Common carriers want to incorporate technological developments into their networks, and to provide some functions ancillary to basic communications. Some reasons from the carriers' points of view may be:

First, interconnected networks with storage or protocol-processing functions would be able to produce more communications traffic, thereby increasing the efficiency of basic network utilization[3] and decreasing the price of communications.

Second, some functions would be efficiently provided to the public only through common carriers, especially benefiting small businesses and households.[4]

Third, in the future, interconnection could be attained by an ISDN. Its late development may jeopardize the international competitiveness of domestic industries[5] against those of other countries that support monopoly PTTs with the early establishment of sophisticated networks.

VASPs

To maintain their current market niche, VASPs want to restrict common carriers from interconnection function provision. Their reasons may include:

First, VASPs are essentially resellers of common carrier services with some "added value," which may saddle their basic services with cost disadvantages. In addition, they are vulnerable to price changes for common carriers' leased circuits. They may see asymmetric regulation against dominant common carriers as the only way to survive.

Second, the interconnection functions that customers expect are often unique to each customer; thus, small organizations such as VASPs are likely to provide services that are better and more timely than common carriers' generalized nationwide services.

Third, the VASPs fear common carriers' predatory pricing and cross-subsidies for their enhanced services.[6]

Government

In Japan, the MPT rejected NTT's request to commercialize the initial version of its Information Network System (INS) protocol[7] because it differed slightly from the probable international standards of an ISDN expected to be recommended by the CCITT in 1988. Ancillary to this protocol decision by the MPT, its "advisory committee for commercialization of digital communications services" disclosed conflicting opinions on NTT's provision of value-added services.[8] Some favor NTT's service for customer convenience, if there are some

safeguards. But others disapprove of NTT's entry into value-added service provision.

3.2.2. Computer Industry Players

In the computer industry there are basically three competing versions of major network architectures: IBM's SNA, DEC's DNA, and the ISO's OSI (see Figure 3-1).

ISO[1] OSI[2]	IBM SNA[3]	Digital Equipment Corp. DNA[4]
Application	Application	User
		Network Management
Presentation	NAU[5] Services Manager	Network Application
Session	Function Management Data Services	Session Control
	Data Flow	
Transport	Control Services	End-to-End Communications
	Transmission Control Services	
Network	Path Control	Routing
Data Link	Data Link	Data Link
Physical Link	Physical Link	Physical Link

[1] International Standards Organization
[2] Open Systems Interconnect
[3] Systems Network Architecture
[4] Digital Network Architecture
[5] Network Addressable Unit

Source: Rebecca Hurst, "Selecting a Network Standard," Computerworld: Focus, Sept. 17, 1986, p. 40. ©1987 CW Communications/Inc., Framingham, MA 01701. Chart by Jeff Babineau adapted with permission.

Figure 3-1

ISO, IBM, DEC: A Comparison of Network Architecture Layers

IBM

IBM has always preferred its own proprietary de facto standards, such as EBCDIC rather than ASCII standards for character coding and SDLC rather than HDLC standards for data transmission protocols.[9] While IBM was strengthening its proprietary SNA by offering communications functions enhancements, such as LU6.2, DIA/DCA, and SNADS (SNA document system),[10] it unwillingly succumbed to pressures from the OSI promotion alliance of Europe, Japan, and U.S. government and industry groups. Thus IBM quickly moved into the Corporation for Open Systems (COS), a consortium for OSI in the U.S., after the European Computer Manufacturers Association (ECMA) in Europe rejected the SNA proposal.[11] IBM claims that it will also develop an OSI product for ancillary interconnection with the non-SNA world.

DEC

DEC has a good reputation for compatibility of products and facilitation of networking.[12] DEC, as the second largest computer manufacturer, primarily supports its own DNA, then IBM's SNA, and lastly ISO's OSI.[13] Because the architecture of DNA seems closer to OSI than to IBM's SNA, future migration to OSI might not be very difficult. European governments want to support OSI; thus DEC will likely put more emphasis on OSI in Europe than in the U.S.[14]

Japanese and European Firms

Japanese and European computer manufacturers are keeping up the pressure for implementation of OSI products as early as possible, to be competitive against IBM.[15] However, the currently available standard is only the message-handling system (MHS) used for electronic mail applications and may not quite satisfy the complex applications needs of computer system users.

ISO and Supporting Organizations

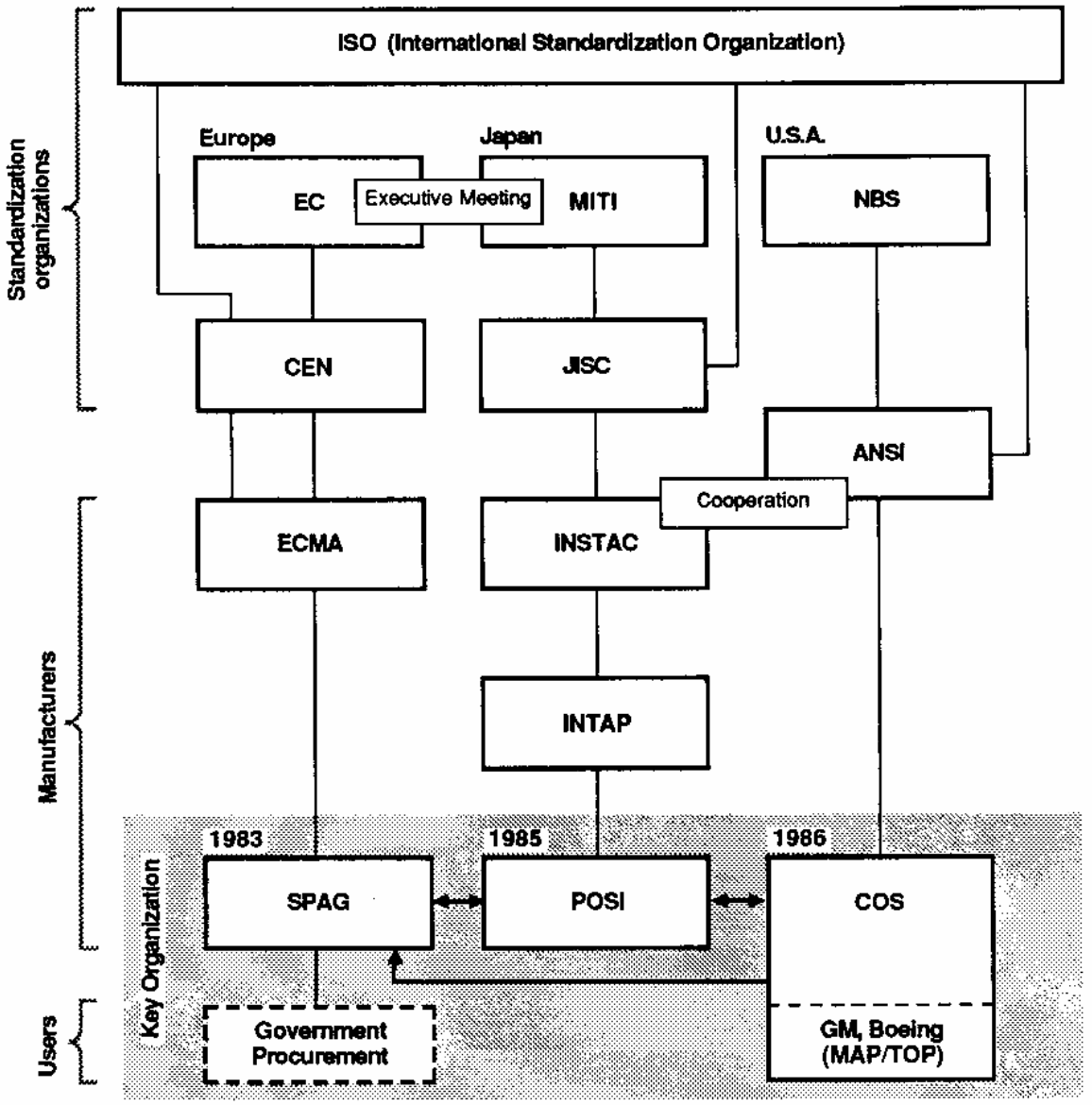
The ISO, as an international agency, has been devising international standards for computer systems, although electrical and electronic engineering standards are controlled by the International Electrotechnical Commission.[16] The ISO has been working on OSI since 1977. The American National Standards Institute (ANSI) in the U.S., the Japanese Industrial Standards Committee (JISC) in Japan, and the

Comité Européen de Normalisation (CEN) in Europe have also been involved in ISO activities. The computer industries in Europe, Japan, and the U.S. support cooperative organizations -- the Standards Promotion and Application Group (SPAG) in Europe, Promotion of OSI (POSI) in Japan, and COS in the U.S. -- to achieve a universal communications environment (see Figure 3-2). This, they believe, is likely to decrease unnecessary software costs and to benefit customers. Their efforts made the ISO move fast, and OSI products are likely to be shipped as early as some time in 1987.[17] COS includes important users, such as GM and Boeing, who made the OSI-compatible Manufacturing Automation Protocol (MAP) and Technical and Office Protocol (TOP), although these major firms are not happy with COS' manufacturer-controlled standardization process.[18]

Government

In Japan, MITI supports the activities of the ISO and related domestic organizations. It maintains a close relationship with the European Community (EC) in efforts toward developing OSI standards. It planned to establish an "enlarged OSI users committee" in early 1987 to incorporate users' demands into OSI products.[19] The Japanese Patent Office, under MITI's aegis, has also decided to become the first government agency to adopt OSI for computer links, scheduled to be put into use in 1989.[20]

In Europe, governments are moving toward government procurement policies that prefer OSI-compatible products. The British government has already decided to mandate OSI standards for the new General Licence for VANS.[21] Similarly, the French government, which is discussing the introduction of competition into the VAS market, is likely to follow suit.[22]



ISO	International Standardization Organization	INTAP	Interoperability Technology Association for Information Processing
EC	European Community	POSI	Promotion of OSI
CEN	Comite Europeen de Normalisation	NBS	National Bureau of Standards
ECMA	European Computer Manufacturers Association	ANSI	American National Standards Institute
SPAG	Standards Promotion and Application Group	COS	Cooperation for Open Systems
JISC	Japanese Industrial Standards Committee	MAP	Manufacturing Automation Protocol
INSTAC	Information Technology Research and Standardization Center	TOP	Technical and Office Protocol

Source: Naoaki Fukusaki, "Quick Development of OSI Coalition among Japan, Europe, and U.S.A.," Nikkei Computer, Sept. 1, 1986, p. 41. Adapted with permission.

Figure 3-2

Promotion of OSI Standards and Cooperative Relationships

3.3. Interconnection Issues

3.3.1. Standardization

Problems in Standardization Efforts

General weaknesses in international standardization efforts derive from political conflicts between the countries, or companies, and from the decision-making process, which moves at the earliest only every four years. Political conflicts may produce incompatible multiple standards, such as three videotex standards and four local area network standards. Slow decision making may not keep pace with technological developments; for example, a standard 64kb/s voice-communications channel has been adopted for ISDN interfaces, even though 16kb/s voice-coding technology has already become available. However, proper timing of standardization is difficult to determine, because standards can be evolved as technologies advance.[23] Standardization too early, which has been called "excess momentum," may hinder technological development and limit market growth, while standardization too late, or "excess inertia," may hinder competition with early movers holding to a de facto standard.

Which Standard?

New standards, such as ISDN and OSI, might not easily be made viable because there are large competing installed bases, such as analog networks/terminals and SNA-compatible systems.

ISDN. Although conceptually and technically an ISDN interconnects or integrates any network, economical interconnection may be difficult in some situations -- for example, between slow-speed telex and high-speed digital transport service. Since ISDN switches, as replacements of telephone switches, usually handle both voice transport and 64kb/s digital transport, interconnection between analog telephone terminals and digital telephone terminals would be secured. However, interconnection between analog non-voice terminals through an ISDN would require some type of terminal interface device, which might be neither convenient nor economical for users.[24] In addition, anticipation that ISDN standards may continue to evolve might keep carriers and users from early adoption of new standards, just as periodical

revisions of packet-switching standards (X.25) have brought some uncertainty to the market.

OSI. Although OSI standards have been supported by governments and computer manufacturers, especially in Europe and Japan, the question is whether OSI would be competitive against the de facto standard, SNA. SNA and other proprietary network architectures have been developed through manufacturers' long-term efforts, while OSI has not yet been developed. IBM improved its SNA functions in the early 1980s,[25] and may enhance SNA's non-IBM interconnection capabilities. The international standardization process might not be fast enough to allow OSI to evolve as quickly as de facto standards can be enhanced. Situations differ in the U.S., Europe, and Japan, because the degree of IBM's dominance differs. New standards for interconnection are more important in Japan, where no single company dominates the computer market, than in the U.S., where IBM dominates the computer market.

In addition, development of OSI products might not be advantageous for non-IBM manufacturers, who may need to maintain compatibilities with both SNA and OSI, unless OSI's market share grows sufficiently. Furthermore, if manufacturers interpret standards differently, OSI products could be incompatible -- creating situations that could be disadvantageous for non-IBM manufacturers. With OSI products, however, they may be less vulnerable to frequent changes in SNA and possible licensing charges[26] for SNA-compatible software.

3.3.2. Who Should Provide Interconnection?

Capabilities for interconnection between networks or terminals could be offered by common carriers or value-added service providers (VASPs) on the telecommunications side, or by computer network software or terminals/PCs on the terminal/computer side.

For example, media conversion functions could be offered in several ways: 1) a real-time interconnection service such as a voice-to-computer confirmation of a bank-account balance; 2) interconnection by a storage function, such as a common carrier's or VASP's message-handling system; 3) an integrated terminal system including media conversion software and hardware, such as fax, telephone, and PC.[27] Competition among these functions would not necessarily be

direct because of the wide range of user needs.

In addition, battles between industries sometimes involve conflicts between government agencies. In Japan, for example, the open interconnection issue has been treated differently by the MPT and MITI. The MPT, on the communications industry side, has been examining ways to support networking among VANs.[28] The Telephone and Telegraph Engineering Committee (TTC), a standardization committee similar to the T1 Committee in the U.S., has begun working toward standardizing interconnection through OSI-based software incorporated in VANs, either between different computers or between ISDN terminals and conventional terminals. MITI, on the computer industry side, has initiated efforts toward standardization of computer communications protocols by establishing an Information Division within the Japanese Industrial Standards (JIS) organization.[29] The conflicts likely to result between MITI and the MPT may contribute to the uncertainty within the communications and computer industries, which generally overlap in Japan. The U.S. government's criticism of MITI and support of TTC, based on the agreement in the 1985 Market-Oriented Sector Selectives (MOSS) negotiations dealing with trade problems between U.S. and Japan,[30] may further complicate these conflicts.

On the other hand, cooperative efforts among competitors could be mutually beneficial. In the U.S., for example, Southern New England Telephone, a local exchange carrier (LEC), has been trying to develop its packet-switched network, ConnNet,[31] in cooperation with Tymnet and information providers. Although VANs have been opposing the BOCs' provision of protocol processing, interconnection between BOC networks and VANs could increase the traffic between user terminals, benefiting both BOCs and VANs.

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Chapter Four

Development of Enhanced/Value-Added Services and Related Communications Policy Issues

The development of enhanced or value-added services (VAS) has raised such communications policy issues as how to attain fair competition between common carriers and service providers while avoiding unnecessary regulation of common carriers, and how to maintain public access to an advanced infrastructure. These types of issues have gained increased importance because of the pace and degree of technological development, the increasing sophistication of user demand, and the growth of the service providers.

This chapter will discuss current market conditions and business opportunities for VAS, as well as threats to their development (section 4.2). Then sections 4.3. through 4.6 will consider related communications policy issues and the implications for enhanced/value-added service providers (VASPs).

4.1. Differences in Service-Provider Development in Three Countries

Different regulatory, competitive, and technological environments have created different market and policy alternatives; thus this chapter begins with brief descriptions of the differing situations in the U.S., Japan, and the U.K.

4.1.1. U.S.A.

Value-Added Networks (VANs)

The FCC first defined VAN in its Packet Communications, Inc. (PCI) decision in 1973.[1] Here, "value added" service was defined as error-free data communications provided through the resale of common carriers' leased circuits, using packet-switching technology. Although PCI failed to begin operation, Telenet was the first to provide a public, packet-switched network.[2] Telenet was, however, prohibited from providing either basic services, such as telephone or telex, or

"hybrid communications" services, defined in Computer Inquiry I as services that include some data-processing functions.

Since Telenet's entry, several companies, such as Tymnet and Graphnet, have entered the value-added market. Before the Computer Inquiry II decision in 1980, they were defined as common carriers. However, Computer Inquiry II defined these VANs as unregulated enhanced-services providers, based on the "contamination theory,"[3] which claims that packet switching itself is basic but protocol conversion "contaminates" this basic nature. Because of the immaturity of the digital data-communications market as well as regulatory limits, VANs were not then very profitable, and a string of acquisitions and mergers during the late 1970s and the 1980s followed their early development. In 1979 GTE acquired Telenet, which also merged with Uninet in 1986. Tymnet, with its former parent Tymeshare, was acquired by McDonnell Douglas in 1984. They provided a packet-switched network with some protocol supports, such as asynchronous, SDLC, and IBM's 3270 protocols.[4] After the Computer II decision, they could add other enhanced services such as electronic mail. Originally their major customers were corporations who wanted to link mainframes and terminals or to access several databases such as Dow Jones and Dialog. Since CompuServe,[5] the Source, and other competing enhanced-service providers developed home use of databases, VANs have been adding less expensive menus, such as night-time only use,[6] to stimulate the home PC-user market and to increase the efficiency of their own networks.

Although the value-added network market in the U.S. grew during the early 1980s, it slowed to an 18% growth rate in 1986, according to the International Data Corporation.[7] These VANs have been diversifying their operations from packet-switched networks and information services to corporate data-communications services. They have been trying to acquire their own communications facilities, such as satellite earth stations and digital termination systems (DTSs)[8] to bypass the local BOCs.

Other Enhanced-Service Providers

Regulatory and judicial constraints may be among the factors that have kept AT&T and the BOCs short of major roles in the enhanced-services market. Although AT&T provides the "plain-vanilla" Accunet

Packet Service (APS), and some BOCs provide local area data transport service (LADT), they are still far from dominant. In addition, AT&T's withdrawal from its "super" VAN -- AT&T NET1000[9] -- in early 1986 cast a shadow over its market performance.

However, the common carriers could consider several factors as promising: Computer Inquiry III's favorable treatment of the CEI/ONA environment (see section 4.3.1.), the DOJ's review of MFJ restrictions based on the Huber report (see Chapter 2), and conceptual development of ISDNs (see section 4.2) could make common carriers key players in this field.

CompuServe, Western Union, and Dialcom are major providers of electronic mail service,[10] storing and forwarding information through telecommunications networks or postal service. General Electric Information Systems Company (GEISCO) and Control Data Corporation (CDC) are among the largest remote computing companies.[11] Courier service companies, such as Federal Express and DHL Worldwide Courier Express, tried to develop worldwide facsimile communications services, but open-end facsimile communication lacks international popularity.[12] Federal Express' "Zapmail" business failed in 1986.[13] Many parties, including IBM and AT&T, have tried to develop the videotex market. Some newspaper publishers, such as Times Mirror and Knight Ridder, however, have already failed to capture the new electronic database market.[14] Although U.S. companies have thus become less enthusiastic about videotex than in the past, a French company, in combination with Minitel, is considering entering the U.S. market.[15]

4.1.2. Japan

The Public Telecommunications Law (PT Law), which was abolished in 1985, prohibited a service provider from using leased circuits for "his basic form of business, [prohibiting both] mediating the communications of other persons by the use of his telecommunications circuit and letting other persons use his telecommunications circuit in their communications."[16] NTT and KDD were exceptions to these restrictions. Although such data-processing services as time sharing compete freely, inter-corporate message-switching services through computers were defined as common-carrier offerings and were provided by NTT on a

regulated basis. The 1982 revision of the PT Law allowed message-switching services among closely related small and medium-sized corporations, and 96 companies provided these services before liberalization.[17]

In 1985, domestic restrictions on leased-circuit use for data communications were eliminated. More than 200 Type 2 carriers had already begun operation by November 1986.[18] Although there is no legal definition of VAN in Japan, Type 2 carriers are often referred to as VANs. The market for Type 2 carriers' services was estimated at $3.4 billion in 1985 and was forecasted to grow to $5 billion in 1987, according to MPT's Networking Promotion Committee.[19]

Special Type 2 carriers provide large-scale and/or international networks.[20] Because most of them are related to the computer industry, they usually provide vertically integrated services -- hardware, such as terminals and multiplexers; application software, such as industry-specific business processing and electronic mail; interconnection with databases; and communications, such as resale of leased circuits and packet-switched service -- aiming at markets throughout Japan and abroad.[21] These carriers already interconnect with foreign companies -- for example, NEC and GEISCO, Fujitsu and CompuServe, Network Service and Tymnet, Intec and Telenet, and Japan ENS and AT&T. In addition, they provide protocol conversion functions, such as IBM's BSC and SDLC; Basic by NEC, Fujitsu, and Hitachi; and some industry standards.

Small-scale General Type 2 carriers are in market niches that provide specific application software for specific industry or inter-industry communications.[22] Various companies, including computer manufacturers, companies in the transportation industry, time-sharing data-processing companies, service industry firms, and publishers entered this market, suggesting how seriously a wide range of companies think of information-communications as an indispensible corporate resource and/or a new-business opportunity, at least for the future. Interestingly, IBM Japan remains a less regulated General Type 2 business, although it extends its market power through several ventures with other Type 2 firms as well as with NTT.[23]

NTT provides value-added services, similar to those offered by Type 2 carriers, in several ways:

- Its Advanced Telecommunications Service sector[24] provides a packet-switched network with protocol-conversion, a facsimile network with protocol conversion and store and forward, and videotex networks with protocol conversion.
- NTT's Data Communications sector[25] provides public data communications services targeted at small and medium-sized companies and special data communications services such as inter-bank electronic funds transfer (EFT), credit authorization, and government accounting.
- In addition, NTT has established several subsidiaries[26] for value-added services, such as Internetwork Inc. with Fujitsu, NEC, and Hitachi; and Nippon Information and Communication Co. (NI+C) with IBM Japan.[27]

Discussions were underway during 1987 to establish fair competition between NTT's Data Communications sector and Type 2 carriers, which could change the market structure.

4.1.3. U.K.

Value-added network services (VANS) have been open to competition since 1982. The U.K.'s definition of VANS, especially in the 1982 General Licence, was different from the U.S. definition.[28] For example, British Telecom's packet switching with protocol conversion (asynchronous/X.25 and X.25/X.75) is basic conveyance. Only BT and Mercury could provide packet-switched network services, until the new Licence became effective in 1986. Prestel is one of the value-added services, carrying third-party traffic on leased circuits. Although registration is waived, databases, electronic mail, and interactive processing for third parties using the public network could be value-added services for users.[29]

In the U.K., provision of basic conveyance, such as telephone and telex, is still limited to BT and Mercury, and simple resale of leased circuits is prohibited even for data communications. These restrictions are maintained to protect common carriers' earnings while at the same time allowing the introduction of competition.

Accordingly, nearly 200 companies had already registered some 800 services as of August 1986.[30] Electronic mail; voice services; on-line

databases; speed, code, and protocol conversion; and videotex accounted for 75% of these services.[31] BT, providing Prestel, Telecom Gold, and Dialcom, is a major player in value-added services, with the exception of on-line databases. However, changing toward a regulatory policy aimed at fair competition, the British government may attempt to increase regulation of BT.[32]

4.1.4. Similarities and Differences

In summary, although differing definitions of VAN/enhanced service complicate a comparison of the three countries, some points deserve mention. The U.K. and Japan are similar in their minimal regulation of VANs, market stimulation after liberalization, and strong role for common carriers. On the other hand, enhanced-service providers in the U.S. are not regulated, and the common carriers' role remains very limited.

While the British government is trying to increase regulation of BT, at the federal level in the U.S. the FCC's efforts aim at deregulating AT&T and the BOCs with safeguards to maintain fair competition. In Japan discussions on fair competition could change the market structure.

4.2. Opportunities and Threats for Value-Added Service Providers

Although enhanced services and VANs may grow more rapidly than basic services, several closely related uncertainties could be critical for communications policymaking. Opportunities and threats may be interwoven but will be treated separately here for analytical purposes (see Figure 4-1).

Opportunities	Threats
. More terminals are likely to be connected with networks.	. More intelligent terminals could support many functions.
. Incompatibility among terminals and among software may increase.	. Common carriers' networks may increase their intelligence.
. Communications costs are likely to be reduced.	. Incompatibility among systems may be decreasing.
. Vertically integrated services may hold competitive advantages.	. Restrictions on leased-circuit use and volume-sensitive tariffs may increase.
. An ISDN would offer opportunities for high- speed, high-quality local services.	. Economies of scale and scope may be difficult to challenge.
. Software development for SNA and LANs supports interconnection with packet-switched networks, possibly increasing opportunities for VASPs.	. The trend toward private communications networks may hurt the VASPs.
. The international market may hold possibilities.	. Customers may tend to resist new services.

Figure 4-1

Opportunities and Threats Faced
by Value-Added Service Providers

4.2.1. Opportunities for VASPs

- More terminals are likely to be connected with networks.

Decreasing prices of traditionally expensive goods, such as modems, communications software, and videotex adaptors,[33] may encourage an increase in the number of non-voice communications terminals and expansion of the general needs for high-speed, high-quality communications networks, especially for digital data communications. Under these circumstances, the popularity of service providers based on packet-switched networks would also increase.

- Incompatibility among terminals and among software may increase.

With fierce competition among many companies in the CPE and computer markets, the spread of incompatible communications terminals, such as PCs and faxs, already creates fairly common problems in businesses and homes.[34] Moreover, as described in Chapter 3, differing

network architectures also require some enhanced functions for interconnection, although penetration of OSI might solve this problem.

- Communications costs are likely to be reduced, especially in the long-distance market. Because VASPs are basically resellers of common carriers' leased circuits, low prices and availability of leased circuits are key factors for the VASPs' survival. Nationwide database access and low-cost electronic mail would increase VASPs' competitive advantage against traditional publishing, post, and broadcast media. A distance-insensitive rate structure gives packet-switched networks an advantage in the long-distance market.

- Vertically integrated service has competitive advantages, enhanced/value-added service providers could offer integrated corporate communications systems, including hardware, software, and database access. In Japan, large-scale VANs are penetrating the market partly because of their vertically integrated service offerings. In the U.S., AT&T's Accunet has yet to provide extensive protocol conversion, nor do the BOCs' LADTs offer nationwide coverage. Therefore VANs in the U.S. continue to have an advantage, at least until implementation of CEI/ONA.

- An ISDN would offer opportunities for high-speed, high-quality local services. A narrowband ISDN with packet interface could begin operation as early as sometime in 1988, when CCITT standards are expected to be established. If ISDN switches replace current telephone switches, more local access points to packet-switched networks may be available than with current VANs or other networks. In addition, some recent developments suggest that a fixed monthly charge for access to ISDN switches would be much less expensive than current dedicated access to VANs or to long-distance packet networks (see Figure 4-2). For example, the West German Bundespost set the ISDN tariff at twice the monthly charge for telephone service and the same charge per call. Japan's NTT is temporarily providing pre-ISDN service at three times the monthly charge for business telephone service and a slightly higher charge per call. These monthly charges are much less than those for current dedicated access to packet-switched networks, such as DATEX in West Germany, DDX in Japan, and Tymnet in the U.S. Thus interconnec-

tion of a local ISDN with long-distance packet networks, such as VANs, could be mutually beneficial.

	West Germany		Japan	
	Monthly Charge	Communication Charge	Monthly Charge	Communication Charge
ISDN	DM54	Same as telephone	¥ 7,000	Same as DDX (9600 b/s)
Telephone (business)	DM27	480 seconds to 12 seconds / DM 0.23	¥ 2,600	180 seconds to 4.5 seconds / ¥ 10
Digital Data Network (9600 b/s)	DM370	2.14 pfenich to 3.98 pfenich / second	¥ 26,000	45 seconds to 3.5 seconds / ¥ 10

Sources: Data on West Germany adapted from Mark Hibbs, "2 x telephone charge = ISDN fees under first rate structure," Data Communications, March 1986, p. 72; RITE, Obei Shobuku no Data Tsushin no Doko [Trend in data communications in Europe and U.S.A.] (Tokyo: RITE, 1985); RITE, Obei Shokuku no Denshin Denwa no Doko [Trend in telegraph and telephone in Europe and U.S.A.] (Tokyo: RITE, 1985). Data on Japan adapted from NTT, "Tariff for Packet-Switched Service," 1985; NTT, "Tariff for Telephone Service; and "INS no Ryokin" (INS tariff), Business Communication, Jan. 1987, p. 99.

Figure 4-2

ISDN Target or Experimental Tariff
Compared to Other Service Tariffs

- Software development for SNA and LANs supports interconnection with packet-switched networks. Recent enhancement of SNA incorporated the optional interface with a packet-switched network, and gateway hardware and software for interconnection of LANs with a packet-switched network[35] could increase the opportunities for VASPs.
- The international market may have possibilities. As of early 1987, the international value-added service market was yet to be developed, partly because of CCITT regulation of leased circuit use.

But there have been government negotiations, especially between the U.S. and Japan, toward liberalization of the market.[36]

(International policy issues will be discussed in Chapter 5.)

4.2.2. Threats or Obstacles to VASPs

Some developments, although they may hold opportunities, also pose threats or obstacles to VASPs.

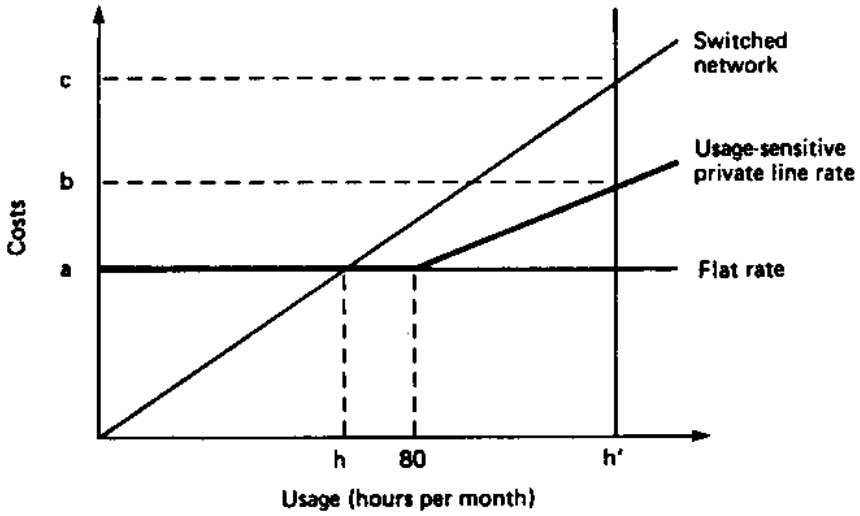
- More intelligent terminals could support many functions. Decreasing prices for computing power and memory have made traditionally infeasible terminal intelligence possible. For example, multi-media workstations, which include software and hardware for text, data, and fax communications, have become available inexpensively. In addition, voice-storage and electronic mail devices[37] attached to PBXs have become popular. These terminal intelligence developments might compete with the network intelligence of VASPs.

- Common carriers' networks may increase their intelligence. Common carriers' provision of protocol processing as an adjunct to their basic service may threaten VASPs markets. Resellers may have cost disadvantages because common carriers may use their own circuits below tariff levels. Although in the U.S. CEI/ONA provides equal opportunities for both common carriers and enhanced-service providers, new entries by common carriers into this market could pose a threat to the enhanced-service providers.

- Incompatibility among systems may be decreasing. The standardization efforts in international organizations, such as the ITU and the ISO, and in national organizations may ease interconnection problems. For example, proliferation of OSI protocol and architecture through voluntary and mandatory processes may decrease the incompatibilities -- and the importance of interconnection functions provided by value-added service providers -- in the long run. However, new standards might take at least a few years to gain momentum in the market.

- Restrictions on leased-circuit use and volume-sensitive tariffs may increase. In the U.K. there are some restrictions on leased-circuit use, such as prohibition of simple resale. In addition, in Germany the Deutsche Bundespost (DBP, the German PTT) has applied a

volume-sensitive tariff (see Figure 4-3) to domestic leased circuits since 1981,[38] and extended its tariff structure into international circuits in July 1986. The DBP's final goal may be a unified tariff based on the volume of information, which implies an inclination toward public networks. Other European countries might follow the German strategy.[39] These preferences for a public network or discriminatory pricing against leased circuits may hurt VASPs.

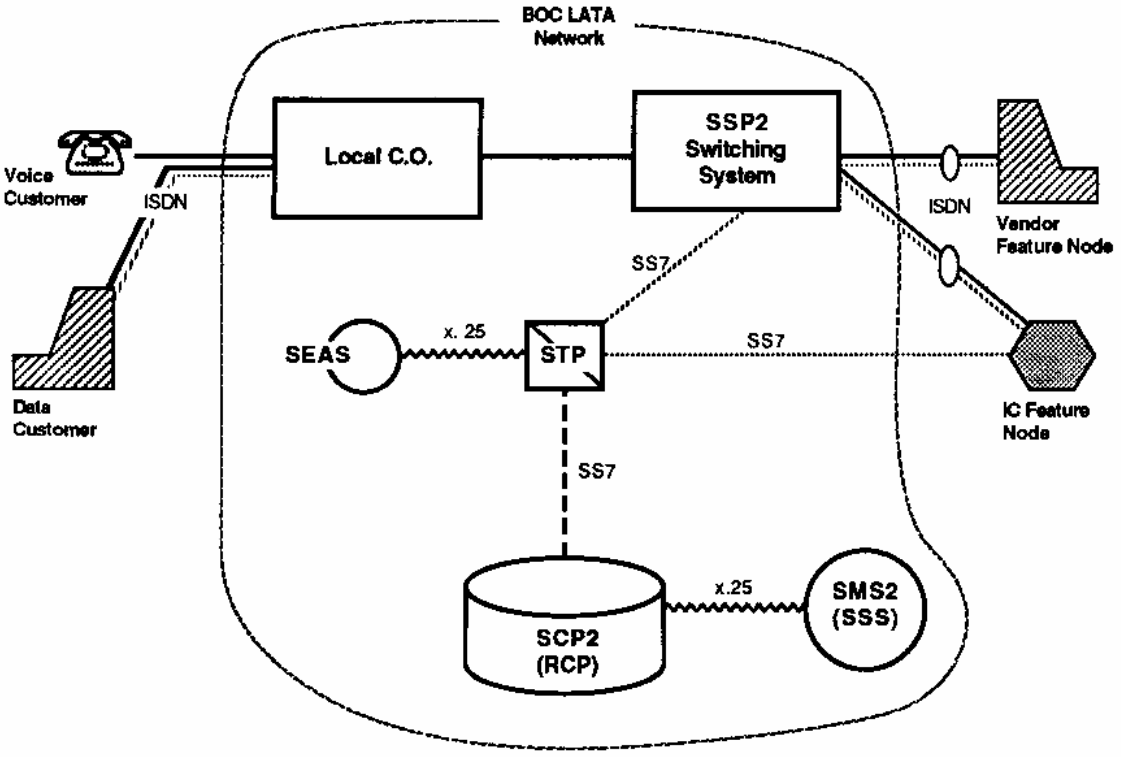


Source: Karl-Heinz Neumann and Bernhard Wieland, "Competition and Social Objectives: the Case of West German Telecommunications," Telecommunications Policy, June 1986, p. 127. Reprinted with permission.

Figure 4-3

Usage-Sensitive Tariff in West Germany

- Economies of scale and scope may be difficult to challenge. Because communications networks may have economies of scale, large-scale network operators, such as common carriers with many customers, may have some advantages. In addition, integrated facilities may be able to supply similar services economically because of economies of scope. These economies may, in turn, be barriers to entrepreneurial efforts by value-added service providers. For example, although Telenet and Tymnet wield dominant power in the still-infant VAN market, profitable expansion of their operations seems difficult.[40]



SSP2 = Advanced (i.e., Issue 2) Service Switching Point capabilities (FN/SI)
SCP2 = Advanced (i.e., Issue 2) Service Control Point capabilities (FN/SI)
SMS2 = Advanced (i.e., Issue 2) Service Management System capabilities (FN/SI)

Source: Third Computer Inquiry, Comments Filed by Ameritech Operating Companies (November 13, 1985), Exhibit B, Figure 5.

Figure 4-6

Intelligent Network 2: Target Services Architecture
Incorporating Feature Node/Service Interface

2) Are there any opportunities for non-carriers? Under an ONA, opportunities for enhanced-service providers would increase, because unbundling of basic services, even into basic service elements, and the mandatory resale structure would eliminate most advantages for common carriers who own their own facilities in the enhanced-services market. A software-based enhanced-service provider could undertake an entrepreneurial venture[70] for the minimal setup cost of one ISDN subscriber line and one terminal or PC.

change in the regulatory framework. Specifically, the FCC's Computer Inquiry III (First Report and Order was adopted in May 1986) and the DOJ's Huber report (which was to be submitted to Judge Greene and Congress in January 1987) could be major sources of change in the enhanced-services market. Section 4.3.1 focuses on the treatment of CEI and ONA in Computer Inquiry III, while section 4.3.2 further explores questions raised in phase II of Computer Inquiry III regarding protocol processing and enhanced-service definitions.

As described in Chapter 2, the Computer Inquiry III decision stipulated several conditions for AT&T and the BOCs' basic and enhanced-service provision. Among these non-structural safeguards, implementation of CEI and ONA has been highly controversial both during the discussions and after the decision. Because the broad architectural concept of ONA, especially, is very different from notions underlying the previous regulatory framework, how CEI and later ONA would be implemented remains uncertain. After briefly describing the FCC's definitions of CEI and ONA, this section will also attempt to clarify conflicts among major players. Details of RHC proposals for ONA and its implications will also be discussed. Finally the definitional issue regarding enhanced service will be described.

4.3.1. Computer Inquiry III: Toward ONA

The FCC's Definitions of CEI and ONA in Computer Inquiry III

CEI. The objective of CEI is to make the availability of a common carrier's basic services the same or "comparably efficient" for both the common carrier itself and enhanced-service providers.[42] In other words, CEI may be defined as the prerequisite for type C equal access (see Chapter 1). The FCC specified nine technical parameters that common carriers must satisfy on a service-by-service basis in order to meet the CEI requirements for enhanced-service provision, thus gradually changing the market structure during an interim period before ONA is implemented. These parameters[43] dealt with:

1) Standardized hardware and software interfaces
2) Unbundling of basic services
3) Resale of basic services at unbundled tariff rates

4) Equal technical characteristics for interconnection

5) Equal installation, maintenance, and repair

6) Equal access opportunities for end-users

7) Equal timing of availability

8) Minimization of transport costs

9) No discrimination against any customer.

To put these parameters in perspective, the unbundling of and resale structure for basic services, as well as end-user access, could be considered key components because they imply the new concept that the carriers would at least partially hand over control of network utilization to the public.

The unbundling and resale principle would have an effect similar to that of structural separation, with common carriers having to give up some of the competitive cost advantage they could have realized by utilizing their bottleneck facilities to provide services less expensively than could other enhanced-service providers.[44] Satisfaction of these parameters will ensure an equal footing between common carriers and enhanced-service providers.

In addition, equal end-user access would eliminate the traditional supplier/user distinction between common carriers and end users.

ONA. ONA may be defined as a general network architecture in which common carriers would provide unbundled basic network functions to all users including the carriers themselves, thus inherently attaining CEI conditions.[45] ONA may be possible through implementation of an ISDN, but CCITT ISDN standards, based on a monopoly structure, may not be sufficient for the multi-vendor environment in the U.S.[46] Several organizations submitted comments on ONA to the FCC, but the Commission avoided precise technological specifications. ONA requirements are only specified on two points -- unbundling of basic service elements and application of CEI parameters.[47] In addition, the FCC asked some appropriate private organizations, such as the T1 committee of the Exchange Carriers Standards Association (ECSA), to assume the responsibility for further specifications and set the deadline for ONA plans as February 1, 1988.[48]

Major Players' Viewpoints

Before detailing the implications of ONA, this section describes the concerns of major interested players.

AT&T. AT&T has been the only major player to strongly oppose the CEI and ONA requirements. It claims that strict CEI/ONA requirements are not necessary because it has neither bottleneck facilities nor dominant power in the long-distance or enhanced-services market.[49] GTE and other independents will probably follow AT&T's logic on the application of CEI/ONA to them.

BOCs (RHCs). The BOCs have expressed mixed attitudes, ranging from some advocates of ONA, such as US West and Ameritech, who see the new regulatory framework as offering good business opportunities, to the view that favors a possible option between ONA and structural separation, to yet another that prefers to waive ONA application for subscribers in order to keep control of the network.[50] However, the BOCs have been actively involved in standardization efforts of the ONA Forum (ONAF), presided over by Bellcore.[51] Most companies believe, based on past experience with standardization, that the FCC's deadline would be difficult to attain.[52]

IBM. IBM strongly supports ONA as an essential non-structural safeguard against both the BOCs and AT&T,[53] because it fears their dominant power in the market and the danger of cross-subsidies from regulated to non-regulated business.

DOJ. The DOJ advocates ONA, even though it is still a conceptual proposal. Although the content of the Huber report and the outcomes of further political struggles are uncertain, the DOJ will likely support the FCC's decision by proposing that the MFJ restrictions for BOC entry into information services should be eliminated if ONA and other conditions are stipulated.[54]

NARUC. NARUC opposes the FCC's oversight of state-level enhanced-service constraints as specified in the FCC's decision. NARUC commented that dominant carriers in many cases ought to be permitted to provide enhanced services as part of their basic network, regulated by the state public utility commissions.[55]

MCI and VANs. They still favor Computer Inquiry II's structural separation requirements, but they are now pushing the FCC toward early and compulsory implementation of CEI and ONA.[56]

In summary, most of the players willingly or unwillingly accept CEI/ONA as providing necessary safeguards for fair competition in the enhanced-services market. Although AT&T opposes CEI/ONA because it stands to lose more than it would gain, the major controversy is likely to be over how, rather than whether, to implement ONA.

RHC Proposals for ONA

Although there is not and will not be just one definition of ONA -- the FCC has already recognized its diversity -- RHC thinking about ONA, as evidenced by their comments at an early stage of the Computer Inquiry III proceedings could be classified into two viewpoints: ONA as a strategic business plan and as a strategic network plan. In their comments on ONA to the FCC, US West seems to take the former view, while Ameritech seems to take the latter.

US West. US West discusses ONA as providing a strategic weapon for future expansion of regional telephone companies. US West's objectives may be seen as threefold:[57] 1) to compete with bypass; 2) to provide information services; and 3) to provide interstate services. To gain approval for these objectives, it is willing to disclose the network to its competitors and customers. It would establish several means of access to network facilities, such as leased-circuit, circuit-switched, packet-switched, and signal modes.[58] In exchange for its support of ONA, it would stipulate: 1) minimal regulation because it faces severe competition against bypassers in an ONA environment;[59] 2) application of a market pricing principle and a proper accounting method other than fully distributed costing (FDC);[60] 3) removal of the artificial definitions distinguishing carriers from non-carriers[61] -- for example, VANs as non-carriers and simple resellers as carriers.

Ameritech. In its comments Ameritech discusses the technological evolution of the network. The company defines the Feature Node/Service Interface (FN/SI) developed by BellCore as the telephone network architecture that would "allow comparable interconnection of third-party service vendors (and carriers themselves) to the core LATA

networks. . . ."[62] Basic service elements, called "primitives" by Ameritech, include, for example, call holding, transfer on busy, and pass control or routing of a call.[63] Instructions for the sequence of these elements can be stored in a routing control point (RCP) outside the switches.[64] An industry standard "service interface" would interconnect the core network with the vendor's "feature node," which would have vendor-specific software.[65]

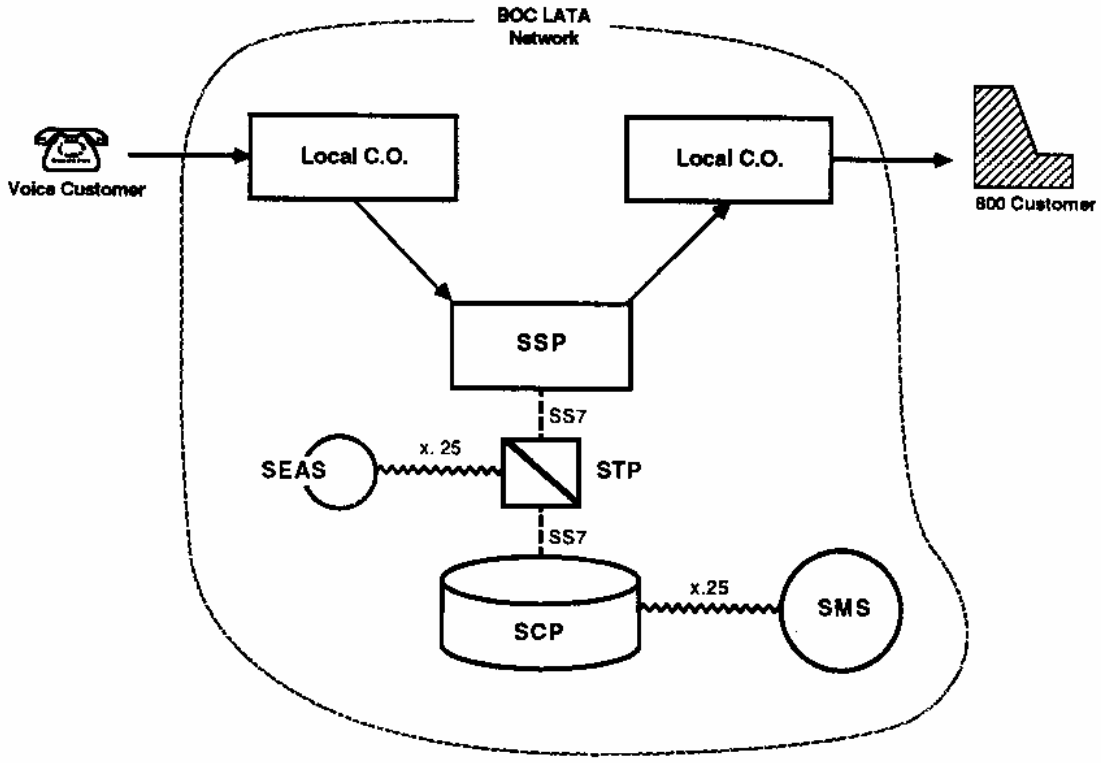
The FN/SI would allow customers and enhanced-service providers to manipulate part of the RCP software. Although Ameritech wants to implement ONA in parallel with the introduction of an ISDN, it admits that FN/SI has some deficiencies.[66] Certain functions, such as protocol processing, may be more efficiently offered through different arrangements. And third-party access to the ISDN D-channel before it enters the telephone company switch is not technically feasible.

Implications of ONA

1) Is ONA employing innovative technologies? Technologically, the interim level of FN/SI, or what Ameritech has defined as Intelligent Network 1[67] (see Figure 4-4), has already been implemented in the long-distance market as AT&T's Software Defined Network (SDN), a "virtual private network" (see Figure 4-5). AT&T defines SDN as an ISDN precursor, or intelligent network architecture, which allows customers to manipulate their own network through a "Service Management System" and "Network Control Point."[68]

The BOCs' technologies may be somewhat behind AT&T's, which suggests one reason for AT&T's opposing and the BOCs' not opposing ONA. For AT&T, ONA implies the necessity to change existing architecture, such as its SDN. Furthermore, unbundling of basic service elements would not apply to MCI, which is also providing service similar to AT&T's. In contrast, the BOCs are in a relatively easy position, having yet to complete their network architecture design.

The latter model of FN/SI, Intelligent Network 2,[69] would be almost accomplished with the introduction of an ISDN that includes Common Channel Signalling No. 7 (see Figure 4-6). To meet type C equal access conditions and to facilitate implementation of an ISDN, the BOCs and AT&T might need considerable financial and technological resources.

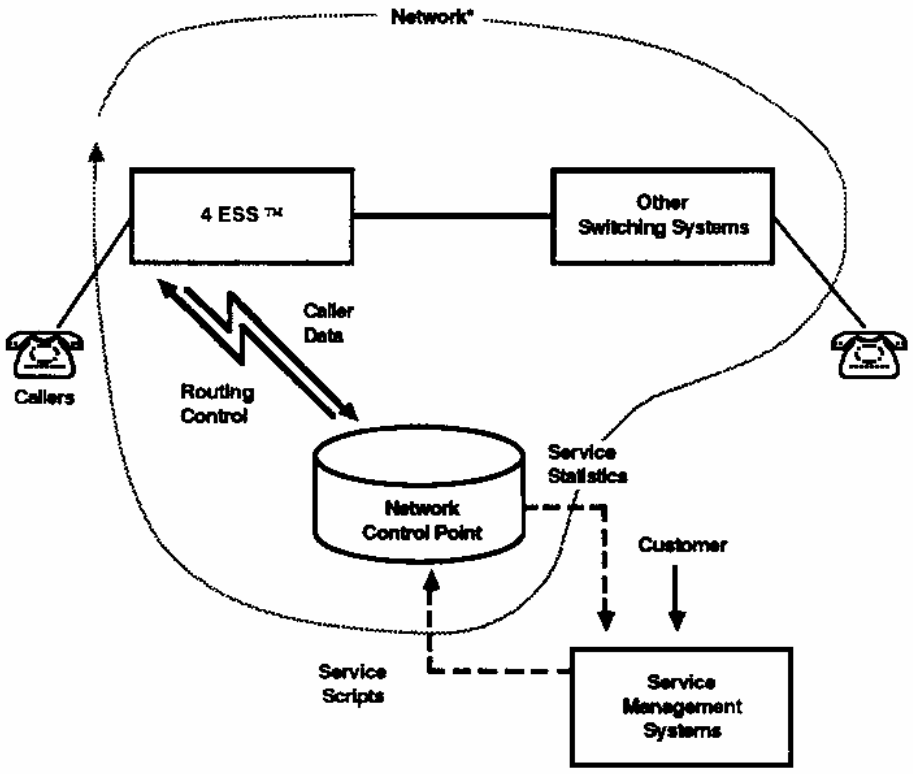


Local C.O.	=	Switch without SS7 or SSP capabilities
SSP	=	Switch with Service Switching Point (SSP) - Issue 1 - capabilities
SEAS	=	Signalling Engineering and Administration System
SCP	=	Service Control Point - Issue 1
SMS	=	Service Management System - Issue 1

Source: Third Computer Inquiry, Comments filed by Ameritech Operating Companies (November 13, 1985), Exhibit B, Figure 4.

Figure 4-4

Services Architecture for Intelligent Network 1

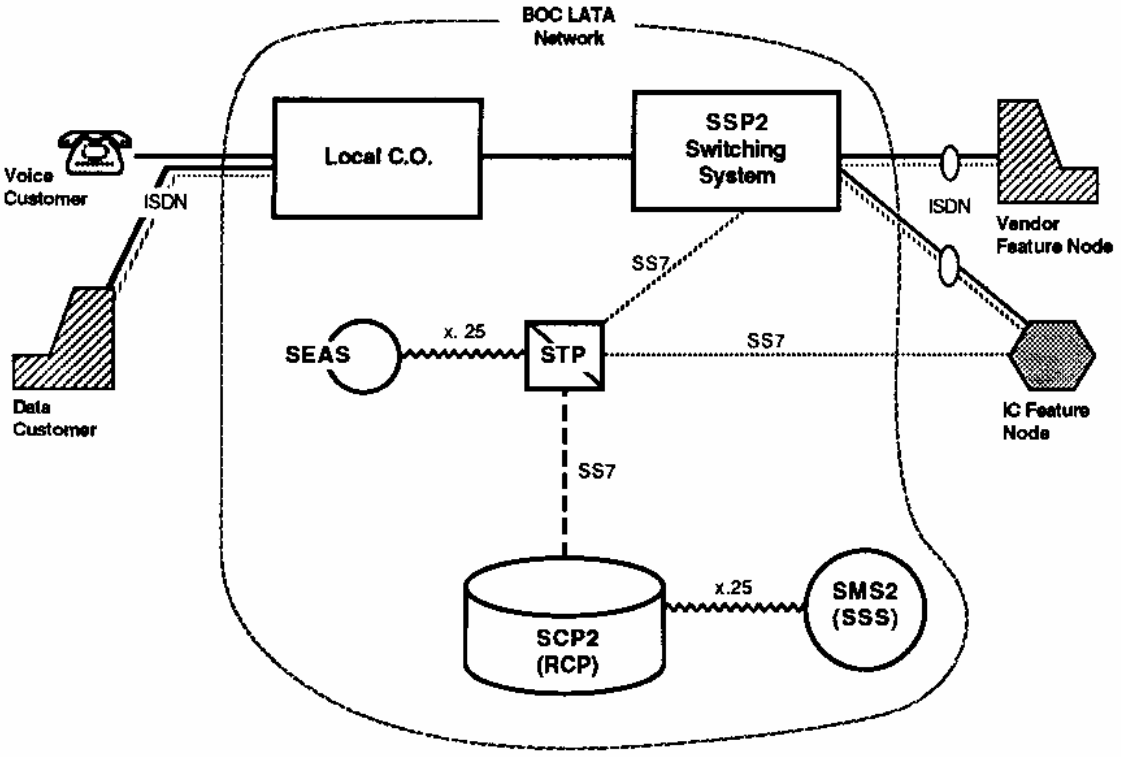


*serving, for example, AT&T's 800 Service and Software Defined Network.

Source: G.W. Gawrys, et al. "ISDN: Integrated Network/Premises Solutions for Customer Needs," in International Conference on Communications '86. Conference Record, Vol. 1, p. 3. ©1986 IEEE. Adapted with permission.

Figure 4-5

ISDN Precursors: Intelligent Network Architecture



SSP2 = Advanced (i.e., Issue 2) Service Switching Point capabilities (FN/SI)
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Figure 4-6

Intelligent Network 2: Target Services Architecture
Incorporating Feature Node/Service Interface

2) Are there any opportunities for non-carriers? Under an ONA, opportunities for enhanced-service providers would increase, because unbundling of basic services, even into basic service elements, and the mandatory resale structure would eliminate most advantages for common carriers who own their own facilities in the enhanced-services market. A software-based enhanced-service provider could undertake an entrepreneurial venture[70] for the minimal setup cost of one ISDN subscriber line and one terminal or PC.

3) Are there any problems for tariffing? Tariffing of basic service elements could be a difficult problem. If basic service elements (BSEs) are defined too narrowly, such segmentation would increase the administrative costs and complexity of user- or carrier-defined software for certain services,[71] a problem that may be mitigated by early discussions toward industry standards or a basic consensus on tariff and technical questions. The SDN tariff already provides one primitive example of a solution,[72] although its basic service elements, such as a signalling channel tariff that applies before and after call setup, are not yet defined. Exchange of information and other positive interaction with international organizations, such as the CCITT, may also be beneficial for establishing appropriate basic service elements. In addition, state/federal regulatory conflicts may arise, because most BSE tariffs will be filed with state regulators.

4) Are there any economic burdens on common carriers? Carriers have two burdens: uncertainties in ONA technologies and in ONA implementation costs. Because the FCC has stepped back from the standardization process, flexible interpretation of requirements and different corporate strategies might lead to incompatible technological standards, which might in turn necessitate costly separate development efforts.[73]

Implementation costs may be another burden for carriers.[74] Although ONA will have to accommodate all user demand without discrimination, forecasting new-service demand and planning facilities may involve some uncertainty.

In addition, the non-discrimination rule might force rural BOCs or small independent telephone companies to accept what probably would be an unprofitable investment for ONA.

5) Are there any problems of efficiency? If protocol processing is integrated with basic services, end-to-end communication would be efficiently completed in one call. But if protocol processing functions intermediate the call at the feature node (FN) in Ameritech's architecture, then end-to-end communication would require two calls. This deficiency bears further examination.

6) Are there any other impacts for regulation? ONA would also impact on the deregulation of BOC activities. Accomplishment of equal access for common carriers and enhanced-service providers would be a key factor in the elimination of "bottleneck facilities" that hinder further deregulation. The FCC's ambitious deregulatory experiments,[75] which might avoid such problems as time-consuming tariff approval, artificially low depreciation rates, and uneconomic cross-subsidies, may be able to begin after implementation of two of the levels of equal access defined in Chapter 1 -- type B and type C equal access. In summary, ONA might as a regulatory framework accomplish many players' goals, although it might bring with it such difficulties as diverse implementation, possible delay of standardization, and some economic burden on common carriers.

4.3.2. Computer Inquiry III, Phase II, Definitional Issue: Enhanced Service and Protocol Processing

As described in Chapter 2, protocol processing has been discussed in phase II of Computer Inquiry III. Despite their current advantages in protocol processing, VANs have expressed concern that the FCC's future decision might narrow their opportunities. AT&T and the BOCs are anxious to enter this market, expecting less restrictive regulation.

The FCC's proposal in the Supplemental Notice of Proposed Rulemaking includes three alternative amendments to the enhanced-service definition. Alternative A defines enhanced service as change of content, provision of information, and storage. Because protocol processing does not change the content of information, it can be offered as a basic service.[76] Alternative B defines protocol processing as enhanced, but the FCC reserves a discretionary right to classify it as basic service.[77] This definition introduces some uncertainty. Alternative C defines any protocol processing as enhanced service, subject to CEI/ONA requirements.[78]

Major Players' Viewpoints

Carriers favor alternative A, but other players prefer C.

AT&T. AT&T prefers alternative A, but its major concern is that it be exempt from CEI/ONA requirements.[79] AT&T argues that being

forced to offer protocol conversion as a stand-alone service would put Accunet at an unfair disadvantage.[80]

RHCs. The RHCs favor alternative A, because they would not be required to unbundle basic service elements,[81] even though the services would continue to be regulated.

VANs. VANs prefer alternative C,[82] which allows them to maintain their advantage in offering unregulated and integrated service in contrast to the regulated, separated service offerings by AT&T and the BOCs. If alternative A is approved, VAN services could be defined as basic and in principle subject to regulation, although the FCC would be likely to forbear regulation. VANs are also worrying about access charges from which they are currently exempt.[83] Telenet has proposed a more aggressive alternative -- that all packet-switched service, including X.25 transparent, should be unregulated.[84]

DOJ. The DOJ also supports alternative C, believing that current regulation has no apparent defects.[85]

Implications of Alternative A:
Protocol Processing as a Basic Service

These opinions reflect the long-term strategies of common carriers and enhanced-service providers. Although the VANs strongly oppose alternative A, it could be seen as the next step after the FCC past waiver decision on asynchronous/X.25 in 1983 and X.25/X.75 protocol conversion in 1985.[86] Alternative A would also be congruent with technological development and an international regulatory framework, as well as with the regulatory frameworks of other countries; the U.S. has been the most restrictive of common carriers' provision of protocol conversion as an adjunct to a packet network.

Possible effects of alternative A may be:

1) A less restrictive policy direction may be favorable not only for common carriers but also for business and home users. Because most countries support common carrier development of public packet-switched networks which would be integrated into an ISDN in the future, U.S. businesses and consumers might wish to have similar opportunities. Because packet-switched service would be available to the public from local switches in an ISDN environment, restrictions against common-

carrier provision of simple protocol processing could curtail some of the options opened by technological development.

2) Common carrier entries might increase the prosperity of a packet-switched network because common carriers have the capabilities to offer less expensive access, especially if an ISDN were implemented, as discussed in section 4.2, above.

3) VANs may lose their market power if the common carriers' basic service offering is very similar to what the VANs have traditionally offered. However, the BOCs, prohibited from providing interLATA network services, would need partners to offer nationwide communications, especially given the importance of the long-distance portion under the packet network's distance-insensitive tariff structure. In addition, VANs could offer a package including several other enhanced services, and such vertical integration could help them survive.

4.4. Japan: Communications Policy Issues

An issue for value-added services in Japan is how to secure fair competition between NTT's services -- especially its Data Communications sector -- and other Type 2 carriers' services. MPT's Telecommunications Council has been discussing policies related to this issue since September 1986. The differences of opinion are outlined below.

4.4.1. Major Players' Views

NTT. NTT has been examining strategies for future data communications services.[88] Because NTT's data communications services are subject to Type 1 carrier regulation, which is asymmetric to that of other Type 2 carriers, NTT believes that structural separation of its Data Communications sector and its registration as a Type 2 carrier would enhance its competitive edge,[89] hopefully facilitating better and less expensive services. The president of NTT requested the MPT to conclude discussions in the Council as soon as possible.[90]

Ad Hoc Commission. The Ad Hoc Commission for Administrative Reform recommended in 1982 that NTT separate its Data Communications sector in order to put the sector on an equal footing with other

companies, with no cross-subsidies from its regulated telephone business.[91]

Fair Trade Commission. The Fair Trade Commission in Japan pointed out in February 1986 that new business, especially a joint venture between NTT and IBM, would have to be monitored carefully and that adequate actions would have to be taken if anti-competitive conditions were found.[92]

Federation of Economic Organizations (Keidanren). In its "Major Issues under the New Telecommunications System," submitted to the MPT and NTT in June 1986, the Keidanren identified several policy directions that it would prefer:[93]

1) NTT's Data Communications sector should be structurally separated. Business relations between NTT and its new subsidiary and the split of assets should be defined clearly.

2) Subsidiaries should be carefully established and operated, in order not to suppress the existing private companies, and to contribute to NTT's efficiency.

3) Restrictions on leased-circuit interconnection with the public telephone network should be eliminated at least for voice mail service.

Type 2 carriers. Type 2 carriers originally supported the structural separation of NTT's Data Communications sector without specific conditions,[94] but they are requesting the very strict conditions[95] that:

1) NTT should not hold any stock in the new company;

2) the MPT should prohibit NTT, except for its new subsidiary, from data-communications-related business;

3) the new company should be split further into small entities;

4) R&D related to data communications should be transferred to the new company;

5) Type 2 carriers and NTT's new subsidiary should be permitted to collocate equipment within NTT's telephone offices.

In general, Type 2 carriers are extremely concerned about the size of NTT's sector, even though its market share would be just above 20%.[96]

MPT. Given complex objectives and constituencies, the MPT has not been in a position to favor structural separation.[97] In May 1986 it expressed concerns[98] that:

1) NTT should be kept from business resembling Type 2 carriers' after the structural separation;

2) separation of R&D related to data communications might degrade the technological level of the NTT laboratories;

3) the structural separation requirement would not be imposed in the Computer Inquiry III environment in the U.S.A.

Its basic policy will be based on the upcoming recommendations of its advisory committee.

Labor union. NTT's labor union would not unconditionally accept complete divestiture from NTT as requested by the competitors because such divestiture would reduce future pensions.[99]

4.4.2. Implications for Communications Policy

This section will briefly discuss the implications of these conflicts. The issue of the structural separation of the Data Communications sector of NTT has a long history. Originally there were two problems -- inefficient operation and cross-subsidies from the telephone business. NTT rejected structural separation, although the Keidanren and the Ad Hoc Commission for Administrative Reform recommended it, and the data-processing industry agreed with them.[100] Currently, although the Keidanren maintains the same position, other players have reversed theirs. Type 2 carriers oppose NTT's unregulated operation, and the MPT might not be willing to loosen its grip, even though NTT wants structural separation. The controversy's major points are:

1) Is NTT still dominant in the Type 2 market? Should the new company be regulated differently?

Although Type 2 carriers argue that NTT's new subsidiary will dominate the market, its 1985 market share may not be sufficient to be dominant, and the market growth rate may be so high that its future dominance is unlikely. However, sudden deregulation could disrupt the market, and the MPT might be forced to choose asymmetric regulation of NTT's subsidiary.[101]

2) What kind of relationship should the separated sector maintain with the parent company: for example, stock holding, exchange of information and R&D?

The percentage of shares to be held by NTT has been a question. Opinions range from favoring 0% to 100%. NTT and its workers want to maintain a close relationship between the parent and the subsidiary,[102] but others consider the separation to be similar to AT&T's divestiture.[103]

Some questions resemble those of Computer Inquiry III, including how to treat customer-proprietary information, collocation of facilities, and other equal-footing conditions.[104]

Other questions include the treatment of the sector's past deficit accumulation, and R&D sharing with NTT, especially for the continuing development of an NTT proprietary computer, called Denden Information Processing System (DIPS).[105]

3) Will structural separation be more efficient than integrated operation?

A concern of the MPT is the FCC's Computer Inquiry III's decision replacing the structural separation requirements in Computer Inquiry II.[106] However, NTT's Data Communications sector's long history as an independent profit center with a resale structure and accumulated resources would make it quite different from the quickly made baby Bell.

The MPT is also concerned about ISDNs. Some believe that integrated operation of common carrier services and data processing in an ISDN environment might be efficient and desirable.[107] Intelligent networks might need to incorporate sophisticated functions for data processing. However, the actual market for data processing or VANs does not now and might not in the future significantly overlap with common carriage business. IBM's failure in its SBS and AT&T's struggle in the computer business and failure with Net1000 suggest that similar hardware technologies may not mean integrated markets.

4.5. U.K.: Communications Policy Issues

Two issues will be examined here.

Simple Resale

An important issue in the U.K. may be whether to eliminate restrictions on simple resale of leased circuits.

With 90% of common carriers' revenues coming from telephone and telex, restrictions on simple resale may be necessary to maintain their stability, while restrictions on other use, such as data communications, may not be necessary. DTI may wish to reconsider this issue in a few years.[108] Although BT would probably disagree with further liberalization, Mercury might favor deregulation if it would be allowed to have a resale subsidiary. Prohibition of telephony and telex service by VANs is likely to be controversial.

Relationship between Dominants

Another issue in the U.K. is what the relationship should be between the two dominants in computers and communications -- IBM and BT.

Although DTI and OFTEL rejected the joint venture attempt between IBM and BT, some observers doubt that there is real competition between them. For example, IBM and BT already separately provide networks for the insurance industry. BT links 95 agents through a packet-switched network to nine insurance companies, seven of which own IBM mainframes. IBM links 30 agents to six insurance companies using SNA.[109] However, if a bridge were provided between these two networks, the two giants' objectives would be virtually attained. Furthermore, in the new EFT-POS (electronic funds transfer at point of sale) project, they are increasing their cooperation with BT's winning the contract for its packet-switched network and IBM's computers being installed in the local telephone exchange.[110]

The British government and user groups will resist these anti-competitive developments. DTI already decided to watch BT's activities more carefully. The major users' group, the Telecommunications Managers Association, has expressed concern about the necessity for both competition and national strategy that would provide the

infrastructure and favorable context within which competitive entrepreneurial effort would build.[111]

4.6. Issues for Future Communications Policy

4.6.1. What Policy Alternatives would Promote both an Advanced Infrastructure and Competitive Benefits in an ISDN Environment?

Communications policymakers have been struggling with this question, and although different countries have apparently emphasized different aspects, more international interaction and mutual awareness have become necessary. For example, U.S. policies concern competition more than advanced infrastructure, while the U.K. and Japan have, at least in the past, placed more emphasis on advanced infrastructure. To attain their objectives, the U.S. and Japan have closely regulated their dominant carriers, while the U.K. allowed the common carriers some freedom.

However, international cross-effects in communications policy-making are emerging. For example, the FCC has been loosening controls on common carriers, particularly in Computer Inquiry III. Computer Inquiry III sees ONA as the key concept for both development of an enhanced infrastructure by common carriers and for the promotion of competition. The FCC's new proposal of a wider definition of basic service to include protocol processing might indicate the Commission's recognition of the importance of common carriers in an advanced information age, a recognition as clear as that in the U.K. and Japan. The discussions about streamlining the regulation of packet service and contract services by common carriers and about replacing rate-of-return regulation with a price-cap approach proposed by FCC commissioners in late 1986[112] also indicate foreign influence, especially from the U.K.

On the other hand, the U.K.'s policies are moving toward more regulatory control, especially for fair competition, as shown in the new Licence for VANS. In Japan, discussions on the structural separation of NTT's Data Communications sector and the inauguration of an international VAN are also scrutinizing the conditions for fair competition, influenced by U.S. policies.

Growing R&D expenses add another difficult dimension to policy decisions. Although ONA is designed to promote competition, common carriers need more R&D and investment in complex network facilities, as well as further efforts devoted to complicated tariff making and cost accounting procedures. For the BOCs to play an important role in an ONA environment, they would have to overcome the currently tight internal cash flows from limited depreciation reserves and BellCore's limited R&D budget;[113] IBM's R&D expenses are four times larger than Bellcore's, and AT&T's are twice. International alliances among communications equipment and/or necessary computer manufacturers indicate that an average corporation might not be able to sustain maximum corporate growth because its limited resources are not enough to cover ever-changing key technologies.[114] The massive requirements for R&D and capital expenditures for an ISDN could increase the importance of common carriers to both basic and enhanced-services provision. Equitable sharing of the responsibilities for implementing open and advanced network architecture might be necessary.

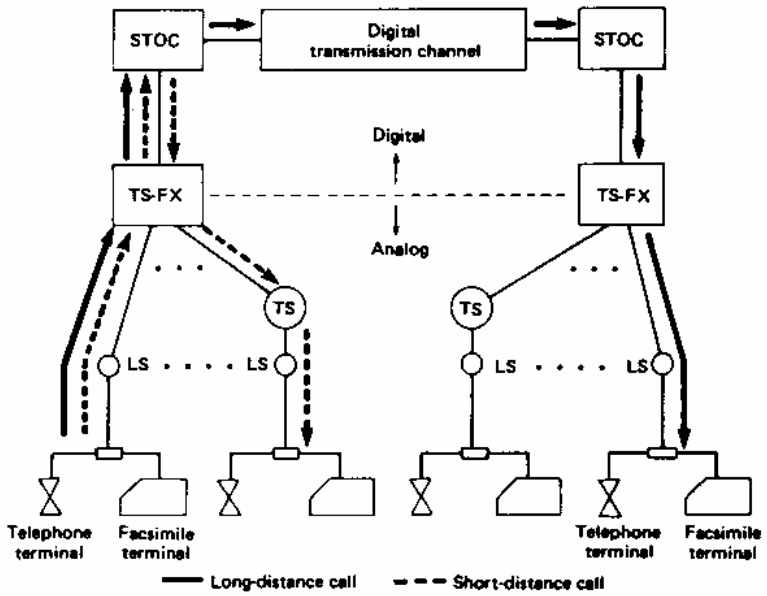
4.6.2. How Might ONA be Applied to Other Countries?

NTT's current network architecture may be seen as a preliminary example of applications of the ONA principle, although the definition of ONA is not clear. NTT has already employed enhanced-service functions embedded in basic communications services. Its public facsimile communications network can serve as an example.

Fax Net Configuration

This network provides several enhanced functions, including repetitive calling, non-delivery notice, multi-address communications, temporary storage, protocol conversion, and media conversion.[115] Its network configuration consists of three parts (see Figure 4-7):

- a telephone network, including the local switch and toll switch,
- a gateway to the digital facsimile network, and
- the digital facsimile network itself.



STOC : Facsimile Storage and Conversion system
TS-FX: Electronic toll switch with public facsimile functions
TS: Toll switch
LS: Local switch

Notes:
Connection method – "1XY" + "Telephone number."
Functions of storage and conversion equipment –
1. Storage: to increase transmission efficiency and provide a variety of services.
2. Conversion: analog-digital conversion; speed conversion.
3. Redundancy suppression: suppression to approximately 1/7.
4. Packeting: packet size 4 Kbit.
5. Automatic error check and request for retransmission.
6. Auto-registering of dates and originators' numbers.

Source: Yasusada Kitahara, Information Network System: Telecommunications in the Twenty-First Century (Tokyo: The Telecommunications Association, 1982), p. 148, Figure 3. Reprinted with permission.

Figure 4-7

Basic Structure of the Public Facsimile Communications Network

Basic/Enhanced Dichotomy

The first issue would be whether services are defined as basic or enhanced, although this classification does not apply to current Japanese regulation. Although all functions could be defined as enhanced, some may also be definable as basic. The first three examples above -- repetitive calling, non-delivery notice, and multi-address delivery -- would not induce much argument. Protocol conversion, temporary storage, and media conversion could be debated. Protocol conversion includes interconnection and size conversion among several types of facsimile equipment, such as CCITT's Group III

standard fax and NTT's proprietary Mini-Fax. This function could be a basic service: It may be as basic as the PAD (packet-assembly /disassembly) function, discussed during phase II of Computer Inquiry III, and may also promote technological development of terminals. On the other hand, size conversion does not change the visual image of information but does radically change the bit stream and thus could be defined as changing content. In addition, it is arguable whether supporting protocol that is not internationally standardized, such as Mini-Fax, could be defined as basic. Temporary storage of information for successful completion of communications would also invite debate. Because storage itself is not the objective of this function, and storage space is shared, it could be a part of the basic public network. On the other hand, the FCC has already defined "subscriber interaction with stored information"[116] as an enhanced service. Media conversion between data code and facsimile pattern does not change the information content, but a significant conversion does utilize special processor power and therefore could be either basic or enhanced.

Application of ONA

Second, if this network service is defined as enhanced, ONA requirements would apply to NTT. Currently bundled services would have to be unbundled into basic service elements (BSEs), and a resale structure would be applied.[117] First, the telephone network portion would have to be separated from the digital facsimile network. The gateway, called TS-FX (electronic toll switch with public facsimile functions), could be either a part of the telephone network or a separate service element. Then the digital facsimile network portion would itself be a principle element of enhanced service.

However, immediate application of such requirements may not be practical for the following reasons:

1) This network is already established as a public infrastructure for advanced communications services. Its 50 thousand customers[118] are not likely to accept drastic change of the architecture and confusion that would seem unnecessary to them. Technologically, software and hardware change would be difficult to implement without capital-intensive and time-consuming efforts and temporary service interruption.

2) The current network architecture is service specific. For example, the gateway is designed only for the facsimile network, although it shares some functions with the telephone switch. Therefore, ONA would not be attained by unbundling.

3) Unbundling of BSEs and of the resale structure would likely increase the total charges, currently bundled into a single tariff. Customers would not accept that increase.

Nonetheless, discussions of ONA will be inevitable. Preliminary discussions, such as informal information exchange among regulators in the U.S. and Japan as well as among regulators and common carriers, may be useful in the short run, while broader discussions may be valuable beginning in 1988 when an ISDN is to be introduced in Japan[119] and an ONA plan will have materialized in the U.S.

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Chapter Five

International Communications Networks

5.1. International Communications Market and Regulations

The international communications market has been growing very rapidly, with annual growth rates during the mid-1980s of 14% in the U.S., 11% in the U.K., and 10% in Japan,[1] almost double the domestic communications growth rates for those years. Revenues from the international market account for 3% of communications revenues in the U.S., 4.5% in Japan, and 23% in the U.K.[2] The lower rate in the U.S. may suggest the magnitude of the domestic market and the potential for future international market growth.

International communications markets are more complexly structured than are national communications markets. Conflicting interests and regulatory structures meet head on because international communications, a sort of cooperative business, cannot be achieved by a single authority in a single country. Communications facilities are generally constructed either by the International Telecommunications Satellite Organization (INTELSAT), a global telecommunications cooperative, or through joint ventures for submarine cable installation. Several international organizations, such as OECD and GATT, have been involved in communications policy issues related to their objectives, such as transborder data flows (TDF) and service trade. Technological changes and active multinational businesses also require changes in traditional frameworks. Thus political, economic, and technological changes both at home and abroad are interrelated. Some of the important changes and conflicts in the international communications market will be discussed here.

5.1.1. The Blurring Boundary between Domestic and International Markets

With the increasing internationalization of business and consumer activities, traditional national sovereignty has become less meaningful, at least for multinational companies. The flow of goods

and information tends to ignore geographical national borders and requires more international communications channels.

For example, the volume of international telephone calls outgoing from the U.S., the U.K., and Japan has paid little attention to geographic proximity: In 1984, 11.5% of U.S. calls, the third heaviest U.S. traffic, went to the U.K.; 17.1% of U.K. calls, the heaviest U.K. traffic, went to the U.S.; and 26% of Japanese calls, again the heaviest traffic, went to the U.S.[3] These three countries, although not geographically neighboring, are closely tied by communications traffic.

Direct access between countries is not necessarily the least expensive means of communication, because each country has its own tariff structure, governed by its own communications policies. Considering that most monopolistic PTTs and de facto monopolies such as BT, KDD, and perhaps even AT&T see few if any competitors, their tariffs do not necessarily reflect the costs between routes. For example, tariffs are usually still distance sensitive even if most of the circuits are routed through the distance-insensitive INTELSAT. Therefore "cream skimming" can take place as easily in the international high-density, low-cost route as in the domestic route, at least technically. Because the British government supports aggressive telex marketing, BT and C&W usually provide the least-cost routes for international telex.[4] Some companies can provide cheaper telex communication by storing telex information, sending the accumulated information through a higher-speed channel such as a telephone line, and transmitting it from the U.K. to its destinations.[5] This kind of international tariff and market structure affects the domestic tariff and market structure, for sometimes an international carrier or another country's domestic carrier can provide the least-cost route. Offering international carriers an incentive to bypass domestic carriers, INTELSAT leases facilities even for domestic use;[6] its new end-user service, IBS (International Business Service), can bypass domestic carriers if end users own or lease a dish on their premises.

In response to these changes, U.S. regulations eliminated the domestic/international dichotomy. With the Record Carrier Competition Act (RCCA) of 1981, the U.S. Congress authorized international record

carriers (IRCs) to provide purely domestic services,[7] and in 1982 the FCC permitted a domestic record carrier, Western Union, to reenter the international record communication market.[8] The Japanese government still maintains the dichotomy, at least for the dominant carriers NTT and KDD.

5.1.2. Blurring Boundaries between Voice and Non-Voice Communications

Traditionally voice communications went through the telephone network, and non-voice communications went through either the telex or data network, but the distinction between voice and non-voice networks has faded, especially in the international communications market. While facsimile traffic on the telephone network has been increasing, the number of subscribers to international telex has decreased, reflecting the domestic trend of facsimile and personal computer substitution for telex. To consider several examples: In Japan, almost 50% of international telephone calls are used for facsimile communications, according to a KDD estimate.[9] KDD's international telex revenue is expected to decrease by a dramatic 20% in fiscal 1986.[10] The troubled Western Union has already seen a decreased importance in U.S. telex, although European and developing countries still depend somewhat on telex networks. Thus the decreasing use of non-voice networks does not necessarily imply decreasing non-voice traffic. To the contrary, a packet-switched network can be used for some types of voice communications, thanks to voice-packetizing technology.[11] Although the quality of packet-switched voice communications is inferior to that of regular telephone communications, large corporations could realize cost savings by using the packet-switched network for international telephone calls.

Thus voice communication may use a non-voice communication network. Or, more generally, there are changes in the relationship between conduit and content. Traditional conduits, such as the telephone network and telex network, were closely related to specific contents -- voice wave and character signal, respectively. Current conduits can carry several types of contents, a change that an ISDN may accelerate in the future.

Accordingly, in 1982 the FCC abolished international carrier regulation based on the voice/record dichotomy. The FCC allowed AT&T to enter the record communications market, and allowed IRCs to enter the voice communications market.[12] In Japan the TB Law does not distinguish between voice and record communications.

5.1.3. The Blurring Boundary between Carriers and Non-Carriers

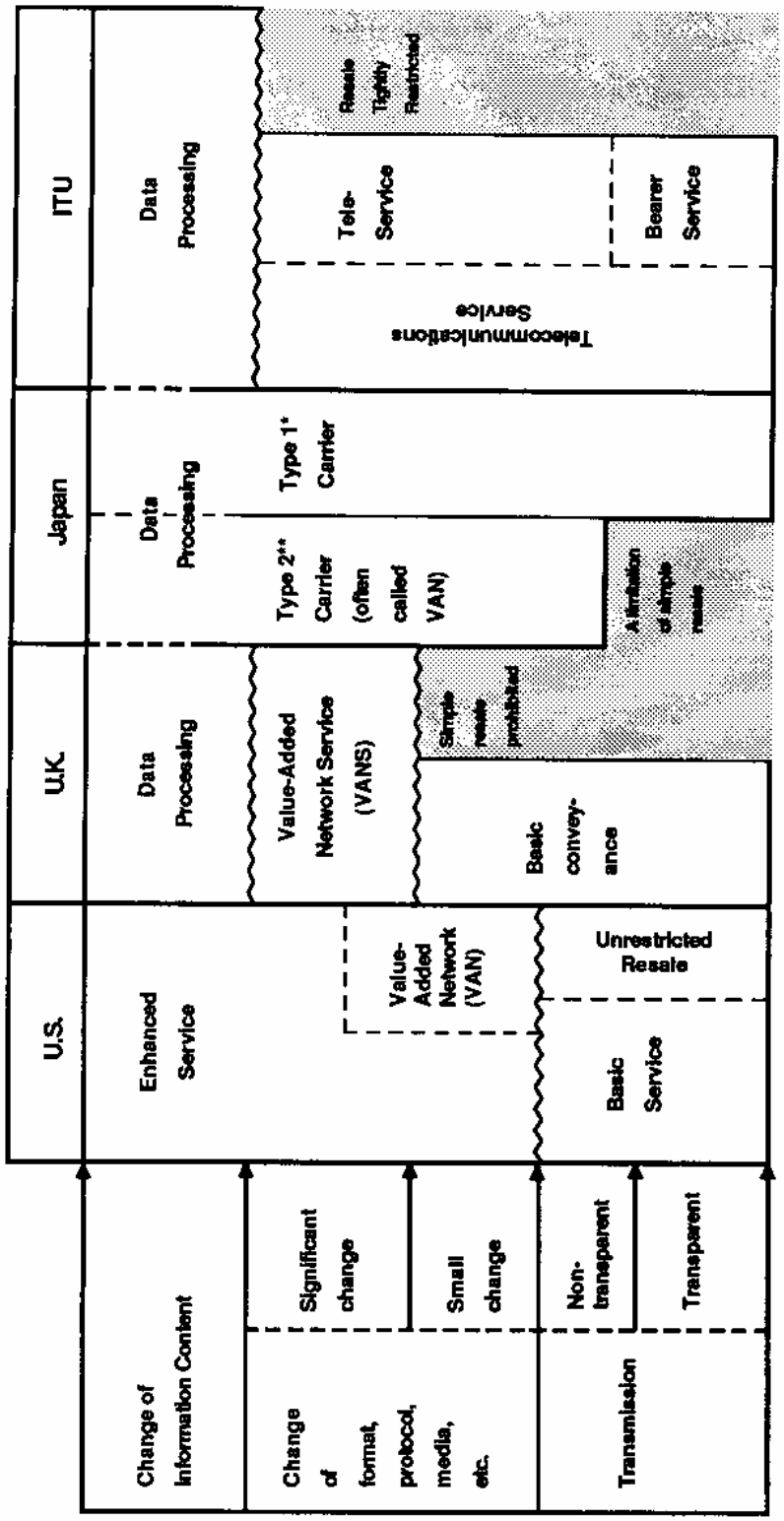
Large users tend either to lease their private networks from common carriers or to purchase facilities. They can be carriers, at least potentially, because they usually operate large-scale networks with some overcapacity. U.S. VANs, such as Telenet and Tymnet, originally defined as common carriers, became "enhanced-services providers" (non-carriers) after the Computer Inquiry II decision in 1982. Internationally, however, they were already approved as RPOAs[13] (recognized private operating agencies), which means that their status is the same as that of common carriers. In its 1982 Authorized User II decision, the FCC approved non-carriers' leasing of an INTELSAT space segment from COMSAT under the same conditions as apply to carriers. The FCC also approved, in May 1986, the transfer of submarine cable IRUs (indefeasible rights of users, which are similar to ownership) from carriers to non-carriers.[14] These regulatory changes in the U.S. gave unregulated enhanced-service providers or private companies increased flexibility in their control of facilities, and made the distinction between carrier and non-carrier less clear. This could be defined as "type A equal access" (see Chapter 1).

However, the traditional relationship between facilities and ownership (or its equivalent) is still important in the regulatory frameworks of Japan and of the ITU.

5.1.4. Different Definitions of Services

As a traditional regulatory and standardization organization, the ITU deals with a wide range of services provided by PTTs and RPOAs. In the ITU's basic framework, there are only two services -- telecommunications services and data-processing services. Data-processing service is defined as service involving "change of content," and it is outside the scope of ITU regulation. Telecommunications service is

defined as any service related to "public correspondence," except for data processing. The service definition and relevant accounting and tariff principles for value-added service, which is on the borderline, have been discussed in the CCITT since 1985, but the CCITT has had great difficulty defining value-added service.[15] It attempted to use the new-service categories that appear in ISDN recommendations -- "bearer" and "tele" service -- but their definitions are not necessarily congruent with domestic regulatory service boundaries,[16] such as basic/enhanced in the U.S., Type 1/Type 2 in Japan, and basic conveyance/value-added in the U.K. (see Figure 5-1). This unsettled definition may bring some uncertainty to current discussions of new business rules in the Preparatory Committee for the World Administrative Telegraph and Telephone Conference (WATTC), which is planned for 1988.



* Facilities owned
** Facilities not owned

Figure 5-1

Differences in Domestic Service Definitions among Countries

5.2. Issues in International Communications Policies

5.2.1. U.S. International Communications Market and Regulatory Structure

In the U.S., communications facilities providers, service providers, and government agencies, among others, compete and cooperate within a complex market and regulatory structure (see Figure 5-2).

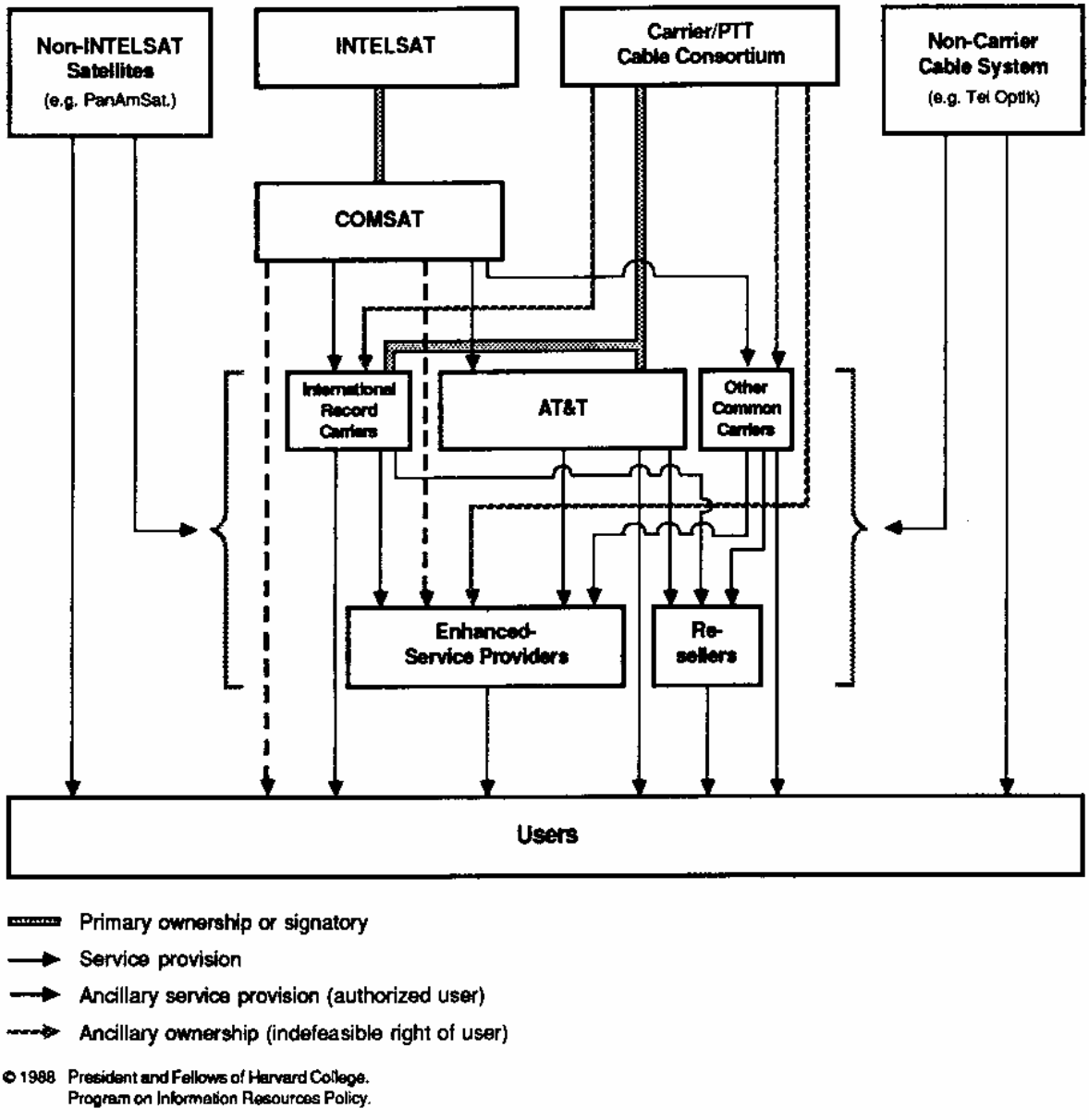


Figure 5-2

Competitive Structure for International Facilities and Service in the U.S. and an International Service Definition

Facilities Providers

INTELSAT. The International Telecommunications Satellite Organization (INTELSAT) is the global cooperative that owns and operates the worldwide international communications satellite system, comprised of 16 satellites as of 1986. It provides some two-thirds of international telephone service facilities and most international television.[17] Interest in INTELSAT is held by 110 member countries through their signatories, including, from the U.S., the Communications Satellite Corporation (COMSAT) with a 24.7% share, the U.K.'s British Telecommunications plc. (BT) with a 13.4% share, and Japan's Kobusai Denshin Denwa Company (KDD) with a 3.7% share. The U.S. share has decreased from 61% in 1965 to 24.7% in 1985,[18] although 70% of INTELSAT revenues still come from the U.S.

Producing 72.5% of its revenues, its international telephone message service has had an annual utilization charge per circuit uniformly set at $4680 since 1981.[19] Another 8.8% of its revenues come from domestic service used in 26 countries, while the remaining portion comes from other new services including the INTELSAT Business Service (IBS), an integrated digital service primarily designed for intracorporate networking.[20] Launching of INTELSAT VI was planned for 1986 with 30 thousand voice-grade circuit capacity.[21]

COMSAT. COMSAT, the INTELSAT signatory in the U.S., was established by the Communications Satellite Act of 1962. It is authorized to plan, construct, own, manage, and operate a commercial communications satellite system by itself or in conjunction with foreign governments or business entities.[22] It acted as a carrier's carrier, providing INTELSAT space segments and earth stations to carriers, until 1982 when the FCC authorized non-carrier access to COMSAT, as well as end-user service by COMSAT.[23]

Non-INTELSAT. A satellite system separate from INTELSAT (the non-INTELSAT system) was conditionally approved by the FCC in July 1985[24] with some restrictions, including that it may not interconnect with the public switched network. A 1984 Presidential Determination initiated the adaptation of the domestic satellite system's "open sky" policy to the international satellite system, noting that "separate

international communications satellite systems are required in the national interest."[25] In February 1985, the Senior Interagency Group (SIG), co-chaired by representatives of the Departments of State and Commerce, also reported the need for non-INTELSAT systems.[26] Orion Satellite Corporation, International Satellite Inc. (ISI), Cygnus Corporation, and RCA American Communications Inc. (RCA) will apply their domestic satellite capacity to international service. The Pan American Satellite Corporation (PanAmSat) plans to serve the Latin American market.

The INTELSAT Agreement requires its members to conduct a "consultation process" before acquiring non-INTELSAT space segment facilities. The consultation obligations apply to "public telecommunications services," defined as

> fixed or mobile public telecommunications services which can be provided by satellite and which are available for use by the public, such as telephony, telegraphy, telex, facsimile, data transmission, transmission of radio and television programs . . . .[27]

The applicant for non-INTELSAT facilities needs to ensure technical compatibility with the radio frequency spectrum and to avoid significant economic harm to INTELSAT.[28] Although the U.S. government has insisted that provision of customized services would not significantly affect INTELSAT's business, INTELSAT has argued that new systems would be a threat.[29]

Carrier/PTT cable consortium. Most international submarine cables are collectively owned by U.S. carriers, such as AT&T and the IRCs, as well as by foreign carriers or PTTs. In the Atlantic Ocean, seven submarine cable systems have already been installed, and the eighth transatlantic cable system (TAT-8), with 38 thousand voice-grade circuit capacity and $335 million investment,[30] is planned to begin operation in 1988. In the Pacific Ocean, the third transpacific cable system (TPC-3) is also planned to begin operation in 1988 with a $1 billion investment and 40 thousand voice-grade circuit capacity.[31] Cost reduction based on new technologies and some extra capacity, at least initially, would enhance facilities competition between satellite

and cable. AT&T claims that with the completion of TAT-8, AT&T's tariff for leased circuit use may be one-third of the 1986 COMSAT tariff.[32]

AT&T's reasons for such eager development[33] may include: 1) it prefers the increased control of facilities; 2) rate-of-return regulation makes ownership more attractive than leasing, because owned facilities included in the rate base would earn some return; and 3) it is a cable equipment manufacturer.

Non-carrier cable system. The FCC and the Secretary of State approved non-carrier cable systems in 1985. Two joint ventures were authorized -- a joint venture between non-carriers Tel-Optik, Ltd. (Tel-Optik) and Cable and Wireless, plc (C&W); and another between Submarine Lightwave Cable Company (SLC) and another company to be specified.[34] The FCC commissioners believe that these cable systems would increase facility competition and would provide many of the benefits enjoyed by domestic users. With no restrictions on services, non-carrier cable systems may have advantages over application-limited non-INTELSAT facilities. Thus non-carrier cable systems may compete with both carrier cable systems and satellite systems.

Service Providers

AT&T. In 1983, AT&T's revenues accounted for 75% of the $2 billion international communications market, or $1.5 billion.[35] AT&T primarily provides public switched telephone services, and although MCI and US Sprint also offer telephone services, they are not yet significant competitors.

International record carriers (IRCs). In 1983, IRC revenue comprised 25% of the international communications market, or $0.5 billion, of which telex accounts for approximately 70% and private leased circuit revenues account for approximately 28%.[36] RCA Global Communications (RCA), ITT World Communications (ITT), Western Union International (WUI), TRT Telecommunications (TRT), FTC Communications (FTC), and US-Liberia Radio Corporation are usually called IRCs because they traditionally have provided primarily record communications services.[37]

Resellers. The international resale business consists largely of international public switched telephone service resale because most IRCs' leased circuit tariffs prohibit resale. AT&T's tariff, however, permits resale of leased circuits only if the lessee reaches necessary agreements with foreign authorities.[38]

Enhanced-service providers. Several companies, including CDC and GEISCO, provide remote computing services (RCS). VANs have been developing their networks, especially to Europe and Asia. The State Department has already approved some VANs, including Telenet, Tymnet, and Graphnet, as RPOAs, which guarantees them the same status as carriers or PTTs in international negotiations, especially in the ITU. Database providers, such as Dialog and Compuserve, are likely to expand their international market.

Government Agencies

FCC. The FCC's authority is primarily to regulate rates, control interconnection, and authorize the construction and operation of facilities.[39] It may establish any policies necessary to execute its functions. It also prescribes certain technical and operational criteria, such as the terminal/network demarcation, and certifies that equipment complies with technical standards. In cooperation with the Departments of State and Commerce, the FCC may determine U.S. positions in international organizations or negotiations.[40] The FCC's role in trade negotiations has been ad hoc, but it appears to be taking a more active interest in trade issues.

Department of State. The State Department considers the foreign policy implications of proposed communications policies.[41] It has wide authority in some international organizations, especially in the ITU, where it is responsible for presenting U.S. policies and recommendations by domestic public advisory committees on communications. However, it must have both the FCC's and NTIA's advice on substantive communications policy matters, and the lines of authority among these three players are not clear.

Department of Commerce. The Commerce Department, through its NTIA, makes major proposals that focus on the commercial implications of communications policies. In 1983, NTIA's proposals included

centralizing executive branch policy authority and transferring the FCC's policymaking responsibility to the executive branch,[42] noting that trade and security concerns had become more important than public utility concerns.

Department of Defense (DoD). As a major user of communications services, DoD has been actively commenting on proposed policies.[43] Among its concerns are maintenance of a fixed monthly charge for leased circuit use and information security, which creates some conflicts with the database industry.

5.2.2. U.S. Communications Policy Issues

Several issues arise when application of domestic communications policy conflicts significantly with international regulatory frameworks. These issues fall into two categories: facilities competition and services competition.

Facilities Competition

INTELSAT vs. non-INTELSAT. One issue may be seen as how to introduce real competition between satellite systems. Restrictive conditions imposed on non-INTELSAT systems might hurt their chances for survival, because they operate at a disadvantage especially compared to INTELSAT's service and the less restrictive regulation of cable systems. Although INTELSAT might try flexible or even predatory pricing against non-INTELSAT systems, such as PanAmSat,[44] its real competitors may be optical fiber cables, especially in the heavily trafficked transatlantic routes. In addition, although some countries might worry about a probable price hike either if non-INTELSAT systems caused significant economic harm to INTELSAT or if INTELSAT applied flexible pricing, in reality, the fixed utilization charge since 1981 despite rapid technological development and scale economy suggests that the real enemy might be INTELSAT's own inefficiency or overcapacity. Thus removal of restrictions on non-INTELSAT systems might benefit both sides.

Raison d'etre of COMSAT. Although COMSAT was authorized in 1962 by the Communications Satellite Act, COMSAT's purpose has changed:

- The importance of INTELSAT and consequently the importance

of COMSAT have decreased, as the U.S. investment share has decreased.

- Users have become more conscious of extra costs from COMSAT's R&D and general and administrative expenses.

However, the FCC rejected direct access, a possible way to avoid the middleman, COMSAT, because direct access would not substantially decrease rates.[45] On the other hand, the Department of Commerce may favor direct access for customized services.[46]

Services Competition

International enhanced services. How to implement and develop international enhanced services has also been an issue.

The FCC's first attempt was the April 1980 Notice on Resale and Shared Use of Leased Circuits.[47] In it, the FCC intended to extend its domestic regulatory policies to the international field, but the attempt was fiercely attacked by both foreign and domestic entities.[48] The CCITT was concerned about the FCC's shortsighted neglect of the unanimously accepted 1976 CCITT recommendations. The CCITT's Recommendation D.1, in setting out the general principles and conditions applicable to all international private leased telecommunications circuits, restricts shared use or resale of leased circuits by customers:

> 1.7 . . . private leased circuits may be used only to exchange communications relating to the business of the customer. . . .
> 1.8 . . . The channels so derived [from a private leased circuit] must not be subleased.[49]

After the European PTTs frightened the U.S. that they could end leased-circuit services or introduce a volume-sensitive tariff, some large users, including DoD, criticized the FCC's proposals, so that its proceeding is still pending.

The FCC's second effort was its application of Computer Inquiry II -- that is, structural separation and a resale structure for AT&T's enhanced-service provision -- to the international market in 1982. European PTTs and the CCITT attacked the FCC similarly to their response in the 1980 resale debate.[50] The FCC contended that it had no

intention either to preempt the resale proceeding or unilaterally to impose U.S. policies onto foreign governments.[51]

The FCC initiated its third attempt carefully in November 1983,[52] with such new concepts as RPOA and IRU, making its decision in May 1986.[53] Designation of an enhanced-service provider as an RPOA was to avoid the application of Recommendation D.1 to the service provider, because as a customer the provider would be restricted by the CCITT recommendations, but carriers such as RPOAs are assumed to obtain facilities through carrier-to-carrier lease contract.

It concluded that an enhanced-services provider's offering of "public correspondence services," if the provider is an RPOA and enters into an operating agreement with a PTT, does not constitute prohibited resale under the CCITT's Recommendation D.1,[54] and that RPOA certification should be streamlined and voluntary.[55] Furthermore, because the FCC authorized enhanced-service providers to obtain IRUs for cable systems,[56] the providers might be in a better position to operate as carriers internationally within the ITU framework. Thus they could own at least some communications facilities in addition to leasing facilities from COMSAT as approved in the FCC's Authorized User II decision.

Further development of international enhanced services requires foreign partnership. Accordingly, Japan and the U.S. have been holding bilateral negotiations, the Market-Oriented Sector Selectives (MOSS), since 1985, dealing initially with four sectors -- telecommunications, medicine, electronics, and forestry.[57] Prompt inauguration of an international VAN was agreed to in the first negotiation. The MPT in Japan will liberalize international value-added service some time in late 1987.[58] However, European PTTs may retain strict regulations on resale.

Regulation of Foreign-Owned Carriers

The FCC has begun to examine the relationship between U.S. regulatory policies and the telecommunications policies of foreign governments.[59] As the trade imbalance grows, especially in telecommunications equipment and services, the FCC decided to consider the appropriateness of foreign carriers' operating with fewer trade restrictions in the U.S. than are imposed by the foreign governments or

PTTs concerned. In response to several instances of friction in foreign telecommunications trade, including West Germany's blocking of AT&T's attempted takeover in 1986 of a French manufacturer, the FCC is asking for public comments on whether it should retaliate with regulatory discrimination against foreign-owned carriers, enhanced-service providers, and manufacturers from countries with strictly regulated telecommunications markets.[60]

There is some question as to whether the FCC has legal authority and technical expertise on trade issues, which already involve such other agencies as the Department of Commerce, the Department of State, the U.S. Trade Representative, and Congress. A former FCC officer has pointed out that the FCC is not well staffed for making trade decisions.[61] However the four objectives of the Commission's inquiry -- to encourage open entry, non-discrimination, technological innovation, and international comity -- seem apt.[62] The FCC admits its limited power, saying that it will only take action after a determination by the executive branch.[63]

There is also a question of whether reciprocal regulatory treatment or trade protectionism might undermine foreign efforts toward gradual liberalization, for some countries might consider such U.S. actions as threatening their national prerogative to make their own best policies. One FCC commissioner has already expressed concern that those actions could lead to a retreat in liberalizing countries.[64]

Other questions include by what criteria companies should be defined as "foreign" and whether the proposed mandatory information filings by operating companies would lead to restrictions inconsistent with deregulatory policy objectives.

5.2.3. Japan's International Communications Market

Competition in the international communications market has not yet fully materialized, although the Telecommunications Business Law in Japan permits new entries, including those of international carriers. This section will describe likely international carriers and service providers.

Type 1 Carriers (Facilities Owned)

Kokusai Denshin Denwa Co. (KDD). KDD -- the name translates as International Telegraph and Telephone -- has long been a monopoly carrier in the international communications market within Japan. It provides many telecommunications services, including basic and value-added services and some data-processing services. It owns portions of submarine cables in the Pacific Ocean and some shares in INTELSAT, acting as a signatory. Its revenue in 1985 was $846 million, of which approximately 65% is from telephone and some 25% from telex.[65]

International Telecom of Japan Inc. (ITJ). ITJ was established in July 1986 in order to conduct a feasibility study for its entry into the international telecommunications market. Its major stockholders are three major trading companies -- (Mitsubishi Corp., Mitsui & Co., and Sumitomo Corp.) as well as Toyota Motor Corp., Matsushita Electronics Industry Co., and the Bank of Tokyo, Ltd.[66] Some foreign companies, such as CitiCorp and Salomon Brothers Co., may participate.[67] ITJ plans to begin operating in 1988 by leasing INTELSAT transponders and getting submarine cable IRUs from KDD. The emerging operator has been supported by KDD and welcomed by the MPT because its major stockholders are Japanese companies.

International Digital Communications, Inc. (IDC). IDC was established for feasibility study in November 1986 by major stockholders C. Itoh & Co., Toyota Motor Corp., Cable & Wireless plc of the U.K., Pacific Telesis International Co., and Merrill Lynch & Co. of the U.S.[68] It also plans to begin operation in 1988 by installing its own submarine cables and utilizing C&W's facilities. MPT harbors some concern about its foreign ownership and C&W's aggressive management style.

Other companies. Possible entrants are domestic satellite communications companies, such as the Mitsubishi group's Space Communications Corp., which plans to offer domestic services in 1988 and international services in 1989.[69] It may face difficulty in getting MPT and INTELSAT permission as a non-INTELSAT system.

Type 2 Carriers (Facilities Not Owned)

Several Type 2 carriers provide international communications service, primarily reselling KDD's public data or telephone network and interconnecting with foreign counterparts. Because the CCITT's international regulations (based on Recommendation D.1) on the use of leased circuits prohibit resale or shared use of circuits except for data-processing services, these carriers are forced to use public networks that impose costly charges on customers and preempt carriers' profit margin.

Two developments catalyzed several companies' joint ventures with U.S. carriers and enhanced-service providers: the U.S. and Japanese governments' agreeing, in the January 1986 MOSS negotiations, to an open market policy in telecommunications trade and especially to early inauguration of an international VAN, and the FCC's May 1986 Report and Order on the deregulation of international enhanced-service providers.

Examples of these U.S.-Japan coalitions are Intec-Telenet, Network Service-Tymnet, Kyodo VAN-Uninet, Fujitsu-Compuserve, NEC-GEISCO, and Japan ENS-Accunet.[70] They provide several services, including electronic mail service, protocol conversion, and database access.

5.2.4. Japan's Communications Policies

Reports of MPT Council

General policies. The basic framework of Japan's international communications policies was articulated in the March 1986 report of an advisory group to the MTP, entitled "Japan's Role in Telecommunications."[71] It recommended that Japan

1) promote multilateral and bilateral policy consultations;
2) strengthen public relations efforts;
3) establish a study group on communications policies;
4) encourage standardization through the ITU;
5) study methods to inaugurate international value-added services; and
6) react flexibly to non-INTELSAT systems.

Policies on Type 2 carriers. Following the fifth of these recommendations, the MPT in early 1986 formed a study group to consider

policy choices for an international VAN. It examined three alternatives.[72] The first was revision of CCITT recommendations D.1 and D.6, which restrict leased circuit use. The second alternative was non-traditional and less restrictive interpretation of these recommendations. The third was the government's designation of RPOA status, similar to PTT status, to Type 2 carriers. This authorization may avoid application of CCITT restrictions which would be inappropriate to PTTs or RPOAs. The study group's report to the MPT's Director of Telecommunications recommended further discussion and clarification of the third alternative, which was taken by the FCC in the U.S., especially on the differences between the national and international frameworks.

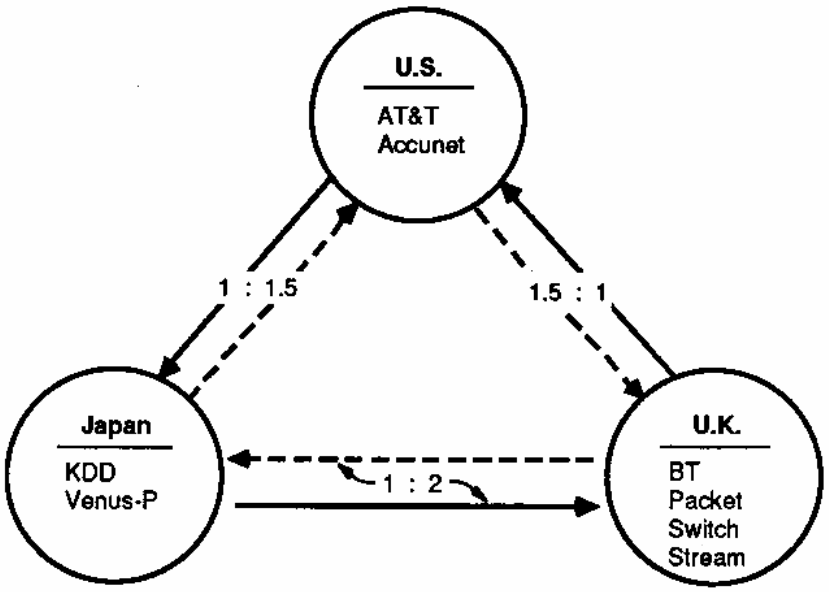
Issues for Type 1 Carriers

Entry regulation issue: How many companies can the international market sustain? Two new carriers may be sustainable, judging from Keidanren's optimistic market forecast of 18% growth per year, reaching $8 billion by 1995.[73] MPT, on the other hand, believes that only one new entry is feasible, based on KDD's pessimistic forecast of less than 10% growth per year, to reach only $4 billion in 1995.[74] However, the market size might be large enough to sustain two new carriers, considering the current competitive $3.6 billion market in the U.S.[75] The two likely new carriers, ITJ and IDC, also have come to believe that they will be able to survive, although the MPT prefers their consolidation.[76]

National sovereignty issue: How much corporate control by foreign capitals should be allowed? Legally one-third foreign ownership is allowed, but MPT tries to retain national sovereignty through narrow interpretation of "ownership" as merely holding stocks without involvement in management decision making.[77] The British government, however, opposed the MPT's restrictive measures against C&W and has demanded resolution of the trade imbalance between the U.K. and Japan, especially attacking the high import tax against Scotch whiskey.[78] Although the president of MCI expressed opposition to C&W's and Pacific Telesis' entries into the Japanese market,[79] the assistant secretary of the U.S. Department of Commerce has expressed the hope to the MPT that

U.S. companies may participate in the new carriers' ventures.[80] The MPT's vice minister replied that foreign carriers operating in their own domestic markets and other foreign companies may be allowed to participate in the Type 1 carriers.

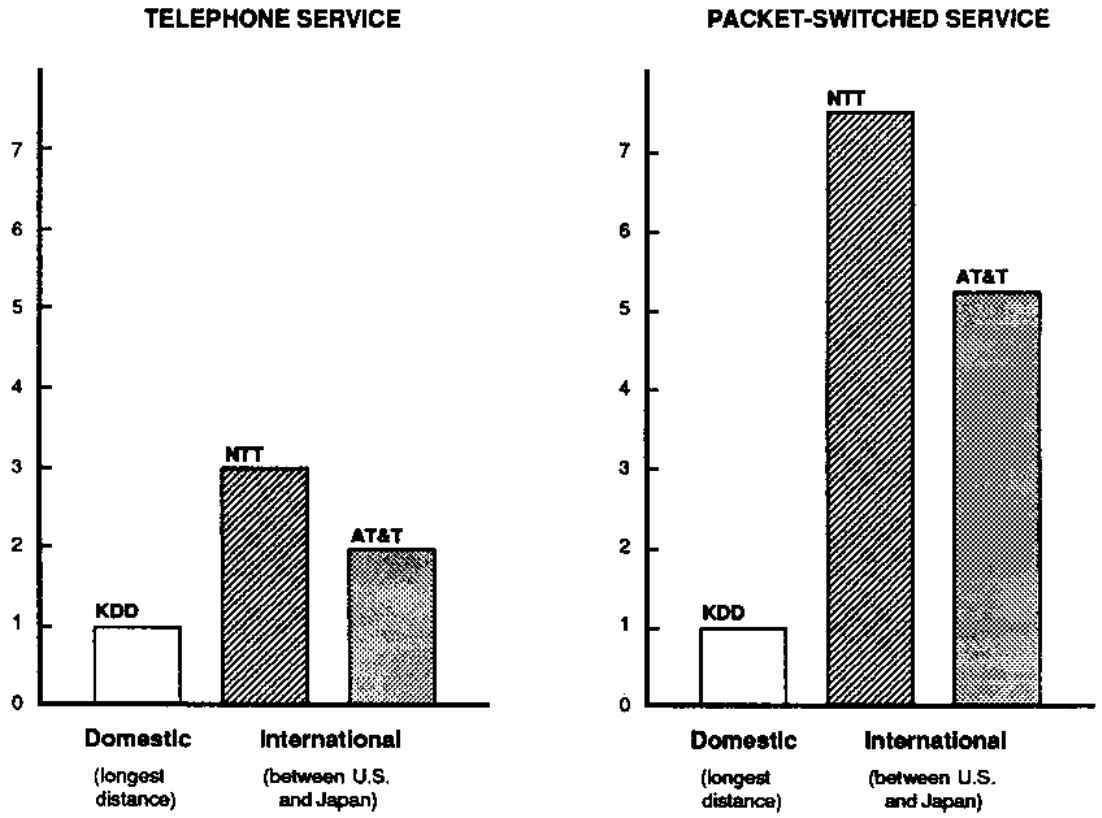
Tariff differences issue: How much discrepancy is reasonable? There may be several imbalances in charges -- between outgoing calls and incoming international calls, between domestic and international calls, and between services. Although different countries, carriers, and services have their own cost structure, too great a difference in charges may be unreasonable and harmful to the public.[81] For example, BT has price advantages against both AT&T and KDD (see Figure 5-3). BT might be able to attract traffic that has its least-cost route via the U.K. Figure 5-4 shows different balances in domestic and international tariffs for telephone and packet services. Because the difference between domestic and international packet-switched service is larger than that between domestic and international telephone services, users might not prefer international packet-switched service.



Source: Data adapted from British Telecom, "International Destination and Charges, Packet SwitchStream;" and Zenichoro Tanaka, "AT&T's Packet Switched Service," Nikkei Communications, March 3, 1986, p. 41.

Figure 5-3

Differences in Charges for Packet-Switched Service



Source: Data for domestic adapted from NTT, "Tariff for Packet-Switched Services," 1985, p. 539. Data for international adapted from Zenichiro Tanaka, "AT&T's Packet Switched Service," Nikkei Communications, March 3, 1986, p. 41.

Figure 5-4

Relative Differences in Communications Charges among Domestic and International Services

Outgoing charges that are higher than incoming may protect domestic database providers, although foreign countries could perceive such protection as a trade barrier. The high charges, although they may attract new carriers, could be uneconomical and the new carriers unsustainable. International charges that are higher than domestic may be harmful to multinational corporations but might not affect most of the public.

Type 2 Carrier Issues

- International acceptance of U.S. interpretations of RPOA. The FCC's RPOA decision has two unclear points:

1) How would international regulations be imposed on domestically unregulated enhanced-service providers? The FCC claims that they can be controlled through the RPOA approval process even though it is streamlined. Some form of domestic regulation may be consistent with international treatment of RPOAs.

2) Why doesn't enhanced-service provision through common carriers' leased circuits violate the resale prohibition in the CCITT's D.1 recommendation? The FCC's reasoning to the contrary is that provision of this service does not compete against the PTT's service but rather provides a partnership. However, some countries consider enhanced-service providers as competitors.

- Japanese regulation according to ownership of facilities and RPOA status.*

1) How would the current Type 1/Type 2 differentiation be maintained? Regulation based on ownership will need special interpretation or clarification if Japan applies the RPOA approach to Type 2 carriers. Because there is no difference between RPOAs and common carriers internationally, they could obtain a carrier-to-carrier lease contract, which could classify them as Type 1 (line-owned) carriers. If the MPT wants to avoid applying strict Type 1 carrier regulations to Type 2 carriers, different regulatory frameworks, such as service-by-service regulation or dominant/non-dominant carrier classification may be necessary.

2) How could the MPT establish conditions for fair competition among KDD, new Type 1 carriers, and new Type 2 carriers, such as non-discriminatory access to KDD facilities and prohibition of cross-subsidies? This question includes whether type A equal access to cables and satellites should be mandatory or voluntary, and whether type C equal access to KDD's basic service facilities should be established.

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* The Revised Telecommunications Business Law became effective September 1987 (see Appendix C).

5.2.5. Issues in the International Arena

WATTC in the ITU

The World Administrative Telegraph and Telephone Conference (WATTC) will be held in 1988 to revise the obsolete 1973 version of the ITU's Telegraph and Telephone Regulations. Differing national regulatory and communications policies underlie differing stances on international regulatory questions:

U.S. The U.S. favors flexible regulations with general definitions, avoiding specific classifications for particular enhanced services.[82]

Japan. Japan opposes the distinction between data processing and communications, in keeping with its domestic law.[83]

U.K. The U.K. has suggested that a simple set of general principles would be preferable, preserving world order while permitting national diversity.[84]

France. France has proposed subjecting private networks to the same technical and operational requirements as public networks because they are compete with each other.[85]

West Germany. West Germany has also called for regulations on value-added service providers.[86]

Canada. Canada wants to regulate private networks and enhanced services.[87]

USSR. The USSR has called for a listing of exactly what services are to be regulated and which are not.[88]

In a battle that may continue for some years, the U.S., Japan, and the U.K. support an international framework that is as liberal as their domestic regulations, while other countries request regulations on most networks, with the exception of purely private networks.

Transborder Data Flows

In April 1985 the Annual Ministerial Conference adopted the "Declaration on Transborder Data Flows." Its four objectives included:

> [i] Promote access to data and information and related services, and avoid the creation of unjustified barriers to the international exchange of data and information;
>
> [ii] Seek transparency in regulations and policies relating

> to information, computer and communications services affecting transborder data flows . . . .[89]

Although the service industry, including databases and financial services, is increasing in importance in the developed countries, most countries depend heavily on U.S. industry. The issue here is whether this declaration is valid. In the U.S., the DoD is moving toward restricting public access to "sensitive" data because of national security concerns.[90] The FCC initiated an inquiry into possible retaliatory restrictions on U.S. communications market access by foreign countries. Such unexpected U.S. actions might arouse other countries' concerns about their dependence on the information and other industries, even though the traditional principle of free flow of information might be alive for the moment. The Information Industry Association (IIA) and other industry associations oppose the DoD's policies.[91] Transborder data flows of information services are significant for the international communications market and therefore of concern to domestic and international organizations.

Notes

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Chapter Six

Summary and Discussion: Domestic and International Policymaking for Value-Added Service Provision in an Evolving Communications Environment

6.1. Summary

Regulations

This paper has discussed regulatory issues for both domestic and international markets, focusing on value-added services. As telecommunications becomes more important for businesses and governments, telecommunications regulations involve more industrial and foreign policy elements. The regulatory frameworks in the U.S., the U.K., and Japan are affected by the evolution of technologies and markets, as well as by foreign influence. As conflicts between the computer and communications industries become more conspicuous, issues about the regulation of new services have gained increased attention in national and international forums. The boundaries between regulated and unregulated services, or between common carriers and value-added service providers (VASPs), have become critical uncertainties for those concerned with the development of new services.

In the U.S., the FCC has been struggling with Computer Inquiry II's definitional approach to the basic/enhanced dichotomy. The FCC in Computer Inquiry III, phase II, proposes a definition of basic service with fewer restrictions on protocol processing. NTIA, some congressmen, and the Department of Justice have advocated removal of MFJ restrictions on the BOCs' provision of information services, with such non-structural safeguards as CEI/ONA. Common carriers may have wider latitude in the telecommunications market than in the past, although conflicts over the definitional boundary will continue as technologies and markets change.

In the U.K., DTI and OFTEL tried to define and enumerate "value-added network services" in detail, but this approach failed to keep pace with market development, which is limited only by the imaginations of the service providers.

Avoiding the definitional approach, Japanese regulations are based on carriers' facilities ownership. However, service-by-service or

market-by-market regulation may be a condition for an international VAN and for NTT's Data Communications sector.

In the ITU, the definitions of the boundaries between telecommunications services and data processing and between public and private networks have been debated. The outcomes of the WATTC could be inconsistent with some national regulatory frameworks.

These conflicting views of value-added services may hinder the development of the new market, especially internationally. Therefore mutual understanding of the objectives and effects of communications policies may be a critical factor for international and domestic communications policymaking.

Technological Development

Technological changes can create new market opportunities which may lead to more competition. The convergence of computer and communications technologies especially create opportunities for a variety of value-added services. Technological convergence, however, does not necessarily mean the convergence of market expertise, as evidenced by a computer company's unsuccessful operation in the communications market and a communications company's unprofitable performance in the computer market.

If open interconnection of terminals and networks is to benefit a variety of players, the outcomes of standardization controversies may be key factors. ISDN proposals represent the accumulated efforts of the common carriers, while OSI comes from the computer industry side, although they are related. Timing of standardization is an issue. The ITU and ISO have worked toward new standards, but the results are still incomplete. New standards compete with the existing installed base, such as the analog telephone network and SNA, but further international standardization efforts aim at overcoming this difficulty.

Technological development has also blurred the boundaries traditionally defined as carrier/non-carrier, voice/non-voice, and network/terminal as follows:

- VASPs (non-carriers) offer public packet-switched or circuit-switched network services, traditionally functions provided exclusively by carriers, by leasing private circuits.

- Voice and non-voice communications can be integrated into digital transmission.
- LANs and PBXs can extend their intra-office communications capabilities to wide-area communications.
- Intelligent terminals, including LANs and PBXs, VASPs, and common carriers, can provide similar functions competitively.

Another issue is who should provide the value-added services. Competition among these forces could lead to a prosperous market, but cooperation, as between a local exchange carrier and a VAN (SNET and Tymnet), might also produce benefits for both suppliers and customers.

Implications for Communications Policies

Although ISDNs and OSI are not yet fully defined, they appear to offer innovative architectural concepts for future communications policy. Implementation of an advanced infrastructure and varied service development, with or without competition, may deserve attention in developed countries' communications policies. Because ISDN and OSI concepts imply equitable competitive conditions, they may be valuable alternatives for consideration, although traditional service providers may see both threats and opportunities in the new environment.

Equal access can be defined in four ways:

- type A equal access to a carrier's carrier by common carriers, VASPs, and users;
- type B equal access to local exchange carriers by interexchange carriers;
- type C equal access to common carriers by other common carriers, VASPs, and users;
- and type D equal access to VASPs by VASPs and users.

These four types of equal access may encourage competition at several levels and may enhance the contestability of the market by removing the advantages, or bottleneck nature, of the carrier's carrier, common carriers, and VASPs.

In the U.S., the first two types of equal access have been implemented, and type C equal access, a goal of an ONA environment, is under discussion. ONA would unbundle common carriers' basic service elements; by maintaining control of carriers' network functions through their own software, VASPs and users could reach an equal footing with

common carriers. Thus ONA could be considered a revolutionary framework for further deregulation of the communications market.

In the U.K., type D equal access to VASPs was mandated for large-scale VANs. OSI requirements are intended to avoid a dominant VAN's advantages and corresponding discriminatory practices and thus to facilitate competition between VANs and terminal equipment suppliers.

In Japan, MPT may consider these types of equal access as viable goals at the stage of full-scale competition. Industry-wide discussions of conditions for fair competition among dominant carriers, other Type 1 carriers, and Type 2 carriers could determine the basic frameworks for communications policies during a transitional period before the next stage.

In the international communications market, further liberalization may be realized through multilateral coalitions among liberalized countries and through global agreements in international organizations such as the ITU. However, international communications policymakers may be dealing with a delicate balance among different countries' interests in such factors as trade, national security, and industrial policies.

6.2. Questions Raised by Further Deregulation

Further deregulation is expected in the U.S., Japan, and the U.K., and is under discussion in other countries, such as members of the EC. The questions are to what extent communications policies might change and what the impacts might be.

U.S.A.

In the U.S., the current review of the MFJ will be completed in 1987, although a fierce battle between the BOCs and other players is expected.[1] Most observers believe that complete removal of the three current BOC restrictions -- on manufacturing, information services, and interLATA communications services -- could take years. ONA implementation is likely to begin around 1990, because implementation could take at least one year after the submission of common carriers' ONA plans and CCITT's establishment of ISDN standards in 1988. Meanwhile, in 1991 AT&T will be relieved of the prohibition on electronic

publishing.[2] This change may evoke another battle between the communications and publishing industries.

The unleashing of AT&T's and the BOCs' entries into new markets may raise the issue of the boundary between telecommunications and other neighboring industries such as the information service industry and the broadcasting industry. It seems unlikely, however, that the major carriers would quickly dominate those markets, considering that the RHCs and AT&T are still short of success in their diversifications into non-communications markets.[3] On the other hand, the revival of the seven small Bell systems, if the BOCs would be allowed to enter interLATA markets, may have a greater impact on the marketplace because they already have expertise in the long-distance market, at least intraLATA. Although long-distance carriers, such as AT&T and MCI, have already strongly objected to powerful competitors' -- namely, the BOCs' -- entries into the interLATA market, the BOCs might decide not to move toward nationwide telephone service but rather toward new services such as international or data-communications services.

Japan

In Japan, 1988 to 1990 could be a turning point for regulation of telecommunications businesses in general, for regulation of NTT, and for the market. In 1988, the Telecommunications Business Law will be reviewed by the Diet with possible discussions on:

- minor revisions of other related laws, such as the Wire Broadcast Telephone Law and the Cable Television Law; and
- regulatory symmetry between Type 1 and Type 2 businesses, including structural separation of NTT's Data Communications sector.

New Type 1 carriers, such as domestic communications carriers and international communications carriers, may fuel competition in 1988. In 1990, the NTT Law will be reviewed, possibly including discussion of divestiture if NTT maintains dominant power, as well as discussion of the tariff structure of NTT's telephone network.[4]

A major issue for policymakers and service providers during this transitional period toward full-scale competition in every market segment is to what extent the MPT should control competition. Two facets of the question are relevant. First, although a major concern

of the MPT is continuity in common carrier regulation, if cost-based tariffs are not approved the resulting competition may be uneconomic and therefore unmaintainable. Second, maintenance of national sovereignty in the communications market is also a major MPT concern, but foreign pressures for free market entry may force the MPT to change its position.

U.K.

In the U.K., simple resale of leased circuits will be reviewed in 1989. Simple resale might be admitted for domestic data communications, which would further promote VANs, while volume-sensitive tariffs might also be considered as an alternative. International VANS may be discussed at the same time. In 1990, the duopoly policy will be reviewed. Policy changes in the U.K. could affect not only the domestic market but also other European regimes.

EC

The EC has been trying to create a universal regulatory model applicable to all its member nations. Although the diversity among the existing regulations may not be easy to accommodate, the EC is likely to seek a uniform stance on basic matters, such as boundaries between PTTs and privately operated networks, the boundary between terminals and networks, and the tariff structure for private leased circuits -- that is, whether it should be on a volume-sensitive or flat-rate basis.[5] Even with such efforts, deregulation in continental Europe may not be as expeditious as in the U.S., U.K., and Japan, because the EC has to maintain a harmonious multinational momentum toward deregulation, even without strong authority against likely resistance from national administrations.

Notes

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Appendix A

Computer Inquiry III, Phase II Order and Development of ONA

This appendix describes the development of CEI/ONA concepts in the U.S. as of late 1987; although an FCC order and the BOCs' efforts have clarified these concepts somewhat, their definition and implementation remain problematic.

Order

The Phase II Order of Computer Inquiry III was released in May 1987.[1] Although Phase II affirms the basic decisions made in the Phase I Order, Phase II also includes some revision and clarification. The major points of this order follow.

- Phase II revised the applicability of CEI/ONA requirements to AT&T. Because AT&T is participating in this increasingly competitive market, the FCC decided to apply the modified ONA plan filing requirements to AT&T, although AT&T must file service-specific CEI plans. AT&T must file a modified ONA plan, describing "how it will provide nondiscriminatory transport of the signalling and other information that will be necessary for the interexchange operation of BSEs offered by the BOCs. . . ."
- Phase II also ruled on "protocol processing." The FCC adopted Alternative C, which affirms protocol processing as an unregulated enhanced service. Thus CEI/ONA requirements apply, replacing the waiver procedure of the Computer Inquiry II regime.
- Phase II clarified requirements for CEI/ONA plans:

  (1) AT&T and the BOCs must file ONA plans by February 1, 1988.

  (2) CEI plans may cover limited areas, but must cover the "areas where a carrier offers an unseparated enhanced service."

  (3) CEI standards will be evaluated by factors such as the absence of systematic differences, end-user perception of equality, and utility to other enhanced service providers.

  (4) In an ONA environment, the availability of CEI or BSEs must not be restricted.

(5) ONA plans must specify future development, and an initial set of key BSEs must be implemented within one year of approval.

(6) Although enhanced services should be free of state and federal regulation, the FCC doesn't preempt tariffing and restrictions on BSE use.

Development of ONA

The BOCs have developed an ONA model, assisted by enhanced service providers. They have structured a common ONA model to accommodate a variety of existing and future architectures.[2] An initial ONA may depend on current technology and may unbundle service elements, such as channel capacity and address signaling protocol, between enhanced service providers and customers. However, technological differences among exchanges may hinder uniform ONA implementation, and the tariffing of BSEs by state regulators may further complicate ONA.

Notes

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A-2 Bell Operating Companies, ONA Special Report Number 4, Nov. 11, 1987.

Appendix B

Review of the MFJ

Judge Greene's decision did not settle the definitional issues regarding BOC provision of information service. Accordingly, this appendix describes key questions on value-added services in the U.S.

Decision

On September 10, 1987, Judge Greene issued decisions on the MFJ's line-of-business restrictions for BOCs.[1] Restrictions on interexchange services, manufacturing, and the sale of information services were to continue based on the judge's belief that no significant changes had occurred in these areas. On the other hand, BOCs were allowed to enter the non-telecommunications market and to provide transmission of information services. Judge Greene also requested, however, that interested parties further clarify "information services."

Service definition issues

In his decisions about restrictions on information services, Judge Greene referred primarily to database access service, especially to the French videotex system. He allowed gateway functions provided by the French system, such as data transmission, address translation, protocol conversion, billing management, and introductory information content, in addition to electronic directory service (White Pages). However, his examples, such as Japan's Automated Meteorological Data Acquisition System, and dial-up services, include other functions -- data processing and information content generation. Thus the decision may contain some inconsistency.

In addition, the relationship between the MFJ's information service and the FCC's enhanced service is not yet clearly defined. Depending on how the definition of information transmission is resolved, the BOCs' impetus for ONA implementation could be affected.

Note

B-1 U.S. v. Western Electric et al., Civil Action No. 82-0192, filed Sept. 10, 1987.

Appendix C

Japan's Regulatory Framework for International Type 2 Carriers

The U.S. and Japan have established the basic regulatory framework for international value-added services, at least for the first stage. For that reason, this appendix describes some important aspects of Japan's regulatory framework as of November 1987.

Revision of the TB Law

Key points of the TB Law revisions, which made international VAS possible as of September 1, 1987, were as follows;

(1) Special Type 2 carriers (providing international VAS) must observe international agreements or treaties.[1] (This requirement means that designation of RPOA is voluntary.)

(2) Type 1 carriers may provide carrier-to-carrier leases.[2] (This may avoid violation of the CCITT's Recommendation D.1).

Services to be provided

After two years of negotiations, the U.S. and Japanese governments agreed on services to be provided by international VASPs. However, because regulatory frameworks in each country differ and regulatory groups want to maintain flexibility, service listings have not been disclosed. However, the definition of enhanced service provider may inherently exclude fundamental services, such as telephone and telex. At the first stage, facsimile and voice mail are also restricted, because these services are similar or equivalent to telephone service. Examples of value-added functions include media conversion, non-standard protocol processing, and storage-retrieval functions.[3]

Future steps

Bilateral negotiations, between the U.S. and U.K. or Japan and U.K., will be next. Multilateral negotiations and international discussions will follow. In addition, service restrictions, such as those on fax and voice mail, may be reviewed.

Notes

C-1 Japan, Telecommunications Business Law (revised 1987), art. 37.

C-2 Ibid., art. 38.

C-3 Nikkei Communications, Sept. 21, 1987, pp. 24-26.

Acronyms

APS	Accunet Packet Service
ASCII	American Standard Code for Information Interchange
AT&T	American Telephone and Telegraph
BOC	Bell operating company
BSC	Binary Synchronous Communication
BSE	Basic Service Element
BT	British Telecommunications plc
C&W	Cable & Wireless
CCITT	International Telegraph and Telephone Consultative Committee
CCIS#7	common channel interoffice signalling no. 7
CDC	Control Data Corporation
CEI	comparably efficient interconnection
CEN	Comité Européen de Normalisation
CO	central office
COMSAT	Communications Satellite Corporation
COS	Cooperation for Open Systems
CPE	customer premises equipment
CPNI	customer proprietary network information
DBP	Deutche Bundespost
DDI	Daini-Denden Inc.
DI	Department of Industry (now DTI)
DIA/DCA	Document Interchange Architecture/ Document Content Architecture
DIPS	Denden Information Processing System
DNA	Digital Equipment and Network Architecture
DNIC	data network identification code
DOC	Department of Commerce
DOJ	Department of Justice
DTI	Department of Trade and Industry
DTS	digital termination system
EBCDIC	Extended Binary Coded Decimal Interchange Code
EC	European Community
ECMA	European Computer Manufacturing Association
EFT	electronic funds transfer
EMS	electronic message system
ESS	electronic switching system
FCC	Federal Communications Commission
FDC	fully distributed costing
FN/SI	Feature Node/Service Interface
GATT	General Agreement on Tariffs and Trade
GEISCO	General Electric Information Systems Co.
HDLC	high-level data link control

IBS	International Business Service
IDC	International Digital Communication
IIA	Information Industry Association
INTELSAT	International Telecommunications Satellite Organization
INS	information network system
IRC	International Record Carrier
IRUs	indefeasible rights of users
ISDN	integrated services digital network
ISI	International Satellite Inc.
ITJ	International Telecommunications Japan
ISO	International Standardization Organization
ITU	International Telecommunication Union
JISC	Japanese Industrial Standards Committee
JT	Japan Telecom
KDD	Kokusai Denshin Denwa Co.
LADT	local area data transport service
LAN	local area network
LATA	local access and transport area
LU6.2	logical unit 6.2
MAP	Manufacturing Automation Protocol
MFJ	Modification of Final Judgment
MHS	message-handling system
MITI	Ministry of International Trade and Industry
MOF	Ministry of Finance
MOSS	Market-Oriented Sector Selectives
MPT	Ministry of Posts and Telecommunications
NARUC	National Association of Regulatory Utility Commissioners
NCP	network communications process
NCTE	network channel terminating equipment
NEC	Nippon Electric Corporation
NTIA	National Telecommunications and Information Agency
NTT	Nippon Telegraph and Telephone
OECD	Organization for Economic Development and Cooperation
OFTEL	Office of Telecommunications
ONA	open network architecture
ONAF	ONA Forum
OSI	open systems interconnection
PADs	packet assembler/disassembler devices
PanAmSat	Pan American Satellite Corp.
PBX	private branch exchange
PC	personal computer
PCI	Packet Communications, Inc.
POS	point of sale
POSI	Promotion of Open System Interconnection
PT Law	Public Telecommunications Law

PTT	Postal Telephone and Telegraph authority
PUC	public utility commission
RCCA	Record Carrier Competition Act
RCP	routing control point
RCS	remote computing services
RHC	regional holding company
RPI	Retail Price Index
RPOA	recognized private operating agency
SDLC	synchronous data link control
SDN	Software Defined Network
SIG	Senior Interagency Group
SLC	Submarine Lightwave Cable Co.
SNA	System Network Architecture
SNADS	SNA document system
SPAG	Standards Promotion and Application Group
STP	signal transport processors
TAT-8	Eighth Transatlantic Cable System
TB Law	Telecommunications Business Law
TDF	Transborder data flows
TTN	Tokyo Tsushin Network
TOP	Technical and Office Protocol
TPC-3	Third Transpacific Cable System
TSS	time-sharing service
TS/FX	electronic toll switch with public facsimile functions
TTC	Telephone and Telegraph Engineering Committee
TWJ	Teleway Japan
VAN	value-added network
VANs	value-added networks
VANS	value-added network services
VAS	value-added services
VASP	value-added service provider
WATT-C	World Administrative Telegraph and Telephone Conference
WU	Western Union
WUI	Western Union International