

Behind the Telephone Debates — 1
At the Heart of the Debates:
Costs, Control, and Ownership
of the Existing Network

Carol L. Weinhaus
and
Anthony G. Oettinger

Program on Information Resources Policy

Harvard University

Center for Information
Policy Research

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P R E F A C E T O T H E S E R I E S

Amidst great political and technical change, two things remain fundamental to the telecommunications industry. These are the physical plant that provides the various telephone services and the costs associated with providing these services.

Volume 1 introduces the reader to the first of these concepts with a step-by-step diagram and explanation of the telecommunications plant, using the pre-divestiture telephone plant as a model and noting the effects of competition and divestiture upon the plant and upon plant ownership and control. Since this same physical plant was still in place the day after divestiture, this plant serves as a foundation for examining the immediate problems concerning post-divestiture plant.

The plant diagram labels are derived from the functions performed by the physical plant rather than from specific pieces of equipment. These functional labels also denote cost categories and thus provide a link between the two concepts -- physical plant and the cost of service. The cost categories* represented by the plant diagram labels have been used by the industry, by regulators and by the courts in debates over the introduction of competition and the divestiture of the Bell Operating Companies from AT&T. They remain basic to an understanding of the evolving structure of the U.S. telecommunications industry.

Volume 2 defines concepts used in this series, starting with a discussion of the reach of telecommunications, where reach refers to the scope or range of a particular telecommunications link or network -- to a single entity, to all entities on a network, or to some middle ground between these extremes. This section explains the reasons for the introduction of competition on the low-cost, high-density routes.

Volume 2 continues with a sketch of the 1982 telephone industry which included the traditional telephone industry -- AT&T, the Bell Operating Companies (BOCs), and the independent companies -- and their competitors. Concepts which appear throughout this series include traditional telephone industry service categories, such as exchange and interexchange; concepts born with the AT&T divestiture, such as LATA (Local Access and Transport Area); and descriptive concepts, such as hook up. These concepts are tied to Volume 1's functional plant diagram and cost diagram.

*In this series, costs are defined as:
annual costs = annual expenses + (annual ROR x total net investment). See pp. 73-74 of this volume; and Index: Costs,

Volume 3 shows the division of the traditional industry's costs between federal and state regulators. These regulators have control over the rate of return (ROR) -- the cost of capital, or what the layman considers profit. By prescribing a maximum authorized ROR and, to a lesser degree, by approving or disapproving various costs, the regulators effectively control the total amount of revenue a company is allowed to collect from its customers: Thus the regulators have a blunt instrument which influences prices.

The question of which costs are federal and which are state leads to jurisdictional battles. The outcome of such battles is usually justified by a philosophy; for example, the philosophy of joint use justified the federal/state costing method known as station-to-station costing. Volume 3 describes the shift in the 1940s from the board-to-board costing method to the station-to-station costing method. This shift justified a structure which increased federal costs with a corresponding decrease in state costs -- generally translated into low rates for basic exchange service. This earlier transition is relevant to the post-divestiture transition since, as of 1984, station-to-station costing was still in place -- just the ownership and pricing changed. Also, in the post-divestiture environment, those favoring access charges are once again calling on the philosophy underlying the board-to-board method to justify changes in costing.

Volume 4 in this series consists of four wall-charts which provide a conceptual framework for tracing the broad changes brought about by divestiture. Accompanied by a detailed text, the charts provide an integrated view of structure, processes, and concepts which are often dealt with out of context or in a fragmented manner: federal and state cost allocations, cost recovery through revenue requirements, pooling of costs, pricing of major state and interstate services, pooling of revenues, and distribution of collected revenues.

Chart 1 views the 1982 pre-divestiture traditional industry composed of AT&T, the BOCs, and the independents. The basic cost diagram, described in detail in the earlier volumes, provides the starting point. Chart 2 translates pre-divestiture industry costs into post-divestiture costs which now include the costs of the other common carriers (OCCs). This chart also illuminates costing changes resulting from the Computer Inquiry II decision (covering terminal equipment and the boundary between the traditional telephone industry and the computer industry) and from the breakup of AT&T. For example, this chart traces regional operating company costs which become access expenses for the intercity carriers (post-divestiture AT&T, the OCCs, and some of the independents).

Using the same structure as Chart 1, the last two charts show the post-divestiture view of costs, revenue requirements,

services, and revenue distribution. Chart 3 covers the regulated portion of post-divestiture AT&T and the independents; Chart 4 covers the regulated portions of the Regional Holding Companies (RHCs) and the independents.

EXECUTIVE SUMMARY

At first glance, the issues tied to telephone plant and company costs appear transitory, linked to the post-divestiture environment. But they include recurring controversies surfacing in a new form.

In the unstable post-divestiture telecommunications world, telecommunications companies, their competitors, their customers, federal and state regulators, and the courts face these persistent problems:

- . Legal boundaries, set by regulators, by the courts, or by established practice, which cut across common technologies.
- . The evolving definitions of "cost" in the regulatory forum, a process reflecting public policy decisions once based on industry-wide negotiations, now based on even wider-ranging considerations.
- . Obsolescence, brought about by technological advances, of old practices and rules, such as accounting practices or definitions of permissible equipment functions, including NCTE, multiplexing at the block, and so on.
- . Changes in ownership of the network, producing changes in network coordination, in established patterns of reimbursement among companies, and in methods of providing an interstate contribution to help cover local operating company costs, including access charges and cost separations.
- . Pressures for and against competition in the marketplace and in government forums.

This paper provides an introduction to the basics of the telephone industry. It describes existing plant and key regulatory and court decisions and defines costs as recorded in company accounts and as used by the regulators. Simplified illustrations clarify the relationships among portions of the plant and between the physical plant and its costs.

T A B L E O F C O N T E N T S

	Page
Preface to the Series	i
Executive Summary	iv
I. INTRODUCTION	1
A. A Century of Policy Swings, 1876 to 1984	1
B. An Overview: The Introduction of Competition	2
C. Pre-Divestiture AT&T Corporate Structure	13
D. Impact of Computer Inquiry II on Corporate Structure	15
E. Post-Divestiture Corporate Structures	15
II. TRADITIONAL INDUSTRY: TELEPHONE PLANT	23
A. Existing Physical Plant	23
B. Terminal Equipment or CPE	25
C. Station Connections: Inside Wiring	26
D. The Customer/Network Boundary	28
E. Station Connections: Blocks	30
F. The Basic/Enhanced Boundary	32
G. The Clash between the Regulated Telephone Industry and the Unregulated Computer Industry	33
H. The Court and Separate Subsidiary Requirements	37
I. Station Connections: Drops	39
J. Subscriber Line OSP	40
K. Circuit Equipment: Outside Plant	41
L. End Office Switches	43
M. Circuit Equipment Within the End Office Building	44
N. The Pre-Divestiture Switching Hierarchy: First Switch in the Network	45
O. The Pre-Divestiture Switching Hierarchy: Switching Levels	47
P. Extremes in Size of Local Service Area	49
Q. Tandem Dial Exchange	50
R. Tandem Dial Interexchange	53
S. The Pre-Divestiture Interexchange Switching Hierarchy	56
T. Shared Switches	59
U. Trunk Groups	61
V. Routing Patterns	63
III. PLANT OWNERSHIP	66
A. Interexchange v. LATA	66
B. Interconnection of the OCCs	68

	Page
IV. AT&T ANNUAL COSTS	71
A. Annual Costs	71
B. Relative Amounts by Category	73
V. THE UNIFORM SYSTEM OF ACCOUNTS (USOA)	75
A. History of USOA Revisions	75
B. USOA: Telephone Plant Investment Accounts	77
C. USOA: Expense Accounts	79
VI. DERIVATION OF ANALYTICAL COST CATEGORIES	81
A. USOA Records	81
B. Separations Categories and Items	82
C. Derivation of Subscriber Line OSP Cost Category	85
D. Costs as Baseline for the Future	87
VII. APPENDIX A	88
A. Swings between Monopoly and Competition, 1870s-1930s	88
VIII. APPENDIX B	96
A. Antitrust Suits Filed Against IBM, 1932-1984	96
IX. APPENDIX C	98
A. Derivation of Analytical Cost Categories for Telephone Plant	98
B. Derivation of Analytical Cost Categories for Non-Plant-Related Expenses	100
X. APPENDIX D	103
A. Acronyms	103
XI. Notes	104
A. Text	104
B. Figures	130

INDEX

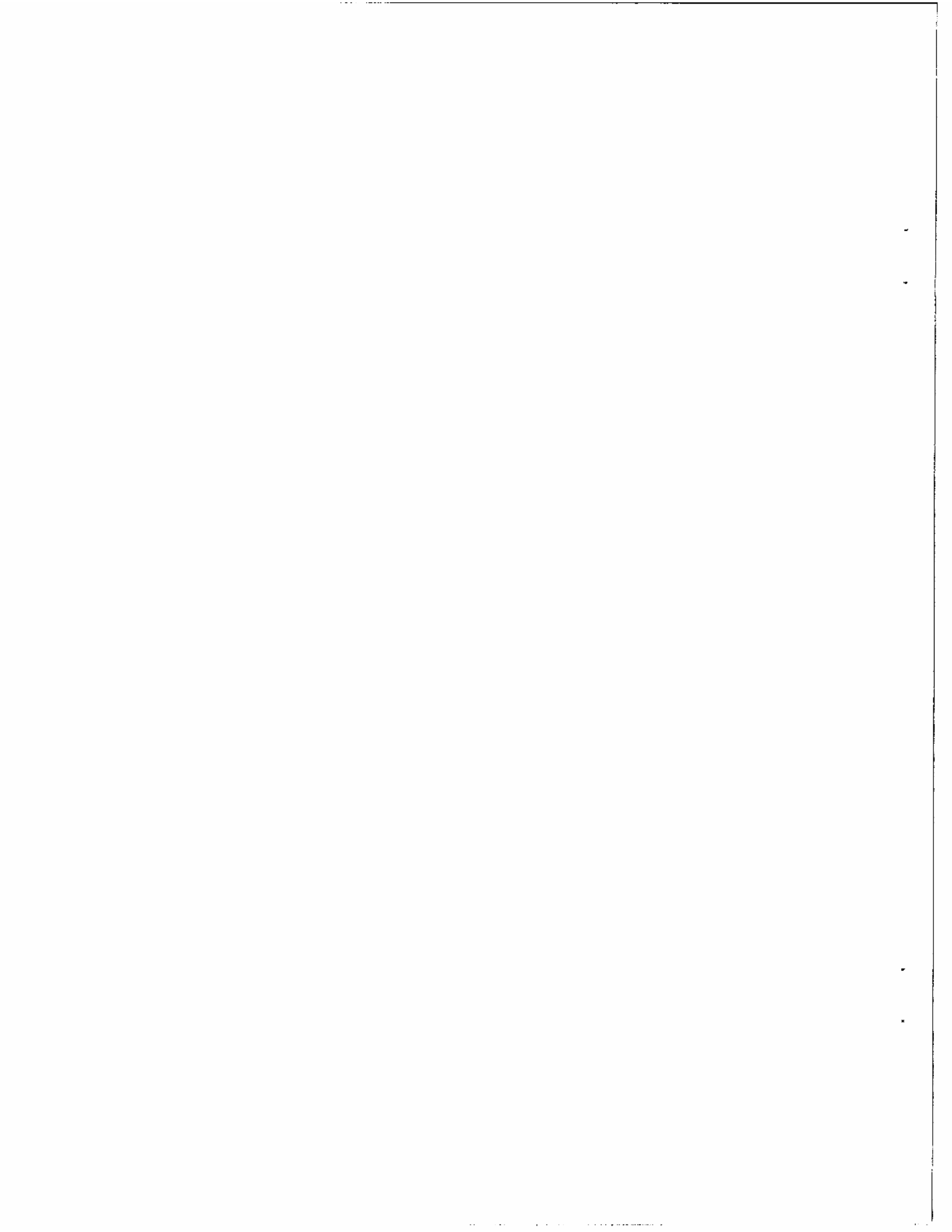
The Index to this series, bound separately, provides volume and page references to all key terms used in Behind the Telephone Debates. Footnotes in each volume indicate the term under which to find the cross-referenced concept.

L I S T O F F I G U R E S

Figure		Page
1	Federal Legislative Record: Telephone Regulation	4
2	Unsuccessful Attempts at Federal Legislation	6
3	Pre-Divestiture Bell Operating Companies (BOCs)	14
4	Corporate Structures: Pre-Divestiture, Impact of Computer Inquiry II, and Post-Divestiture	16
5	Regional Holding Companies	17
6	Telephone Plant: Functional Diagram	24
7	Terminal Equipment or CPE (Customer Premises Equipment)	25
8	Station Connections: Inside Wiring	27
9	Station Connections: Blocks	30
10	Station Connections: Drops	39
11	Subscriber Line OSP (Outside Plant)	41
12	Circuit Equipment: Outside Plant	42
13	End Office Switches	43
14	Circuit Equipment: Within the End Office Building	45
15	Connections Between Telephones: Direct versus a Single Switch	46
16	Connections Between Telephones: Two Switches	47
17	Hierarchical Routing	48
18	Routing Connections Between Levels in the Traditional Industry	49
19	Extremes in Size of Local Service Area	50
20	Tandem Dial Exchange Plant	51
21	Links Between Local Service Areas	54

Figure		Page
22	Tandem Dial Interexchange Plant	55
23	End Offices Centering on a Class 4 Switch (Toll Center)	56
24	The Interexchange Network	57
25	Pre-Divestiture AT&T Switching Hierarchy	58
26	The Twelve North American Regional Centers, 1983	59
27	Pre-Divestiture AT&T Shared Switches, 1982	60
28	Trunk Groups	62
29	Routing an Interexchange Call	64
30	Pre-Divestiture Plant Ownership: Exchange/Interexchange Divisions	67
31	Illinois LATAs: Illinois Bell and Independent	68
32	Interconnection of the OCCs (Other Common Carriers) with the Traditional Network	70
33	Pre-Divestiture AT&T Costs: 1976 and 1980	72
34	Pre-Divestiture AT&T Costs: Relative Amounts by Category	73
35	History of USOA Revisions	76
36	Assignment of Central Office Equipment for Divestiture	78
37	Assignment of Tower Equipment for Divestiture	79
38	USOA Commercial Expense Accounts	80
39	USOA Equipment Investment in Subscriber Line OSP (Outside Plant)	81
40	Derivation of Analytical Cost Categories: Separations costs for OSP (Outside Plant)	82
41	Derivation of Analytical Cost Categories: Separations Items for Commercial Expenses	83
42	Derivation of Analytical Cost Categories: Distribution of Separations Costs for Land and Buildings	84

Figure		Page
43	Derivation of Analytical Cost Categories: Distribution of Separations Items for Maintenance and Depreciation	85
44	Derivation of Analytical Cost Category: Subscriber Line OSP	86
45	Derivation of Analytical Cost Categories: Terminal Equipment (CPE), Station Connections Equipment, OSP Equipment, and Central Office Equipment	98
46	Derivation of Analytical Cost Categories: Distribution of Separations Costs for Land and Buildings, Furniture and Office Equipment, and Vehicles and Other Work Equipment	99
47	Derivation of Analytical Cost Categories: Separations Items for Commercial Expense, Traffic Expense, and Revenue Accounting Expense	100
48	Derivation of Analytical Cost Categories: Distribution of Separations Items for General Expenses and for Maintenance and Depreciation	101
49	Derivation of Analytical Cost Categories: Distribution of Separations Items for Taxes	102



I N T R O D U C T I O N

IA. A Century of Policy Swings, 1876 to 1984

Monopoly	Competition	Monopoly	Competition
began in 1876	1893	1921	1957

The shift toward competition which began during the 1950s was not the first such shift. Rather it was one more swing of a pendulum -- one which had moved repeatedly between monopoly and competition in response to changes in the balance of political and economic forces. appendix A describes major events marking the swings between the 1870s and the 1930s.* Section IB provides the details of the later swings following the 1920s.**

In fact, as early as 1911, the telephone industry had already undergone one shift from monopoly to competition. At that time, Arthur Holcombe, a Harvard University instructor, wrote the following paragraph which still has a contemporary ring:

Competition in the telephone business has existed for nearly a score of years in a large part of the United States. By the expiration of the fundamental telephone patents in 1893 the legal barrier to active telephone competition was removed, and to the American public at that time competition seemed the promptest and most effective method of regulating the then existing telephone monopoly.

With a few changes, Holcombe might have been writing on the conditions leading to AT&T's (American Telephone and Telegraph Corporation's) breakup on January 1, 1984. Holcombe thus described the prevailing American view of his time -- that a competitive telephone industry was preferable to a telephone monopoly.

But four years after Holcombe's book appeared, Theodore Vail, then president of AT&T, expressed a view which opposed competition and foreshadowed the return to monopoly:

Much of the public misunderstanding and financial loss to the public has been through new promotions, which under the name of "competition" and the cry of "down with

*See Appendix A, pp. 88-95 of this volume; and Index: Regulation; and Competition.

**See Section IB, An Overview: The Introduction of Competition, pp. 2-12 of this volume.

monopoly" duplicated in part existing utilities, -- covered only by the profitable part of the business, -- and did not meet the essential "raison d'être" of a utility, which is, to afford facilities to all.⁵

The arguments made by Vail and Holcombe illustrate the opposing sides of the continuous debate on whether the public interest is best served by a monopoly or by a competitive industry.

In 1983, AT&T's Chairman, Charles Brown, gave his view of the upcoming 1984 divestiture and the return to competition:

If we have a truly competitive communications marketplace, with regulation only where it is needed, I believe AT&T and the divested telephone companies have a significant and constructive role to play in revitalizing the American economy and in maintaining and enhancing U.S. technological leadership in communications.⁴

While competition and monopoly represent one axis in the telephone industry shifts, regulated and unregulated commerce represent another axis. Therefore, it is possible to have unregulated competition or regulated competition, as well as many shadings between these two extremes. For example, some companies may remain regulated while others are unregulated. In the 1950s and 1960s, FCC decisions allowed competitors to enter the traditional industry's transmission facilities market.⁵ This move created regulated competition in the transmission market. Different rules applied to the various companies and customers. The traditional industry was subject to price regulation; its competitors were not.

IB. An Overview: The Introduction of Competition

The breakup of AT&T, effective January 1, 1984, focused public attention on a shift from the regulated telephone monopoly to a more competitive market structure. The pre-divestiture monopoly was the result of a series of political and economic pressures which gained momentum in the early 1920s and 1930s. The Willis-Graham Act, passed by Congress in 1921, encouraged the consolidation of the nation's many telephone companies by exempting them from antitrust actions under Section 7 of the Clayton Act.⁷ Supporters of the Willis-Graham Act argued that "telephoning" was a natural monopoly and that local competition achieved nothing but additional expense and inferior service. At that time, there were 7950 independent (non-Bell System) telephone companies. (By 1980 the number had shrunk to 1483.)¹⁰

By 1934, the telephone monopoly was well established. The Communications Act of 1934 created an agency, the Federal Communications Commission (FCC). This Act transferred authority over interstate telephone and telegraph companies from the Interstate Commerce Commission (ICC) to the FCC. Authority over the telegraph market was consolidated by giving the FCC functions previously vested with the Postmaster General. The Act also gave the FCC authority over the competitive international carriers market in addition to authority over the domestic monopoly. In a further consolidation of authority over communications, the FCC took over all functions previously performed by the Federal Radio Commission. Since the Communications Act of 1934, Congress has passed only minor amendments. Figure 1 highlights the legislative history of telephone regulation.

Date	Public Law	Description
1910	Mann-Elkins Act (P.L. 218)	Places jurisdiction over interstate rates charged by telegraph, telephone, and cable companies under the Interstate Commerce Commission (ICC).
1920	Transportation Act of 1920 (P.L. 152)	Restates jurisdiction of ICC as encompassing "the transmission of intelligence by wire or wireless."
1921	Willis-Graham Act (P.L. 15)	Gives ICC the power to exempt consolidations and mergers of telephone companies from the restraints of the anti-trust laws.
1927	Radio Act of 1927 (P.L. 632)	Forbids radio licensees to acquire telegraph or telephone systems and forbids telegraph and telephone systems to acquire radio stations, thereby creating a monopoly.
1934	Communications Act of 1934 (P.L. 416)	Creates Federal Communications Commission (FCC); gives it the authority over telecommunications previously vested in the ICC. Also gives the FCC authority over the telegraph market and the international carrier market as well as functions previously performed by the Federal Radio Commission. Accomplishes the goal of consolidating authority over communications in one agency, a idea proposed as early as 1929 in Couzens Bill, S. 6.
1943	Amendments to the Communications Act of 1934 (P.L. 4)	Permits consolidations and mergers of domestic carriers.
1949	Amendment to the Rural Electrification Act of 1936 (P.L. 423)	Provides low interest loans (at 2%) for the development of telephone service in remote areas. The House Report which accompanied this amendment stresses the need for universal service, calling it "area service." This amendment effectively places control of rural telephone development under the Department of Agriculture.
1962	Amendment to the Rural Electrification Act of 1936 (P.L. 87-862)	Broadens the definition of telephone service.

Date	Public Law	Description
1971	Amendment to the Rural Electrification Act of 1936 (P.L. 92-12) Federal-State Communications Joint Board Act (P.L. 92-131)	Establishes a Rural Telephone Bank to make loans (at 5%) to most rural telephone companies. Rural Electrification Administration continues to make 2% loans to companies with extremely low subscriber density, with low net worth, or which are unable to obtain credit from other sources at reasonable terms. Expands federal-state joint boards to cover cost separations. Joint boards are advisory in that their recommendations are not binding on the FCC.
1972	Amendment to the Rural Electrification Act of 1936 (P.L. 92-324)	Expands ability of Rural Telephone to obtain funds for its supplementary financing program at the lowest possible costs.
1976	Amendments to Communications Act of 1934 (P.L. 94-276)	Requires common carriers to give 90-day notice to FCC of intent to change charges, classifications, regulations, or practices.
1981	Record Carrier Competition Act of 1981 (P.L. 97-130)	Allows Western Union to enter the international non-voice market and the international record carriers to begin domestic services.
1984	Cable Communications Policy Act of 1984 (P.L. 98-549)	Sets restrictions on telephone company ownership of cable systems. Establishes a Telecommunications Policy Study Commission, comprised of four Senators and four Congressmen, to "compare various domestic telecommunications policies of the United States and other nations, including the impact of all such policies on the regulation of interstate and foreign commerce."

• 1985 Program on Information Resources Policy, Harvard University.

Figure 1

Federal Legislative Record: Telephone Regulation

The Communications Act of 1934 gave the FCC authority over telephone company acquisitions. According to the Act, the FCC may authorize acquisitions:

If the Commission [FCC] finds that [a] proposed consolidation, acquisition, or control will be of advantage to the persons to whom service is to be rendered and in the public interest.¹²

Consolidations among telephone companies continued, primarily among independent telephone companies, with some acquisitions by AT&T.* Although the independent companies are financially only a

*See Index: Independents.

small portion of the traditional industry, they are an important political force within Congress and within individual state legislatures. In terms of post-divestiture acquisitions, the court order for divestiture forbids AT&T only from acquiring "the stock or assets of any BOC."¹⁵ The FCC retains its control over carrier acquisitions.

After 1934, Congress made only minor changes in the laws governing the telephone industry. Beginning in the 1970s, Congress made repeated attempts at a major revision of communications law, but only one of these bills progressed beyond committee hearings [Figure 2]. However, these legislative initiatives influenced regulatory and court actions.

Date	Bill	Description
1976-1977	Consumer Communications Reform Act of 1976 (H.R. 12323)	Attempts to reverse the pro-competition policy of the FCC; in particular, tries to undo the Carterfone-MCI line. Often referred to as the "Bell Bill," this bill was recommended by an industry committee comprised of six independent telephone companies and AT&T. The bill was re-introduced in 1977 (as H.R. 8, H.R. 513) but never left committee.
1977	(H.J.R. 285, S.J.R. 30, H.J.R. 512)	In contrast to the Consumer Communications Reform Acts, these resolutions express approval of the recent pro-competition developments.
1977-1979	Van Deerlin Bill (H.R. 13015)	A general revision of the Communications Act of 1934 removes most of the restrictions keeping AT&T from entering other telecommunications markets. Reintroduced in modified form in 1979 as H.R. 3333, H.R. 6121; hearings held but no further action.
1979-1981	Hollings Bill (S. 2827)	Proposes general revision of the Communications Act of 1934 to encourage competition and deregulation; hearings held but no further action. A variety of similar legislation, including S. 607, was introduced by Senators Hollings and Goldwater.
1981-1984	(S. 898, S. 999, S. 1660, S. 2282, S. 2469, S. 2618, H.R. 4102, H.R. 4103, H.R. 4464, H.R. 4840, H.R. 5158, H.R. 5724, H.R. 6155)	<p>Extensive hearings were held through 1982 concerning revisions to the Communications Act of 1934 (S. 898, H.R. 5158), but the momentum to restructure the telecommunications industry through legislative enactments stalled after the approval of the AT&T antitrust settlement.</p> <p>In the Senate, hearings were also held on the International Telecommunications Act of 1982 (S. 2469) and continued in May of 1983 (S. 999). This bill encouraged competition in the international telecommunications and information services market. In 1984, the House conducted hearings on this same topic. (H.R. 4464).</p> <p>In February of 1984, the Senate proposed to limit ownership of national television networks by foreign entities or by aliens (S. 2282). The house also introduced a similar bill (H.R. 4840). Later that year, the Senate attempted to amend the Trade Act of 1974 to promote expansion of international trade in telecommunications products (S. 2618).</p>

Date	Bill	Description
1981-1984		<p>The Universal Telephone Service Act of 1983 (S. 1382, H.R. 3621) introduced in May, 1983, insures basic telephone services at reasonable rates for all customers.</p> <p>In response to the FCC's Access Charge Plan, Congress introduced the Universal Telephone Service Preservation Act of 1983 (S. 1660, H.R. 4102) incorporating the earlier Universal Telephone Service Act. The later bill regulates post-divestiture rates; no further hearings after FCC issued January 1984 ruling. However, in August of that year the House introduced a bill (H.R. 6155) to limit telephone access charges on local users.</p> <p>Another House bill (H.R. 5724) reflects interest in promoting competition in the satellite communications industry; however this bill was tabled in subcommittee.</p> <p>Another 1984 bill (H.R. 4103) establishes a national policy for the cable television industry. This bill was tabled, because some of its provisions were incorporated in the Senate's S. 66 which was passed into law, becoming the Cable Communications Policy Act of 1984.</p>

• 1985 Program on Information Resources Policy, Harvard University.

Figure 2

Unsuccessful Attempts at Federal Legislation

Following World War II, the telephone industry, dominated by AT&T, began to draw on the growing field of electronic (and later digital) technologies, a field which would soon transform the communications industry. These technologies provided the basis for the development of transistors, microcomputers, and electronic switches and served also as the foundation of the electronic computer industry, dominated by IBM.

Although IBM used many of the same technologies as AT&T, IBM was treated differently by government regulators. The computer industry grew up without formal government regulation while the telephone industry was a regulated monopoly. The strict regulation of the telephone industry extended over entry, over services rendered, and over prices charged. Until the 1980s, IBM avoided this type of regulation by electing not to do business, at least in the United States, in areas subject to telephone-style regulation. The reluctance of the computer industry to enter a regulated field helped preserve the notion of a telephone monopoly. AT&T was kept out of the computer business by an

antitrust suit that the U.S. government brought against it (and its Western Electric subsidiary) in 1949. The 1956 Consent Decree,¹⁴ which ended this suit, kept AT&T and its subsidiaries from any business other than common carrier communications services regulated either under federal law,¹⁵ mainly the Communications Act of 1934, or under state law. Thus, a legal boundary grew between the unregulated computer industry and the regulated telecommunications industry.

This legal boundary prevented competition between the giants of these two fields -- AT&T and IBM. Thus the 1956 Consent Decree preserved the old order: It kept the traditional telephone companies -- comprised of AT&T and more than 1400 independents* -- within the bounds of regulated communications services. In general, the computer industry chose to remain on the unregulated side of this boundary. In addition to telephone industry regulation, other factors hampered IBM's entry into the telecommunications market. Since 1932, IBM has faced a series of antitrust suits filed by both private industry and by the Department of Justice. Appendix B lists the major antitrust actions against IBM between 1932 and 1984.**

However, both the telephone and computer industries drew from a common technology. While the legal boundary set in 1956 cut across this common technological base, the actual division is blurred, not a clear "bright line."¹⁶ Thus other companies, less visible than AT&T and IBM, provided equipment and services which undermined this legal boundary.

Under the traditional monopoly, AT&T and the independents operated the telephone network and provided all the equipment attached to this network. The monopoly restrictions forbade any "foreign attachments,"¹⁷ focusing on problems of incompatibility and reliability (maintenance and repair) of such attachments. Thus, only equipment provided by the traditional telephone industry (AT&T, the BOCs, and the independents) could be connected. This included equipment manufactured by the traditional industry or purchased by the industry. Individual customers were prohibited from hooking up their own equipment.

After World War II, there were continuing attempts to attach customer-owned and -maintained terminal equipment to the network. Under limited conditions, the FCC allowed interconnection of recording devices in its 1947 decision on Use of Recording Devices. During this same post-war period, in contrast to the FCC stance, state agencies generally prohibited the interconnection of such recording devices. The FCC also permitted customer-owned attachments, such as teletypewriters, in limited¹⁸ cases where the telephone company couldn't satisfy the demand.

*See Index: Independents.

**See Appendix B, pp. 96-97 of this volume; and Index: Regulation; and Competition.

The first notable challenge to the foreign attachment restriction came in 1957 with the settlement of a nine-year dispute between AT&T and the manufacturers of a product called Hush-A-Phone. Manufactured since 1921, Hush-A-Phone was a cup-like device which snapped onto the telephone receiver, shielding the caller's conversation. Essentially, a caller could get the same result by shielding his mouth with his hand as he talked into the handset. The makers of Hush-A-Phone asked the FCC to override¹⁹ AT&T's prohibition of this "foreign attachment" to a telephone.

Initially, the FCC refused to override AT&T's foreign attachment policy. However, this decision was overturned in federal court. Arguments in the case hinged on whether Hush-A-Phone "is deleterious to the telephone system and injures the service rendered by it." The court stated that:

To say that a telephone subscriber may produce the result in question by cupping his hand and speaking into it, but may not do so by using a device which leaves his hand free to write or to do whatever else he wishes, is neither just nor reasonable.²⁰

Hush-A-Phone thus set a precedent for attaching equipment manufactured outside the traditional industry to the traditional industry's network. This precedent would later be applied not only to mechanical attachments to customer-owned telephones but also to personal computers, business computers, and a myriad other formerly foreign attachments. The Carterfone decision (1968) provided an acoustic bridge from the strictly mechanical cup of Hush-A-Phone to contemporary electronic terminals. Carterfone held that the use of an acoustic coupler to connect private radio systems with the telephone network should be allowed since this coupler does no technical harm to the network.²¹ Electrical connection of terminals was ultimately sanctioned by the FCC and the courts.²²

The "harm to the network" issue raised in Hush-A-Phone continues to be controversial.²³ The varying degree of sophistication in terminal equipment attached to the telephone network has created problems of incompatibility. For example, a PBX (Private Branch Exchange) is a switch connecting telephones or other terminal equipment within an organization. A customer may have problems hooking up a simple telephone to his organization's PBX. Howard Frank, the President of Contel Information Systems, itself a subsidiary of Continental Telecommunications, noted on February 22, 1984, that:

If it's a digital phone, it most likely won't work with a Private Branch Exchange (PBX) telephone system installed in a different building. Certainly it won't work with another vendor's equipment. Incompatibility,

one of the major problems of the data communications and processing world, appears to be spreading to the voice communications world.²⁴

In addition to problems of incompatibility, the use of computer technology in terminal equipment has added to the problems associated with computer communications. As Howard Frank continued:

Telephone system outages are becoming as routine as computer systems outages were a decade ago. Moreover, because of the software structure of a modern PBX, it is possible that only portions of the system fail at any one time. Thus, certain features and services often tend to disappear from the system while others remain in operation. This leads to progressive system deterioration, constant service calls by the PBX vendor, and increasing levels of user frustration.²⁵

The customer's frustration may be compounded by the fact that AT&T no longer coordinates the entire network. When a customer has problems with his service, there is now the question whether the fault lies with the manufacturer of the terminal equipment or with the local operating company at either end or with the long-distance carrier in-between.

In addition to allowing foreign attachments, Hush-A-Phone opened the way for further breaches in the traditional industry's monopoly. Before 1959, the FCC licensed microwave frequencies to private entities only on a case-by-case basis. In 1959, the FCC's Above 890 Decision²⁶ widened the competitive market for transmission facilities. The granting of microwave frequency rights became the rule rather than the exception. This decision allowed anyone to apply for these frequencies and to build their own microwave transmission facilities instead of using those provided by the traditional industry.

Above 890 also allowed certain entities to share private microwave systems. Under the FCC's mandate in the Communications Act of 1934 for "promoting safety of life and property" and in order to provide "economic benefits . . . to the public, either as taxpayers or rate payers,"²⁷ the FCC identified airlines, electric utilities, stock and commodity exchanges, the U.S. Post Office, and federal, state and local government agencies as authorized to share privately owned transmission facilities. These authorized customers also wanted to supply their own in-house communications services for both voice and data transmission. Therefore, they pressured the FCC to expand the Above 890 Decision. Meanwhile, in response to the competition allowed by Above 890, AT&T offered these authorized customers special prices for using AT&T facilities in its TELPAK offering.²⁸

Unauthorized customers and potential competitors pressured the FCC to further open the transmission market. Under subsequent rulings, a wider range of customers could share facilities²⁹ bought at bulk prices from the traditional industry. By buying in bulk, each customer received equivalent transmission services at a lower price than traditional carriers' retail price. These buyers could further profit by reselling these same services. Initially, the FCC authorized such resale only when the service was combined with a:

"value added" service . . . [that] will take channels leased from other carriers and combine them with computers and software to transmit³⁰ data more efficiently and with less error.

On the surface, this "value-added" requirement continued to regulate transmission facilities. However, the ability to resell this type of service reflected the unregulated nature of the data processing (computer) industry.* In 1977, the FCC broadened the Above 890 guidelines by eliminating the "value-added" restriction on shared use and resale.³¹

Some of the companies buying transmission facilities were in direct competition with the traditional industry. Starting with MCI in the early 1970s, companies in direct competition with the traditional industry (called other common carriers or OCCs) built their own facilities and competed directly against AT&T for customers.³² The OCCs were permitted to interconnect with the traditional industry's facilities.³³ Thus, the OCCs could reach customers beyond the OCC physical facilities.

Meanwhile, it became impossible to enforce the legal boundary created by the 1956 Consent Decree. The legal division was at odds with technological advances and market pressures. There was a demand for services which combined aspects of both the computer and telecommunications industries. This demand led to an FCC inquiry into the nature and location of the boundary between regulated communications and unregulated computer services and facilities. The question arose as to whether AT&T could provide intelligent terminals.³⁴ The FCC's initial attempt to deal with such issues produced Computer Inquiry I³⁵ which tried to draw a hard line between data processing and telecommunications. Computer Inquiry I survived only the briefest contact with reality: The whole issue was³⁶ reopened only five years later in Computer Inquiry II (1976).

Computer Inquiry II divided services into two categories: "basic" services which are the sole province of the regulated telephone network and "enhanced" services which are open to competition. This inquiry provides elaborate definitions for these basic and enhanced categories. Computer Inquiry II also provided guidelines for the telephone industry provision of

*See pp. 33-34 of this volume; and Index: Services, value-added.

non-basic, "enhanced" services and new terminal equipment, or Customer Premises Equipment (CPE).^{*} In 1983, AT&T set up a separate subsidiary -- AT&T Information Systems (AIS) -- to provide these competitive products and services.^{**} At the time of divestiture, the issues raised in Computer Inquiry II continued. Each time a company wanted to provide a new service, it had to take into account the FCC's "basic"-versus-"enhanced" distinction. Companies providing regulated network services could adhere to these distinctions or apply for waivers from the Computer Inquiry II rules. Both the telephone and computer industries could contest competitive service offerings on the basis of this basic/enhanced line. The FCC arbitrated as to which products and services were solely within the province of the network, which were solely within the province of the competitive market, and which were shared by both.

The conditions that opened competition in the domestic telephone industry also led to increased competition in international services. In 1982, the FCC allowed international record carriers (IRCs) to compete with AT&T's international voice services.³⁷ These international voice or non-domestic voice services cover any call with one endpoint in the domestic U.S. or any call which transits (passes through) domestic facilities even though both endpoints of the call lie outside the domestic U.S. ("Domestic" refers to the 48 coterminous states -- that is, all the states, excluding Alaska and Hawaii.) AT&T Long Lines Department, converted into AT&T Communications in 1984, operated international voice services in addition to domestic interstate and other services.

In the mid-1970s, both Congress and the Justice Department attempted to resolve problems created by the introduction of competition and by battles over the telephone/computer boundary. In 1974, the Justice Department initiated an antitrust action against AT&T,³⁸ and Congress made repeated attempts to restructure the telecommunications industry [Figure 2]. The Court and Congress grappled with many of the same issues. For example, it became evident that the newspaper and other media industries had come to see AT&T as a competitor in their business. The focus was Yellow Pages advertising which, in prospective electronic versions, was seen as competing directly with classified and display advertising. Other information services, such as time, weather and Dial-a-Joke, were also contested. The 1982 consent agreement in the antitrust case reflects accommodations of these issues.

On January 8, 1982, the Department of Justice announced two major antitrust actions. The Department dropped its antitrust suit against IBM and announced a settlement with AT&T.³⁹ The dismissal of the IBM antitrust suit left IBM in a better position to compete in the altered telecommunications environment.

^{*}See pp. 26, 28-29, 33-37 of this volume; and Index: Computer Inquiry II.

^{**}See pp. 15, 21-22 of this volume; and Index: AT&T.

In August 1982, the antitrust case against AT&T was settled by a modification of the 1956 Consent Decree. In the 1982 Modification of Final Judgment (MFJ), AT&T agreed to give up ownership of its 22 local operating companies (the Bell Operating Companies or BOCs), although AT&T still retained its minority ownership in Southern New England Telephone and in Cincinnati Bell.* In return, AT&T was released from the constraints imposed by the 1956 Consent Decree. AT&T was free to enter the data processing market. In the Modification of Final Judgment, the court presented its rationale for the breakup of AT&T:

The principal means by which AT&T has maintained monopoly power in telecommunications has been its control of the Operating Companies with their strategic bottleneck position. The divestiture . . . remove[s] the . . . main barriers that previously deterred firms from entering or competing effectively in the interexchange market [emphasis added].⁴⁰

The divestiture pulled apart the corporate structure of the entire Bell System, with portions of AT&T and the BOCs recombining to form Regional Holding Companies (RHCs) and a newly configured AT&T. This divestiture and the restructuring of AT&T and the BOCs further opened the door to competition.

While Congress' Cable Communications Policy Act of 1984 had some effect on the telecommunications industry (restrictions on telephone ownership of cable systems and establishment of a Telecommunications Policy Study Commission), Congress had yet to pass any revisions with as broad a sweep as the judicial breakup of AT&T.

Divestiture in January 1984 left the restructured AT&T, the Regional Holding Companies, the independent telephone companies, the OCCs, the computer industry, the newspaper and publishing industries, and all the other information industries jockeying for position in the new environment. For these companies, success or failure depends upon their ability to respond to the market. The telephone industry's ability to set prices or to create new products and services is subject (before and after divestiture) to varying degrees of government regulation; and regulators, in turn, base many of their decisions on industry expenses and plant costs. In contrast, other industries are free to compete without special regulatory constraints.

The remainder of Volume 1 describes the traditional industry's plant and the costs involved -- both of which exist after divestiture and provide the springboard for all post-divestiture battles. Before the 1980s, the language and the infrastructure of the telecommunications industry were known only in segments and only by a technical elite. This series aims to clarify that environment for a much larger group which is currently involved and for those who may want to enter.

*After divestiture, AT&T sold its interest in these two local operating companies.⁴¹ See Index: Plant, ownership.

IC. Pre-Divestiture AT&T Corporate Structure

From the 1940s until 1970, AT&T ownership and operations remained relatively stable. The structure reflected balances between manageability within the company and pressures from the financial community; jurisdictional balances among national, regional, state and local interests; and customer characteristics, such as financial clout or location.

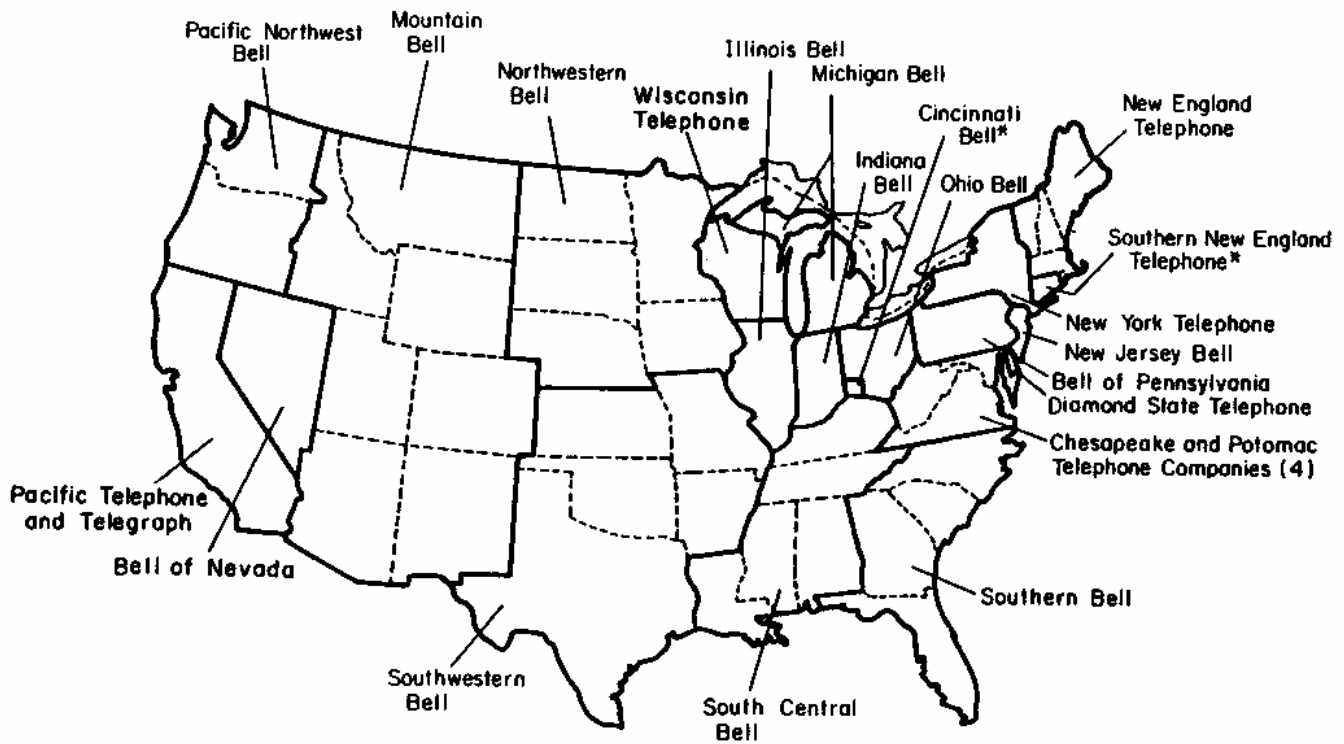
AT&T, the parent corporation, and its subsidiaries -- 22 Bell Operating Companies (BOCs), Western Electric Company, and Bell Laboratories⁴² -- existed as a regulated monopoly prior to the 1984 break up. In addition to its 22 BOCs, pre-divestiture AT&T had minority interest in two more local operating companies: 24% of Cincinnati Bell and 33% of Southern New England Telephone [Figure 3].⁴³

The entire AT&T operations were often referred to as the Bell System. Prior to divestiture, this term helped distinguish AT&T's toll and local operations from those of the independent telephone companies. Because divestiture not only created new corporate entities but also brought about changes in the existing AT&T corporate structure, this series differentiates these changes by referring to pre-divestiture AT&T (the former Bell System) and to post-divestiture AT&T.

As with the parent corporation, the name as well as the corporate alliance of the BOCs changed upon divestiture. Therefore, in this series, BOC refers to the pre-divestiture local operating companies owned by AT&T.

Three groups of BOCs shared their top management. For example, although Diamond State Telephone (Delaware) and Bell of Pennsylvania were distinct subsidiaries on paper, the same person was president of both companies. Similar arrangements existed between Pacific Telephone and Telegraph and Bell of Nevada and among the four Chesapeake and Potomac Telephone Companies. Even though the top management was shared, each company had different boards of directors.

The number of pre-divestiture BOCs varies with the counting method. If the two minority-held companies are added, the tally is more than 22. If the companies sharing top management are counted as a single company, the tally is 17. This series uses a count of 22 pre-divestiture BOCs for the separate subsidiaries providing state services (local operating companies).



*AT&T owned a minority interest in these two companies until 1984

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Figure 3

Pre-Divestiture Bell Operating Companies (BOCs)

Before 1983, each BOC provided services within the borders of its own state. Some BOCs, whose territory covered more than one state, such as Southern Bell, provided services among these states. In addition to local distribution, the BOCs also provided some interstate services which constituted less than 2% of the interstate traffic.*⁴⁴

Western Electric (which became AT&T Technologies, Inc. post-divestiture) served as AT&T's equipment manufacturer. On January 10, 1978, Western Electric established a subsidiary to compete in international communications equipment markets for the first time since the 1920s. In 1980, AT&T established a subsidiary, AT&T International, which took over all international business within the company except for international long distance calling provided by AT&T Long Lines (post-divestiture AT&T Communications). Bell Laboratories provided research and development for the entire AT&T operations.

*See Index: Service Areas, LATAs, regulation, corridor exemption.

In addition to its subsidiaries, several of AT&T's internal divisions provided customer services. AT&T's Long Lines Department provided most of the interstate services and AT&T's Treasury Department handled the company's stocks and bonds, including services for shareholders.

ID. Impact of Computer Inquiry II on Corporate Structure

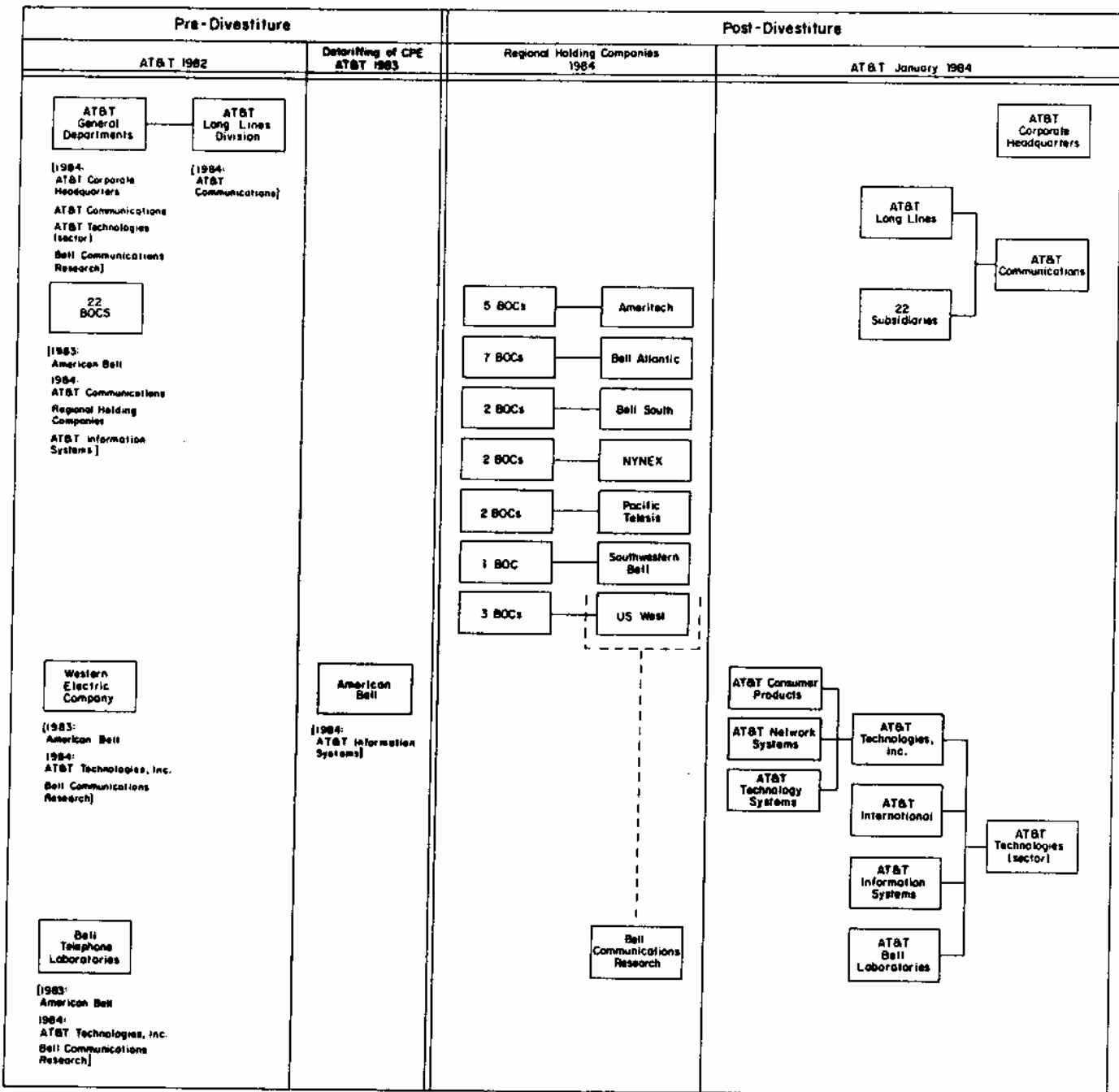
Even before the antitrust settlement, the FCC's Computer Inquiry II decision caused changes in AT&T's corporate structure.⁴⁵ Computer Inquiry II required AT&T to set up a "fully separated subsidiary" to handle certain deregulated products and services,⁴⁶ including new terminal equipment (CPE or Customer Premises Equipment).^{*} During the transitional period between the 1982 court approval of the breakup of AT&T and the actual breakup in 1984, AT&T created Americal Bell (later to become AT&T Information Systems) to handle the requirements set by Computer Inquiry II. Portions of the 22 BOCs, Western Electric, and Bell laboratories were combined to form this subsidiary. American Bell took over the leasing and selling of new terminal equipment; these functions were previously handled by the BOCs. Leasing of in-place terminal equipment (CPE) remained in the BOCs during 1983.

During this 1983 transition, AT&T's corporate structure changed, only to change again in 1984. The antitrust settlement occurred after the FCC's deregulation decision. AT&T and the BOCs faced a transitional year in which reorganization was necessary to fulfill the requirements of Computer Inquiry II while at the same time the companies prepared for another reorganization required by the court.

IE. Post-Divestiture Corporate Structures

Between 1982 and 1984, actions of the FCC and the courts caused major changes in AT&T's corporate structure. Figure 4 shows 1982 pre-divestiture AT&T corporate structure, the creation of American Bell in response to Computer Inquiry II, and the portions of the various 1984 post-divestiture corporate structures.

*See pp. 28-29 of this volume; and Index: Plant, Customer Premises Equipment.



[] indicate transfer of some or all of the organization in the above box to corporate entities listed within brackets.

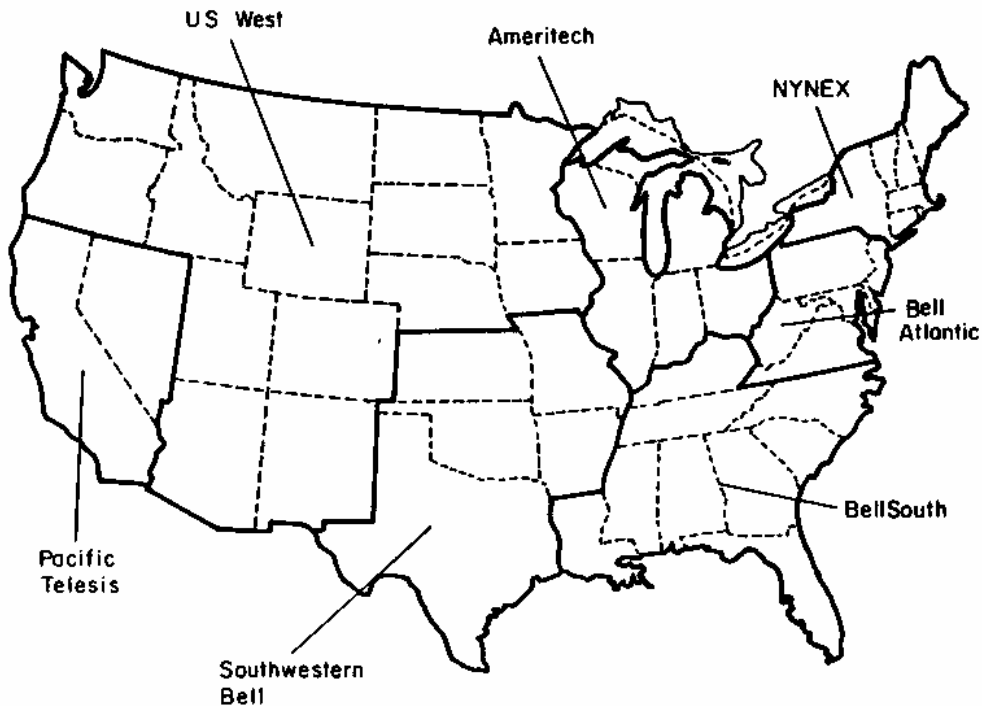
*Computer Inquiry 3, FCC Docket No. 20826, Final Decision, 77 FCC 2d 384 (1970).

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Figure 4
Corporate Structures: Pre-Divestiture,
Impact of Computer Inquiry II, and Post-Divestiture

Divestiture divided the ownership of AT&T and BOC assets and liabilities (plant investment, expenses, taxes, etc.) among the divested BOCs and a reorganized AT&T. Under the antitrust settlement, BOC ownership shifted from AT&T to seven regional holding companies (RHCs), which served as the parent corporations. The ownership of these regional holding companies passed directly from AT&T to its shareholders on December 31, 1983. The seven regional companies were given approximately 75% of the former BOCs' holdings.⁴⁷

In Figure 5 the boldfaced lines indicate the boundaries of the regional holding companies. The dashed lines indicate state boundaries within each region. The regions reflect an attempt to create corporations preserving the 22 pre-divestiture BOC boundaries yet combining the BOCs into compact geographic units roughly equal in business and in assets. This continuing presence of the corporate entities which originally provided state services eased the shift from a single company into eight parts -- the new AT&T and the Regional Holding Companies.



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Figure 5

Regional Holding Companies

In the Modification of Final Judgment, the court used the term "BOC" to refer to entities which later became the Regional Holding Companies. However, the structure of these regional companies varies, containing subsidiaries providing regulated network services and subsidiaries providing competitive services. A year after divestiture, terms had yet to surface which distinguished the regulated network portions of these companies from their fully separated subsidiaries. The general term local operating company refers to both independent and Bell local network operations. Therefore, this series uses "regional company" or "regional operating company" to refer to the parent Regional Holding Companies and to their various subsidiaries.

The settlement, the Modification of Final Judgment (MFJ),⁴⁸ as first proposed by AT&T and the Department of Justice, gave the regional companies "exchange telecommunications and exchange access functions," while prohibiting the regional companies from providing "any other product or service . . . that is not a natural monopoly service actually regulated by tariff."⁴⁹ The court modified this proposed settlement, giving the regional companies directory advertising and sales (Yellow Pages service) as well as permission "to provide, but not manufacture, customer premises equipment [CPE]."⁵⁰ Under the MFJ, the regional companies gave up their embedded CPE,⁵¹ although the court allowed these companies to provide new CPE.⁵² The court also forbade AT&T from entering the "electronic publishing" market for seven years.

In August 1983, the court assigned the use of the Bell name and logo to the regional companies.⁵³ The former BOC's cellular services subsidiaries (now part of the Regional Holding Companies) were allowed to market mobile telephone equipment and services, both conventional land mobile systems and cellular advanced mobile communications.

The MFJ required the regional companies to form a centralized organization to coordinate responses to natural disasters, such as floods, and to national security requirements, as in wartime. It stated:

The BOCs [regional companies] shall provide, through a centralized organization, a single point of contact for coordination of BOCs [regional companies] to meet the requirements of national security and emergency preparedness. [emphasis added]⁵⁴

The MFJ provided these companies greater leeway in coordinating work of common interest:

The BOCs [regional companies] may support and share the costs of a centralized organization for the provision of engineering, administrative and other services which can most efficiently be provided on a centralized basis. [emphasis added]

AT&T's Plan of Reorganization set up an organization to meet the national security requirement and gave this organization responsibility for accounting and technical support. Portions of Bell Laboratories, Western Electric Company, and AT&T General Departments helped form this new organization called Bell Communications Research or Bellcore (initially called the Central Services Organization (CSO) in the Plan of Reorganization.) The seven regional holding companies collectively own Bell Communications Research.

AT&T retained its remaining operations and was allowed to enter previously forbidden markets. Figure 4 shows the restructured AT&T as of January 1984. After divestiture, AT&T contained three major sectors: AT&T Corporate Headquarters, AT&T Communications, and AT&T Technologies. On the left-hand side of Figure 4 the text in brackets indicates the change in each corporate entity upon divestiture. For example, in 1983 and 1984, AT&T General Departments sent over 85% of its staff to AT&T Communications, to AT&T Technologies, and to Bell Communications Research.

The post-divestiture AT&T Corporate Headquarters establishes the policies for the entire corporation and provides support for the chairman. This sector is smaller than the pre-divestiture AT&T General Departments, which also coordinated policy for the BOCs.

AT&T Communications oversees the regulated portion of the company. This second major sector of AT&T includes the former AT&T Long Lines interstate operations and a portion of the former BOC state toll operations. The settlement split responsibility for BOC services under state jurisdiction between AT&T and the regional holding companies. This split of state services created new market definitions and changed the regulatory patterns for AT&T and for the former BOCs. Before divestiture, AT&T provided the majority of the interstate services and dealt with the FCC; the BOCs provided mainly state services and each dealt with its own state regulatory commissions. The settlement provided a new service area definition -- Local Access and Transport Area or LATA.* (Referred to as "exchange areas" in the settlement, this

*See Index: Service Areas, LATAs.

new definition was not the same as the regulatory definition of exchange.)⁵⁶

After divestiture, AT&T Communications provided services between LATAs (interLATA service) while, in general, the regional companies provided services within LATAs (intraLATA service). With two exceptions, the court's basic business prohibitions kept the regional companies from competing in the interLATA business.⁵⁷

While there were only two exemptions, these occurred in two major population centers -- at the New York City/New Jersey border and at the Philadelphia/New Jersey border. These two exemptions, called LATA corridor exemptions, let the regional companies already operating in these corridors compete directly with AT&T and the OCCs for interstate traffic.* In the Modification of Final Judgment there is no actual prohibition against AT&T's (or the OCCs') entering the intraLATA markets. With the court remaining silent, the state regulators deal with competition within LATAs. For example, a portion of state toll operations now lie within the LATA boundaries. State regulators can now decide whether or not they will allow intraLATA competition in toll operations.

When a LATA crosses a state border, the regional company may provide interstate intraLATA service, bringing the company into contact with two state regulatory agencies and with the FCC.**

Since AT&T Communications provides service between LATAs, it provides service both between states (interstate) and, if the state has more than one LATA, AT&T provides service within the state (intrastate). Four states contain only one LATA: Maine, New Hampshire, Rhode Island, and Vermont. (Most LATAs have small sections spilling over the state borders, but only a few LATAs cover large amounts of territory in two neighboring states.) For all practical purposes, interLATA service doesn't exist within these states.

In terms of regulation, AT&T Communications now deals with 44 state regulatory commissions and with the District of Columbia in addition to the FCC. (Alaska and Hawaii are served by independent telephone companies.) In answer to tax and divestiture requirements on the state side of AT&T's business, 22 separate residual corporate entities were created from its previous BOCs to contain the assets for intrastate services. AT&T created these 22 companies as a means of making divestiture tax free to the shareowners.

*See Index: Service Areas, LATAs, corridor exemptions.

**See Index: Service Areas, LATAs, regulation crossing state borders.

The change in ownership of the network cast the local network in a different light. The antitrust settlement gave the Regional Holding Companies control of local services and a portion of the pre-divestiture state toll services, to form intraLATA services. These services remained under state regulation. The creation of the LATA boundary in place of the old state boundaries upset the pre-divestiture balance between federal and state regulatory authority. The regional companies now provided interLATA carriers, such as AT&T or the OCCs, with local distribution within the LATAs (access into and out of the LATAs). There is now controversy over which regulatory authority, federal or state, should control local access charges for calls between LATAs. In general, the FCC sets interstate rates and each state regulatory commission sets rates within its own state. Although the access charge is a local operating cost, the charge itself may be levied on carriers with interstate services, with intrastate services, or with both. Or the charge may be levied on the customers. It is unclear which regulatory authority has jurisdiction. The fact that interLATA calls may be either between states (interstate) or within a single state (intrastate) adds to the controversy.

While AT&T Communications provides services subject to state and federal regulation, the third major sector, AT&T Technologies, oversees the detariffed and unregulated side of AT&T's business. AT&T Technologies contains four primary corporate entities: AT&T Technologies, Inc., AT&T International, AT&T Information Systems, and AT&T Bell Laboratories. Note that AT&T Technologies is a sector within the parent corporation and that AT&T Technologies, Inc. (formerly Western Electric), is a corporate subsidiary under the management of this sector. AT&T Technologies, Inc. itself has three divisions: AT&T Consumer Products, AT&T Network Systems, and AT&T Technology Systems. A description of the various entities within the AT&T Technologies sector follows:

AT&T Technologies, Inc.: Research, development, manufacture and sale of telecommunications and information management equipment. Essentially contains the pre-divestiture Western Electric Company.

AT&T Consumer Products: Manufacture of telecommunications and information management products which are wholesaled to those who sell to residence and business customers.

AT&T Network Systems: Manufacture and sale of transmission, switching and central office products.

AT&T Technology Systems: Manufacture and sale of silicon chip products and other electronic components; software and computers for general

purpose use and for use in communications systems; and products primarily for the Department of Defense and related agencies.

AT&T International: Markets AT&T Technologies, Inc.'s products and services outside the United States.

AT&T Information Systems: Direct sale; service; lease of CPE and communications products and systems for business, government, institution and residential use; and provision of enhanced services. Contains the 1983 American Bell and a portion of the pre-divestiture BOCs.

AT&T Bell Laboratories: Research and development unit of AT&T. Formerly the pre-divestiture Bell Telephone Laboratories.

The corporate restructuring in answer to the introduction of competition, Computer Inquiry II, and the divestiture, enabled AT&T to enter international markets and new domestic markets, such as computers, word processing, and finance.

TRADITIONAL INDUSTRY:
TELEPHONE PLANT

IIA. Existing Physical Plant

The physical pre-divestiture AT&T plant is still the most pervasive element in the new telecommunications environment. While the corporate structures shifted and ownership changed, the physical plant remained in place. This existing plant serves as a foundation for any examination of changes in post-divestiture plant. It takes more time to reconfigure physical plant than it does to legally transfer ownership of the plant. Therefore, this section examines this pre-divestiture plant and the immediate plant-related problems raised by divestiture.

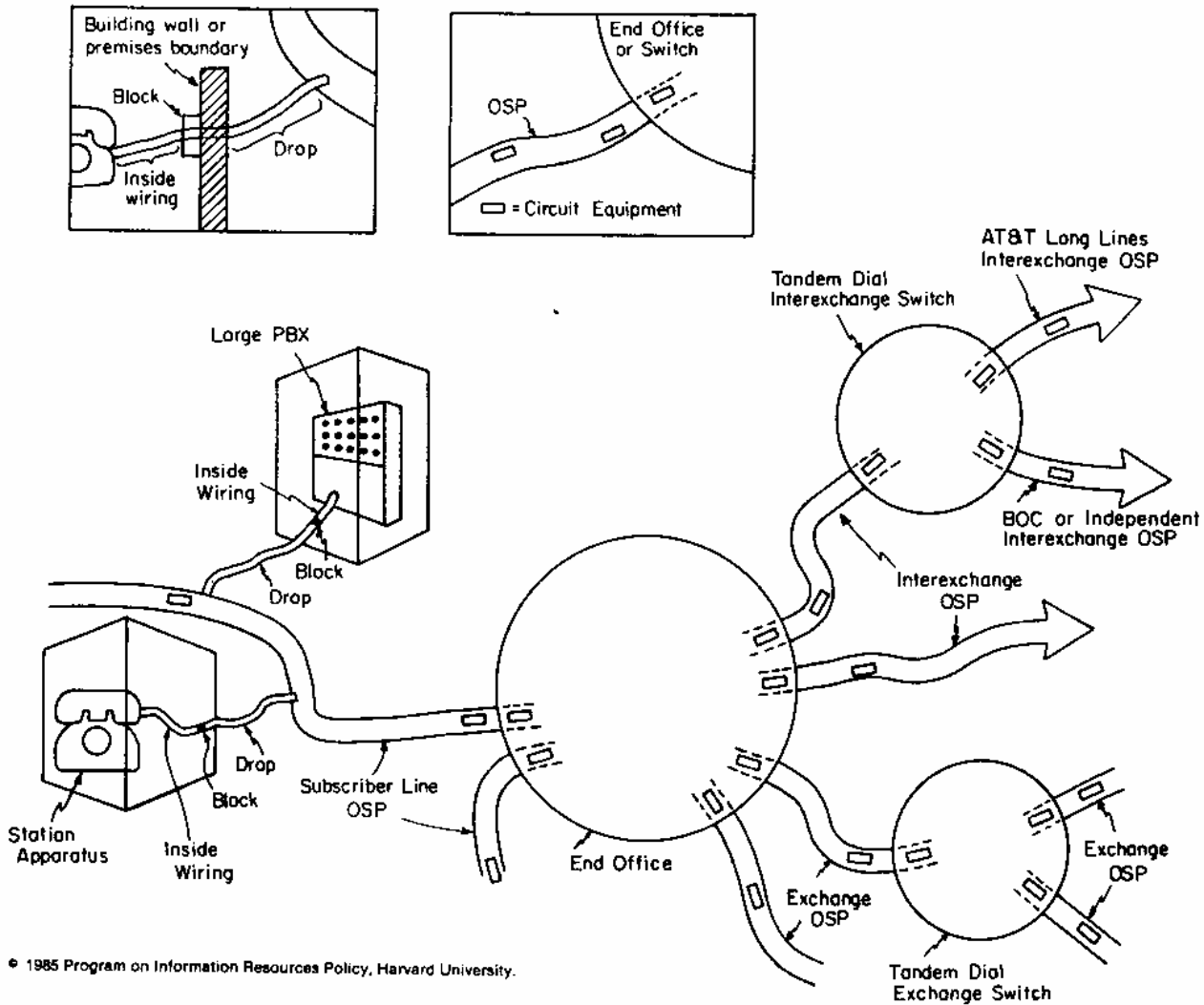
The labels in Figure 6 name the functions of the physical plant rather than specific equipment or buildings. For example, the "end office" label names a certain type of switching function and not a specific building or a specific piece of equipment. There may be one or more end offices in a single building. Or the same physical equipment may make end office connections (exchange connections) as well as interexchange connections.

Figure 6 uses these specific labels because the cost data in this volume are grouped according to these functions.* The labels stem from an early attempt by the FCC to examine the effect of opening up the terminal equipment (CPE) to competition.⁵⁹ These functional groupings are practical rather than logical or accidental; the cost data underlying these groupings are adapted from an AT&T filing in this FCC inquiry.

Some of the labels from this filing reflect the accounting system used by the traditional telephone industry -- the Uniform System of Accounts (USOA). Other labels from this filing reflect categories defined by the Separations Manual.⁶⁰ This manual sets forth rules which enable regulators and the traditional industry to divide costs between federal and state jurisdictions. We elaborated some of these groupings to shed light on later debates on the boundary between competition and regulation. For example, the "inside wiring" label reflects subsequent debates on the accounting and deregulation⁶¹ of this portion of the plant.**

*See pp. 71-87 of this volume; and Index: Costs, derivation.

**See pp. 26-27 of this volume; and Index: Plant, inside wiring.



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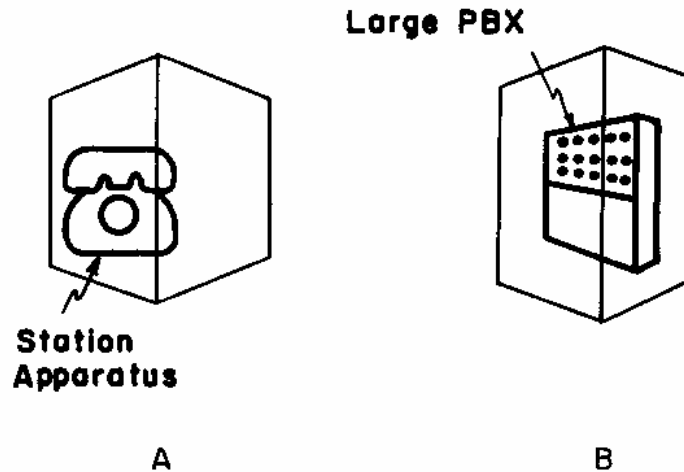
Figure 6

Telephone Plant: Functional Diagram

This volume continues with a step-by-step walk through the pre-divestiture AT&T plant, starting at a terminal, which might be a simple telephone or an elaborate computer. Each step not only defines the base line of the plant as of 1982 but also examines trends and controversies over this plant, including changes due either to divestiture or to the introduction of competition. The functional labels in the diagram are explained in this walk-through. For clarity this discussion focuses on the pre-divestiture AT&T plant, although the independent companies have comparable plant.

IIB. Terminal Equipment or CPE

The most common appliance connected into the traditional network is still the home or office telephone [Figure 7A]. PBXs (private branch exchanges) provide another method of hooking into the network. Often in organizations with a large number of telephones -- such as big businesses, government agencies, or universities -- telephones within the organization are connected to one another by a switch, called a PBX. Within an organization, the PBX may provide the organization's telephones, computers, private lines, or other PBXs with a hook up, or access, into the network [Figure 7B].



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Figure 7

Terminal Equipment or CPE (Customer Premises Equipment)

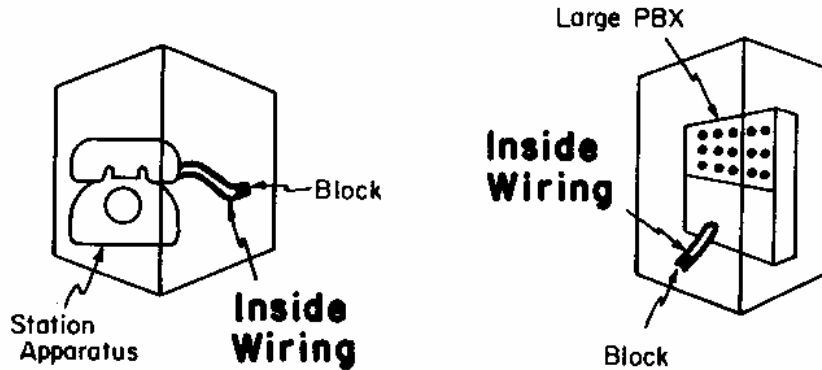
The labels "Station Apparatus" and "Large PBX" of Figure 7 reflect plant recorded in two different USOA accounts. While these accounts record terminal equipment investments, the account names no longer accurately reflect the type of equipment, if they ever did. For example, different types of PBX equipment fall under different USOA accounts. The Station Apparatus account includes "small [PBXs] and booths"; the Large PBX account includes "multiple manual [PBXs], and . . . dial system [PBXs] of types designed to accommodate 100 or more lines or which can normally be expanded to 100 or more lines."⁶² The Station Apparatus account also includes the ordinary telephones and key sets (telephones with buttons which enable the caller to select lines).

Because terminal equipment usually resides within the customer's house or building, the equipment listed as Station Apparatus and Large PBX is often collectively referred to as CPE, or Customer Premises Equipment. Changes in the types of terminal equipment and in the services offered are changing the definition of CPE. In the traditional telephone industry, CPE included plain telephones, key sets, and PBXs. With the introduction of competition in the CPE market through the Carterfone decision⁶³ and with the detariffing of traditional CPE in Computer Inquiry II,⁶⁴ customers were able to hook up a wide variety of equipment alongside the traditional CPE. These non-traditional terminals include video displays, personal minicomputers, giant corporate or military computers, and security or fire alarms.

Even before divestiture in 1984, the CPE market was widely competitive with the traditional telephone companies, the computer industry, the consumer electronics industries, and the toy industries, both within the United States and abroad, all scrambling for their share of the market. With the detariffing of CPE, telephone companies can now change their prices without submitting a tariff to the FCC for approval. However, it should be noted that the FCC still holds regulatory authority over terminal equipment attached to the telecommunications network or performing telecommunications services. Regulated competition best describes the CPE market. While the FCC refrains from CPE price regulation, the FCC continues to regulate other aspects of CPE, such as the definition of CPE itself or the technical standards required for interconnection with the network.

IIC. Station Connections: Inside Wiring

After a customer lifts the receiver on a telephone or turns on a computer terminal, inside wiring carries the message or signals from the telephone to an entry point in the network [Figure 8]. This entry point marks the customer/network boundary for facilities located on the customer's premises. The "Inside Wiring" label refers to telephone plant, excluding CPE, which lies on the customer's side of this demarcation point -- usually within a building. The "bandwidth" of the inside wiring is a measure of its capacity to carry information. This capacity determines whether the customer can hook up only a single telephone into the network or whether the customer can hook up a large computer.



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Figure 8

Station Connections: Inside Wiring

In the traditional telephone network, only telephone companies could install CPE and inside wiring. After installation, these companies retained ownership of this equipment. Shortly before the breakup of AT&T, inside wiring entered the no man's land between the regulated network and the competitive market. In 1982, the FCC regulations opened the CPE and inside wiring markets to competition.⁶⁵ A customer can now buy a telephone or PBX from anyone and can either let the telephone company install the inside wiring or, as long as certain registration requirements are met, the customer can install it himself or hire someone else to do the work. Similarly, when a customer buys a house, he can install his own wiring or have it installed by a contractor. However, beyond this point the electrical wiring analogy falls short. The customer owns and is responsible for maintaining his electrical wiring. With telephone inside wiring, the ownership and responsibility for maintenance are less settled. Computer manufacturers such as Xerox (Ethernet) or Wang (Wangnet) provide inside wiring; Local Cable TV (CATV) companies also provide inside wiring. Standards for inside wiring vary state by state.

As of 1984 the inside wiring expenditures were still recorded in a USOA account called "Station Connections." But we label "Inside Wiring" to reflect changes starting in 1980⁶⁶ which treated inside wiring separately from the remaining portion of station connections plant.

IID. The Customer/Network Boundary

By establishing a competitive terminal equipment market, Computer Inquiry II created a boundary based on physical location and ownership. The detariffed CPE market, which is open to competition, lies on one side of this boundary. The regulated telephone network lies on the other side.⁶⁷ The FCC also required AT&T to offer CPE through a fully separated subsidiary -- a legally separate company. In practical terms, this means that the network side of the company learns of its unregulated subsidiary's CPE products only when these products are made public. In the same manner, the CPE subsidiary learns of network changes when these changes are made public.⁶⁸ In its Final Decision the FCC justified its special treatment of CPE as follows:

We conclude that in light of the increasing sophistication of all types of customer-premises equipment and the varied uses to which such equipment can be put while under the user's control, it is likely that any given classification scheme would serve to impose an artificial, uneconomic constraint on either the⁶⁹ design of CPE or the use to which it is put.

Initially, the customer/network boundary lay between CPE and inside wiring. A year later, the move toward competition in the inside wiring market (discussed above) left inside wiring in a regulatory limbo.⁷⁰ In some cases the regulated telephone industry retained ownership of inside wiring; in other cases, the customer owned his inside wiring. For simplicity, this discussion lumps terminal equipment and inside wiring together on the competitive side of the customer/network boundary.

Following the 1970 Computer Inquiry II decision, the very location of CPE (ignoring the question of inside wiring) made it a focus of battles between the computer and telecommunications industries. It became important to each side to define CPE. What functions this equipment was allowed to perform determined which functions were open to competition and which functions were solely within the province of the regulated network. Within the definition of CPE lies the major question of whether certain functions are an integral part of the network or just hooked onto the network. For example, it is technically possible for non-traditional terminals to include Network Channel Terminating Equipment (NCTE). NCTE controls the interface between equipment located on the customer's premises and high speed data transmission over the traditional industry's network.

A year after Computer Inquiry II, controversy arose as to whether the regulated network could perform NCTE functions or whether CPE performed NCTE functions.⁷¹ In 1983, the FCC included NCTE in its Computer Inquiry II category of CPE (terminal equipment).⁷² However, in some instances, the FCC stated that the telephone carriers "have the right to supply NCTE in conjunction with [local] loop facilities."⁷³ By applying for a waiver of the separate subsidiary rule for CPE, a telephone company could provide NCTE as part of its basic transmission services. The problem faced by the FCC was how to keep NCTE functions competitive and not exclusive property of either the equipment manufacturers or of the regulated telephone network.⁷⁴ The FCC therefore left NCTE perched on the customer/network boundary.

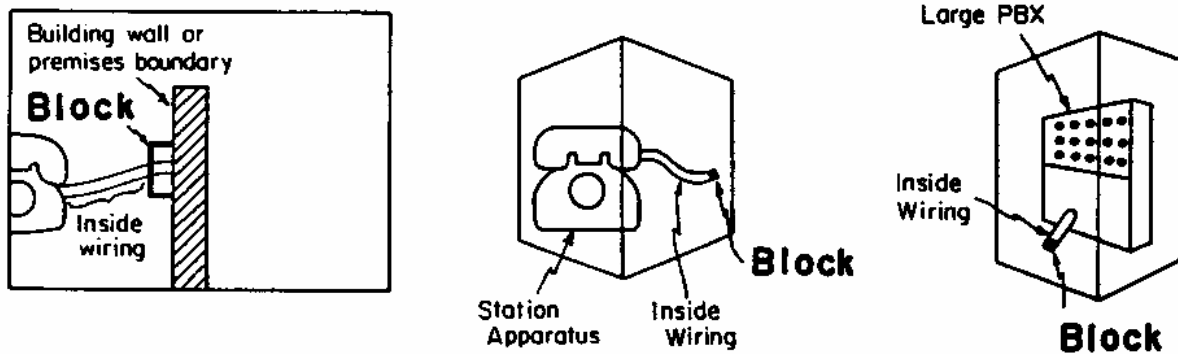
The Modification of Final Judgment changed the ownership of the network, giving⁷⁵ the regional operating companies "natural monopoly service," or the local network side of the boundary.* This regulated portion of regional company plant includes station connections while excluding the existing terminal equipment (the embedded CPE). However, the court allowed the regional companies to offer new CPE under a separate subsidiary. At the same time, the court prohibited these regional companies from providing "telecommunications products."⁷⁶ Since some CPE is extremely sophisticated, it is not clear where the line should be drawn between CPE and telecommunications products. The court added another layer of complexity to the problem of defining CPE. While various parties still battled over the Computer Inquiry II definition of CPE, the court added a new twist: How did CPE differ from telecommunications products? At stake is the boundary between regulated and unregulated businesses.

*There is controversy over whether the local monopoly still exists or whether local bypass has already destroyed (or will destroy) this monopoly.

III. Station Connections: Blocks

The block represents the network side of this customer/network boundary, also called the customer premises boundary or the demarcation point. At this boundary the traditional telephone network interconnects with inside wiring equipment somewhere on the customer's property. Traditionally, two pieces of equipment lie at the customer premises boundary. The first piece is the "protector," which shelters the live wiring connection from physical interference, such as lightning or other stray currents [Figure 9]. The second piece of equipment, the block, provides the interface, or actual connection, between inside wiring and the rest of the network. For convenience, these two types of apparatus -- protectors and blocks -- may be grouped and called a block.

To see an ordinary block, a residential customer need only look for the wires leading to the wall of his house. On the side of this wall lies the block, marking the customer/network boundary. For a business customer, the boundary may be less obvious, but the same principle applies. Figure 9 represents the most simple extreme: inside wiring consisting of one line. In general, a business customer will have numerous inside wiring lines leading to the block.



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Figure 9

Station Connections: Blocks

Block expenditures are recorded in the USOA "Station Connections" account. This account includes the traditional block equipment as well as other equipment serving this customer/network interface. The labels in Figure 9 distinguish inside wiring from blocks because the treatment of the equipment named by these two labels involves separate issues.

Originally the protector was just a simple device to connect wires from outside to inside wires, with another wire running to the ground to protect against stray currents. With advances in technology, it is now possible to locate more sophisticated functions at the block. After years of obscurity, the block has entered the limelight of high technology. For example, the block may now include testing and loop back equipment. Testing equipment enables the company operating the network to test the local loop from a remote facility. Loop back equipment allows the telephone company to make tests on its portion of the network regardless of the attachments on the customer's end. Usually the terminal equipment is seen as completing the local loop.*

As with CPE, there are problems over the definition of the block. The same questions arise over what functions are the sole province of the regulated network and what functions may be done outside the network by the customer. While it can be argued that testing and loop back functions easily fall on the network side, if digital NCTE is used in these functions, it is harder to classify the block. It, too, is left perched on the customer/network boundary.⁷⁸

Other uses of the block leave it perched on the basic/enhanced boundary. For example, it is now possible to put a multiplexer at the block. A multiplexer enables a single wire pair or a single glass fiber to carry more than one message or signal at a time. In terms of the local loop, a caller can talk on the line while someone else uses the same line to link a terminal to a computer data base: With a multiplexer, no single activity may tie up the line and exclude other activities. On a larger scale, such as in a telecommunications or computer network, a multiplexer creates subchannels or time slots, allowing "many different users to be served by the same transmission path."⁷⁹ In theory, the multiplexing function may be performed at numerous locations. In practice, the telephone industry may multiplex anywhere within its network, but legal and regulatory decisions exclude the multiplexing function from telephone industry-provided CPE.⁸⁰ In other words, some suppliers can include the multiplexing function in their CPE and some suppliers can't.

Therefore, the customer premises boundary may be a physical object, such as a building wall, or may be legally determined, such as a boundary based on what function the equipment performs. As shown above, in theory, a multiplexer can work at any number of locations, but legal considerations may restrict its use in a particular spot depending on who owns the multiplexer.

*See Index: Plant, local loop.

IIF. The Basic/Enhanced Service Boundary

In addition to the customer/network boundary, with the competitive CPE market on the customer's side, there is another border between the regulated network and competitive telecommunications markets. This border is a service border; it is different from the physical customer/network boundary. The same piece of equipment may perform multiple services. For example, the same switch may transfer both ordinary interstate toll calls or 800-number toll calls. In the first case, the customer making the call pays; in the second case, the business offering "free" calling pays.

In 1980, the same Computer Inquiry II decision which detariffed CPE also created a service boundary between the regulated telephone industry and the unregulated computer industry. The FCC created two service classifications: "basic" and "enhanced." Before divestiture, basic services fell under the traditional telephone network. Enhanced services were unregulated, and the FCC required AT&T to provide "enhanced services" through a fully separated subsidiary.⁸¹ According to this decision:

A basic transmission service is one that is limited to the common carrier offering of transmission⁸² capacity for the movement of information.

However, the FCC's definition leaves the door wide open to interpretation as to what is necessary for performing basic transmission. The FCC allows for memory or storage used in conjunction with network operations:

In the provision of a basic transmission service, memory or storage within the network is used only to facilitate the transmission of the information from the origination to its destination, and the carrier's basic transmission network is not used as an⁸³ information storage system [emphasis added].

The FCC then defined enhanced services as:

any offering over the telecommunications network which is more than a basic transmission service. In an enhanced service, for example, computer processing applications are used to act on the content, code, protocol, and other aspects of the subscriber's⁸⁴ information [emphasis added].

In spite of the FCC's attempt to draw a clear boundary, its regulators faced a problem with origins in the technology itself. While the pre-divestiture traditional network was designed as a single entity, Computer Inquiry II continued the path laid by earlier competitive decisions which invited scrutiny of individual elements of the network.

IIG. The Clash between the Regulated Telephone Industry and the Unregulated Computer Industry

Since World War II, both the regulated telephone industry and the unregulated computer industry have drawn from a common technology. For example, a cable may connect two computers within the same office building. This configuration can be viewed as a single system or the cable can be viewed as moving, or transmitting, data between the two distinct computer systems.

The clash between the regulated telephone industry and the unregulated computer industry started in the 1950s and continues into the 1980s. This section traces a major thread leading to post-divestiture battles among the regulated portions of the telephone industry, the unregulated portions of this industry, and the unregulated computer industry. In the debates at the basic/enhanced boundary, the following technical terms spring up: value-added service, packet-switching, and protocol conversion. Therefore this discussion includes explanations of these terms.

The 1956 Consent Decree marks the courts' first attempts to adjudicate the dispute as to which services were not within the province of the telephone network. In other words, the court told AT&T what was not permitted. This decree drew a legal ⁸⁵ boundary across what could be considered a common technology. While this boundary between the two industries made a political compromise possible, the boundary was arbitrary in terms of technology.

With the introduction of "value-added" services in 1973, the battle continued. The issues raised at this time* carried over into Computer Inquiry II, and into the post-divestiture service offerings.

According to the FCC,

a "value added" service . . . will take channels leased from other carriers [the traditional telephone industry] and combine them with computers and software [the computer industry] to transmit⁸⁶ data more efficiently and with less error.

*The initial cases concerned interstate services but later expanded to cover both state and interstate services.

The initial "value-added" service offering connected computers through "packet-switching technology." In Packet Communications, Inc., the FCC pointed out the differences between a packet-switched network and the conventional telephone-switched network:

Unlike the conventional telephone system, in which circuits are switched to provide an individual customer with exclusive use of a particular line or circuit, a "packet switching" circuit transmits small groups (packets) of digitized data over a network of lines to a designated recipient, usually a computer.

In other words, a packet-switching service, among others, allows computers to talk to one another over a network. This value-added service takes the signal from a computer, subdivides this signal and reformats it into packets (short bursts of information bits). These packets are forwarded over the value-added carrier's network to their destination -- another computer which reassembles the packets into a signal and sends it to the appropriate computer. In order to route the packets, a header is attached to each packet and, in some instances, a trailer also.

Packet-switching makes efficient use of the network because a single message can be broken into a number of packets, each of which can follow an entirely different transmission on the way to the final destination. This technology enables a company to balance its switching and transmission costs.

"Protocols" are the rules, or standards, which enable two computers, especially two different types of computers, to talk with one another. In packet-switching:

"Protocols" govern the methods used for packaging the transmitted data in quanta, the rules for controlling the flow of information, and the format of headers and trailers surrounding the transmitted information and of separate control messages.

Protocol conversion is the application of rules, or protocols, to data. This process enables the transfer of data between different computers, including computers using different computer languages. Large computer or telecommunications networks are essentially computers (switches, PBXs, or other equipment) linked together by some form of transmission (cable, microwave, or other forms). Therefore, protocol conversion is important for anyone sending data over these networks; this process remains the focus of many battles between the telephone and computer industries.

Computer Inquiry II placed protocol conversion under the "enhanced" classification.⁹⁰ However, this ruling was contested and, in November 1983, the FCC refined its definition of protocol conversion.⁹¹ The FCC allowed the regulated "basic" service to include certain forms of protocol conversion:

A basic switched service may properly include those forms of protocol processing which are necessary⁹² for a switched service to be offered.

The FCC continued,

This principle applies to entire calls made on a switched network (e.g., to MTS [Message Telecommunications Service] and WATS [Wide Area Telecommunications Service] calls . . .), and to individual messages which are, in essence, individual calls themselves (e.g., to packets in a packet-switched network).

However, the FCC concluded that this basic type of protocol conversion did not include aspects of enhanced protocol conversion:

these [basic] network functions . . . do not involve the creation, deletion, or modification of message information, nor subscriber interaction with stored information.⁹⁴

In cases where protocol conversion is used to "facilitate interconnection of networks" or helps the transition during the introduction of a new technology, the FCC required the telephone carrier to apply for a waiver from Computer Inquiry II's requirement -- in other words, such protocol conversion must normally be offered by a separate subsidiary.⁹⁵

Issues concerning the basic/enhanced service distinctions spilled over into the post-divestiture environment. In 1980, the FCC initiated⁹⁶ proceedings to clarify the definition of protocol conversion. In light of the pending AT&T divestiture, the FCC concluded that protocol processing is "inherent in switched transmission and is not within the definition of enhanced service."⁹⁷ The FCC also allowed the traditional industry to perform protocol conversion as part of basic transmission service in the interconnection of packet-switched networks. However, to insure competition in the data processing market, the FCC required telephone companies to file for a waiver of the Computer Inquiry II requirement that all enhanced services be offered under a fully separate subsidiary.⁹⁸ In such waiver requests, the FCC was:

prepared to act more favorably . . . in circumstances where the performance of the basic network can be improved materially only by provision of protocol processing in the network, and not where others can do so outside the network.⁹⁹

With the change in ownership, the Regional Holding Companies inherited the defense of the local network. Six months after divestiture, 14 of these operating companies filed for waivers to enable packet-switched services.¹⁰⁰

One such battle pitted the regional operating companies against the computer industry and the providers of deregulated terminal equipment. On February 14, 1984, Southern Bell filed a tariff with the Florida Public Service Commission (PSC) to provide a local packet-switching service called Local Area Data Transport Service (LADT).¹⁰¹ The arguments centered over whether this service included elements which were enhanced (and therefore should be provided under the separate subsidiary requirement) or whether these elements were an integral part of basic transmission service. Within one month, IEM asked the Florida PSC to suspend and investigate Southern Bell's tariff; within four months, IBM asked the FCC to determine whether this local service violated the requirements of Computer Inquiry II.¹⁰² The computer industry's general desire to avoid regulation played a role in computer company intervention in the local packet-switching tariffs.

The arguments in this case centered over the customer/network boundary and over the basic/enhanced boundary. The LADT customer links his terminal equipment with specialized interface which allows entry into this local packet-switched network. A multiplexing function allows the LADT customer to use the LADT packet-switching network and the carrier's voice network simultaneously.¹⁰³ Therefore all the elements discussed above surface in the controversy over this type of service: whether or not parts of this service are solely the province of the regulated network (run by the regional operating companies) or open to competition. If a function is open to competition, must the regional operating company supply it on a fully separated basis or can the company apply for a waiver of this requirement? The debates question the involvement of NCTE, the type of protocol conversion (if any), and the treatment of the multiplexing function.

In November 1984 the FCC approved a partial waiver of the Computer Inquiry II separate subsidiary rule enabling 14 regional operating companies directly to provide limited protocol conversion. These companies can now offer protocol conversion to send packet-switched information from the LADT to long distance carriers such as Telenet or Tymnet. The FCC postponed making a decision on the provision of protocol conversion from the

asynchronous mode used by most personal computers to the packet-switched standard for local service.¹⁰⁴

For clarity this discussion separated the customer/network issues and the basic/enhanced issues. In reality, these two issues walk hand in hand. Equipment performs a service, so any battle fought on one front spills over into the other. The battle over local packet-switching service therefore includes questions on the role of NCTE, equipment involved in the customer/network controversy.

III. The Court and Separate Subsidiary Requirements

The Modification of Final Judgment increased the complexity and the number of battles over the control of telecommunications/computer technology. After divestiture, the question arose whether Computer Inquiry II's separate subsidiary requirement for enhanced services should be applied to the regional operating companies. The FCC initiated proceedings to determine whether the conditions established in Computer Inquiry II and in Cellular Communications Systems* applied to the post-divestiture regional companies.¹⁰⁵ While these regional companies had already set up fully separated subsidiaries to handle new CPE, the treatment of their enhanced services remained ambiguous.

It is questionable whether the definitions of the Modification of Final Judgment match those in Computer Inquiry II. In its inquiry into the treatment of regional company enhanced services, the FCC states:

It is not clear that the scope of "information service" [as defined by the MFJ] is congruent in all respects with our Computer II definition of enhanced services The BOCs may be of the opinion that there are certain enhanced services that they could provide under Computer II¹⁰⁶ which would not be barred under the [MFJ].

The court also created an additional twist to the battles between the regulated monopoly and the competitive market. In the Modification of Final Judgment, the court restricted the products¹⁰⁷ and services offered by the regional operating companies. In order to enter markets not specified by the Modification of Final Judgment, a regional company must petition the court.¹⁰⁸ In the months immediately following the divestiture, the regional companies requested that the court waive its "line of business" restrictions for various services proposed for local (intraLATA) operations.¹⁰⁹ Some of these services were related to telecommunications and some were not.

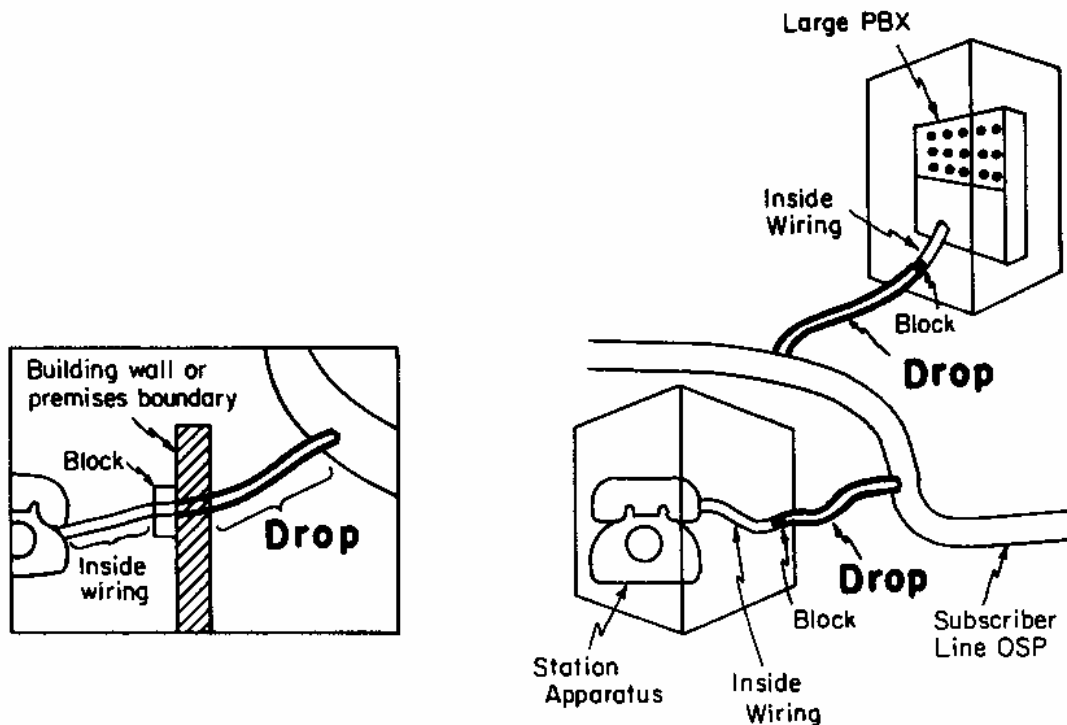
*See Index: Services, cellular.

They included equipment leasing, software programs, and real estate transactions and investments. The regional company waivers asserted that these new "lines of business" would be offered by a separate corporate entity. This approach avoids the court's fear that a regional company "could use its monopoly power to impede competition in the market it seeks to enter."

With the active entry of the court, the Department of Justice, and Congress, there are more players in the telecommunications field. Rules which applied to the earlier monopoly no longer hold true. The introduction of regulated competition has swelled the ranks, producing a mix of regulated and unregulated competitors. Federal and state regulators are in open conflict on issues ranging from the price of access into and out of local operating networks to the length of time required to depreciate equipment. And everyone has to take a closer look at what everyone else is doing.

II I. Station Connections: Drops

Outside the customer/company boundary, called the premises boundary, the drop connects the block to the next part of the network. Figure 10 suggests the most literal interpretation of "drop" -- a pair of electrical wires running from the building to the nearest cable, strung on a pole, or buried underground in a conduit. Other forms of connection are possible: satellite dishes (microwave) or laser beam detectors (light transmission) can be part of or bypass entry into the telephone companies' wires or optical fibers.



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Figure 10

Station Connections: Drops

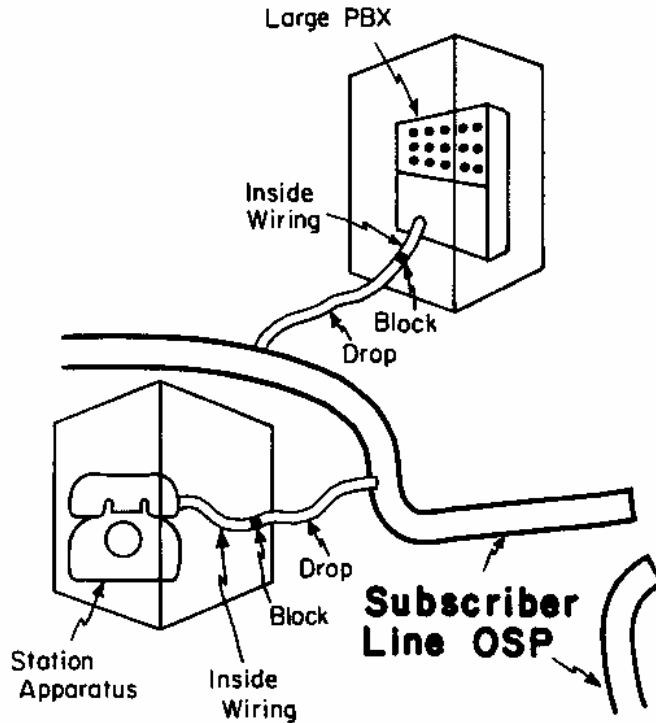
In the traditional industry's accounting system, the USOA, the Station Connections Account contains expenditures for inside wiring, blocks, and drops. With the introduction of competition and the pressure for deregulation, it has become necessary to identify specific portions of the Station Connections Account. The lumping together of inside wiring, blocks, and drops ignores the reality of the competitive environment.

III. Subscriber Line OSP

The traditional drop wire carries the call to cables running along poles or to cables underground. A typical copper cable contains many wire pairs, each entering from the station connections along the route. These cables are referred to as subscriber line OSP, where "OSP" stands for "outside plant," namely the portion of the plant out in the streets instead of inside the buildings [Figure 11]. New applications of existing technologies -- multiplexers and associated "carrier transmission" methods -- increase the capacity of the traditional wire cables.

The basic subscriber line OSP function is to transport signals from the customer premise location to the first switch of the network. The plant investment for this function is relatively large -- making local bypass (avoiding the use and, if possible, the costs of this portion of the plant) attractive to customers with large amounts of local use. This large investment has made subscriber line OSP the focus of major historical and contemporary battles over costing and pricing of telephone service.

"Outside Plant" is a term used in the Separations Manual to designate this type of plant. This manual specifies how to determine which OSP costs are under state regulation and must be recovered from state services and which OSP costs are under federal regulation and must be recovered from federal services. The manual divides the OSP category into three subdivisions: subscriber line, exchange, and interexchange OSP. The "subscriber line OSP" label refers to the lines which run between a customer's location and the first switch of the network.



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Figure 11

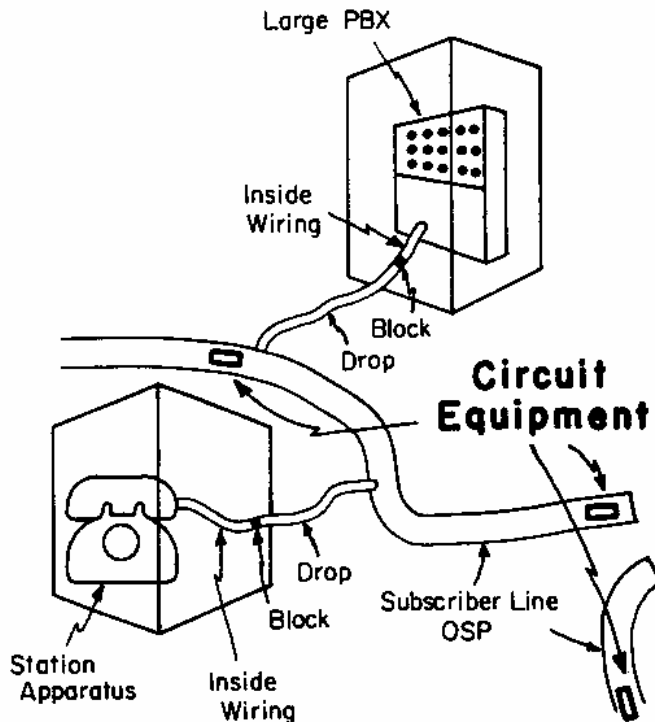
Subscriber Line OSP (Outside Plant)

Alternatives to the traditional network have already sprung up, including CATV coaxial cables, cellular microwave systems and lightguides. Microwaves are carried through the air. If a fiber optic lightguide replaces a wire cable of equal physical size, transmission capacity may be increased a millionfold.

I.K. Circuit Equipment: Outside Plant

Along the route of the subscriber line, attached equipment may enhance or modify the signals which convey the customer's call. This equipment includes amplifiers, equalizers, concentrators, and multiplexers. For example, as the signals travel over a wire, they eventually weaken. Amplifiers, placed along the wire, overcome this weakening. Equalizers compensate for distortions in the signal and maintain the original frequencies in the signal.

In Figure 12, this equipment is labeled "Subscriber Line Circuit Equipment." This illustration underlines the arbitrary nature of assigning plant to categories. The labels in Figure 12 reflect assignments which have been determined by political and legal as well as technical considerations.



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Figure 12

Circuit Equipment: Outside Plant

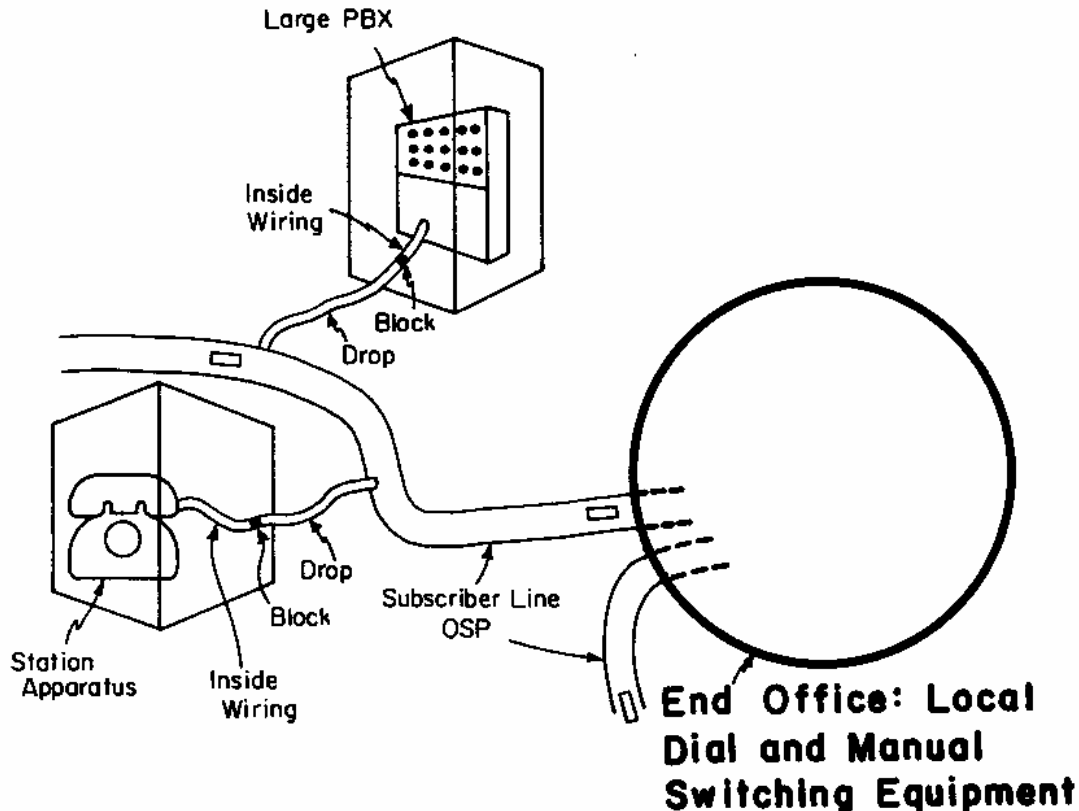
"Circuit Equipment" is a term from the Separations Manual to designate sending and receiving the signals. In all forms of transmission, the need for circuit equipment varies with the type of transmission equipment, as in CATV coaxial cables or in fiber optic lightguides or in copper wire cables.

Some circuits may include concentrators. This type of equipment can bundle and unbundle messages for transmission. In this respect concentrators resemble the multiplexers in the "Station Connections" grouping. Concentrators can also route messages; in this respect concentrators resemble switches. However, subscriber concentrators are outside plant in the literal sense of being out in the streets. Therefore, concentrators may also be viewed as circuit equipment.

III. End Office Switches

Whether a customer's outgoing call travels over a line or through the air, its destination in the traditional telephone system is a switch, called the serving switch.

The industry calls such a switch an end office switch, or a class 5 switch [Figure 13]. The Separations Manual calls these switches "Local Dial Equipment" or "LDE." The same building may house one or more end offices as well as other switching functions, such as toll (interexchange) switching.



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Figure 13

End Office Switches

Most of the switches are automatic; the customer's call is switched by a machine. Other types of equipment enable human intervention in the switching process. The Separations Manual refers to this operator-assisted switching equipment as "Manual Switching Equipment." This category includes the sophisticated processing systems and work centers associated with operator-assisted calls. Either type of switch connects the customer's

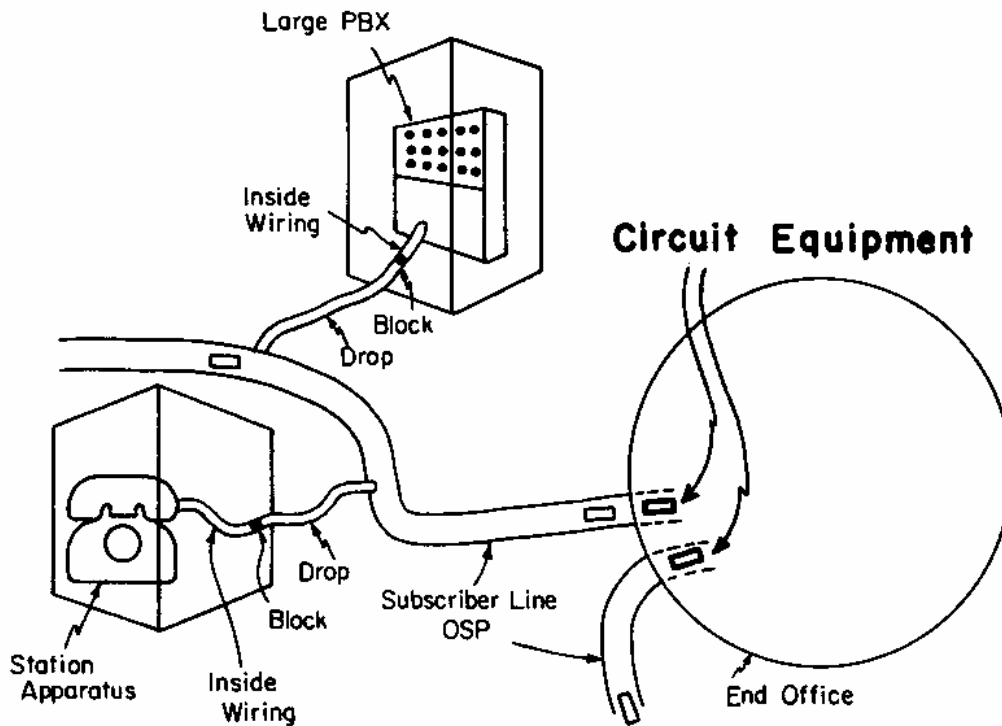
telephone either to another building along the same cable (Subscriber Line OSP) or to a destination beyond.

The class 5 switch, or LDE, is the focus of major battles among competing long haul suppliers. These battles are over the nature and terms of their access to customers. In addition to access, there are battles over who will supply switching services. The following examples illustrate switches that may be owned by AT&T, the local operating company, a customer, an intermediate company between the customer and the traditional industry, or a variety of competitors:

1. Some CATV head ends -- which transmit signals -- contain switches.
2. Individual customers may purchase PBXs which are large switches located on the customer's property.
3. Many companies provide switching for computer data.
4. In some cases, the end office switch provides local switching (exchange) to customers as well as Centrex[®] service. Centrex service provides fewer features to use in making calls than many PBXs located on the customer's premises. How far the local operating companies may "enrich" the Centrex switching is an issue.^{1,2} For the customer actually making a call, the Centrex-processed call is indistinguishable from the equivalent PBX-processed call.

IIM. Circuit Equipment Within the End Office Building

The building containing the end office switch may also contain subscriber line circuit equipment at the connection between the OSP line and the switch [Figure 14]. This circuit equipment may be an integral part of the switch or may be separate from the switch.



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Figure 14

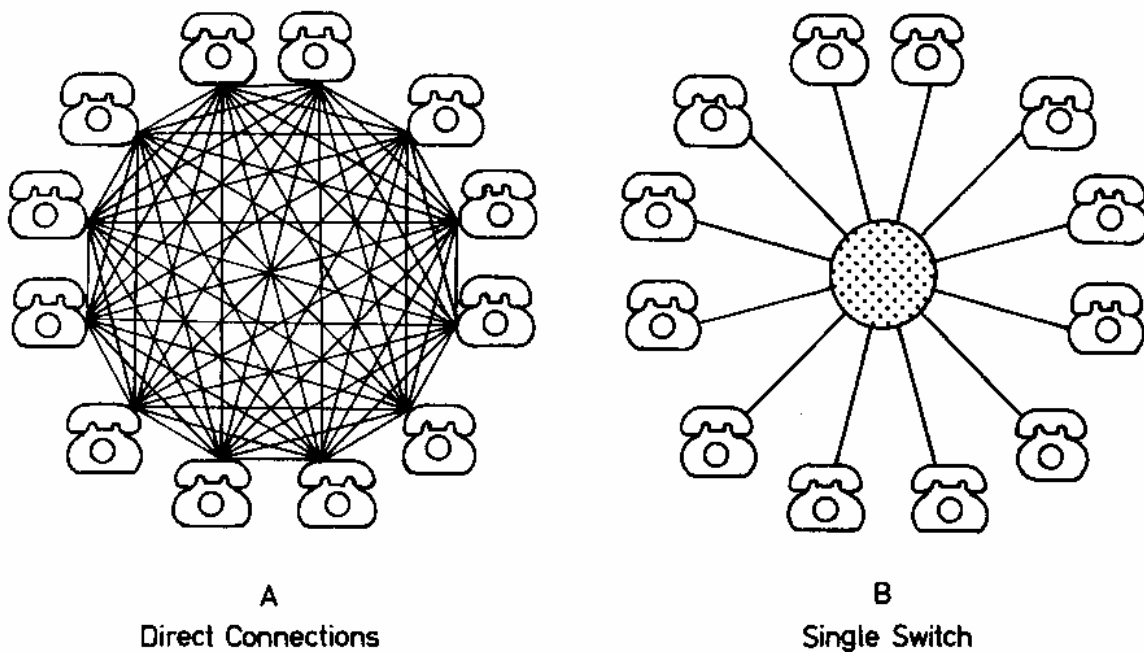
Circuit Equipment: Within the End Office Building

During the early development of the telephone, "local loop" literally meant a wire running from the end office to the customer's telephone and back to the end office. The loop included both the telephone and the wire. Because the wire doubles back, it is referred to as a wire pair. This idea of a continuous loop formed by a pair of wires and a telephone remains only as a metaphor. In telephone industry jargon, "local loop" generally refers to the subscriber line OSP and its associated circuit equipment, drops, and blocks.

IIN. The Pre-Divestiture Switching Hierarchy: First Switch in the Network

In an ideal network, once a call reaches the first switch, the call should be able to reach any other terminal in the network. Traditional telephone industry network design made it possible for any end terminal to reach all other end terminals. However, this ability to reach all other terminals does not mean all terminals have direct links between one another. For example, connecting 12 telephones directly to each other would

require 66 lines [Figure 15A]. Hooking up every telephone directly to every other telephone in the United States would be absurd, requiring 10 million billion connections. However, if you use a switch to connect any one of the 12 telephones to any other telephone, you only need 12 lines, each line running from a telephone to the switch [Figure 15B]. In its simplest conception, such a switch permits only one conversation at a time. Part of the art of engineering real-life switches is to enable enough conversations to go on simultaneously. Otherwise, when one caller uses the switch, the remaining customers trying to make calls receive a message that no circuits are available and must try redialing the call. Or, if the switch is over-engineered, most of it remains idle and adds an unnecessary cost to the telephone bills.



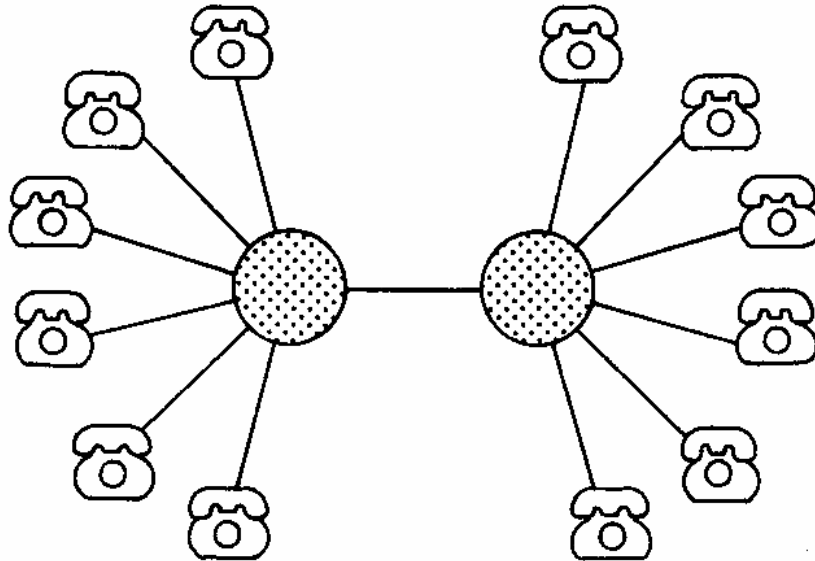
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Figure 15

Connections Between Telephones: Direct versus a Single Switch

In the pre-divestiture traditional industry, the end office switches (also called Class 5 switches) performed this initial terminal connection. However, this arrangement of a single central switch may not be economical, depending on the number of telephones, the amount of traffic, or the distance between the telephones. The switches themselves have physical limitations and can only handle a certain number of telephones. If there is too much traffic, the customers may be able to make their calls,

but it takes longer to make connections. When several of the telephones are a long distance away from the rest, stringing multiple wires from these telephones to the first switch is economically inefficient. In each of these examples, the problem may be solved by using two or more switches [Figure 16]. In this solution, each telephone hooks up with only one switch; however, a single link runs between two switches. Each switch handles fewer telephones and has less traffic. The distance between the telephone groups is then covered by a single link instead of multiple links.



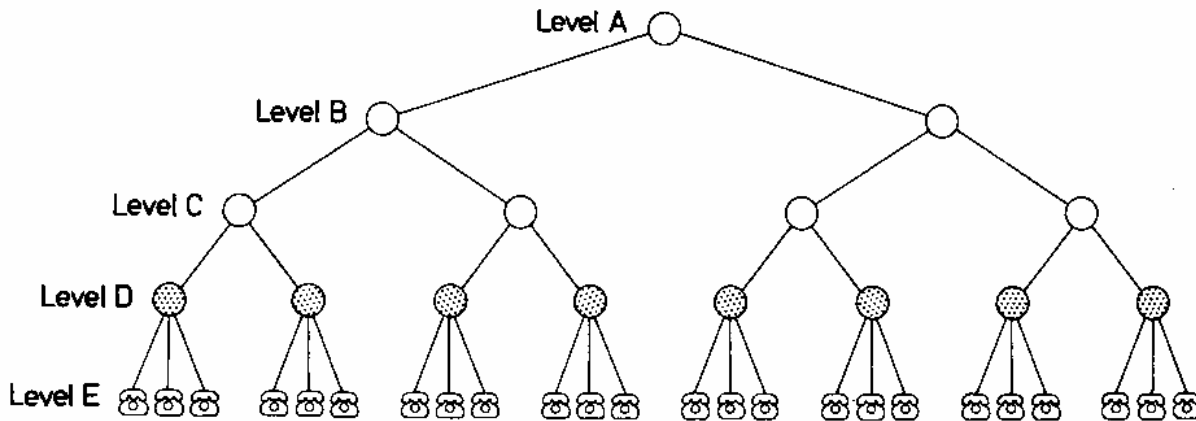
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Figure 16

Connections Between Telephones: Two Switches

II.0. The Pre-Divestiture Switching Hierarchy: Switching Levels

Just as it is absurd to connect all telephones directly, it is equally absurd to hook up all end office switches to one another. As of 1982, pre-divestiture AT&T had nearly 10 thousand end offices. Direct hookups would require almost 50 million connections. In the same manner that one switch may connect many telephones and reduce the number of lines between telephones, one switch may connect many switches and reduce the number of lines between switches. The switch which connects only other switches and not end terminals is considered a higher ranking, or a higher level, switch. In Figure 17, level E switches represent switches connecting terminals. Switches above level E have direct connections only to other switches, not to terminals.



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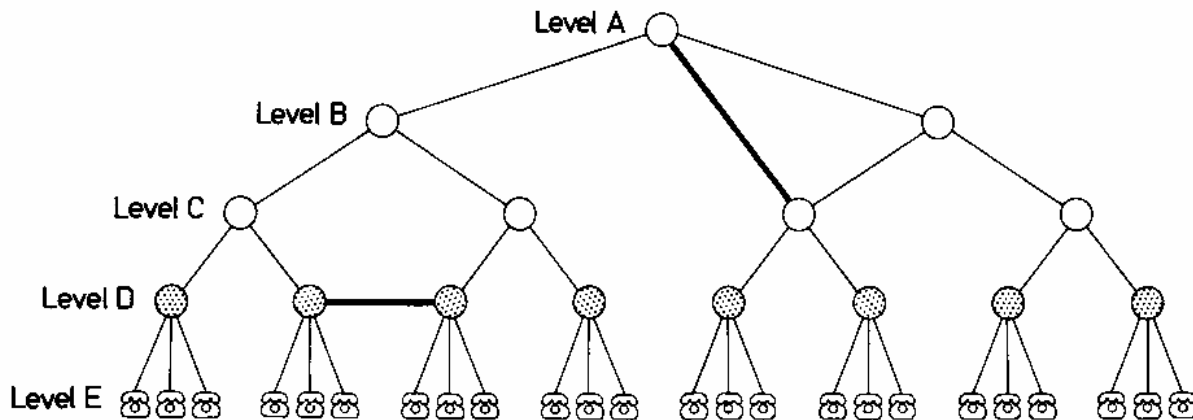
Figure 17

Hierarchical Routing

In a strict hierarchy, the bottom level can only reach the level above it; the top level can only reach the level below it. In the intermediate levels, each level has connections to the level directly above and to the levels directly below. As you move up levels in the hierarchy, the number of switches at each level decreases until you reach a single switch at the top. In this configuration, all end terminals may reach one another, but not all points (terminals and switches) are directly connected.

Each additional hierarchical link between two terminals may degrade the quality of the connection or add to cost. The art of network engineering is to balance these factors against the cost of too many direct connections.

Prior to divestiture, the traditional telephone industry's network was neither strictly hierarchical nor strictly composed of direct terminal connections. Over heavily traveled routes, having direct connections makes more sense than routing this traffic through numerous switches. These routes may connect switches at the same level, such as two switches at level D, or these routes may connect switches at different levels, such as a switch at level A and a switch at level C [Figure 18]. In the traditional industry, the use of a hierarchy insured last resort routing. If a call couldn't travel the route using the least number of switches, the call traveled up the hierarchy through increasingly higher level switches. Eventually the call reached a level where it was routed down through decreasingly lower-level switches toward its destination at a terminal.



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Figure 18

Routing Connections Between Levels
in the Traditional Industry

At the highest switching level, the traditional industry's routing differed from the strict hierarchy. The traditional industry had 12 top-level switches for North America rather than a single switch. Each of these 12 switches had a direct link to the 11 other switches.

IIP. Extremes in Size of Local Service Area

Small towns, such as Lubec, Maine, have a relatively small amount of calling. In fact, one switch handles all the calls made within the borders of Lubec and its neighboring towns, Trescott and Whiting [Figure 19A]. The local service for this three-town area is called "exchange service." The switch providing connections for this local service area is called an end office switch or a class 5 switch. This type of switch performs the lowest level switching functions in the telephone industry's switching network. All the terminals within the Lubec local service area have direct connections with the Lubec end office switch.



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Figure 19

Extremes in Size of Local Service Area

However, larger metropolitan areas require two or more end offices to handle the larger number of telephones, the high volume of traffic, or the relatively large distances. The Atlanta, Georgia, local service area covers 3131 square miles compared to the Lubec local service area's 118 square miles [Figure 19B]. The Atlanta local service area is geographically the largest in the United States, contains numerous end offices, and serves a densely populated urban community, while the Lubec local service area has one end office and serves a sparsely populated rural community. These represent extremes in local service areas.

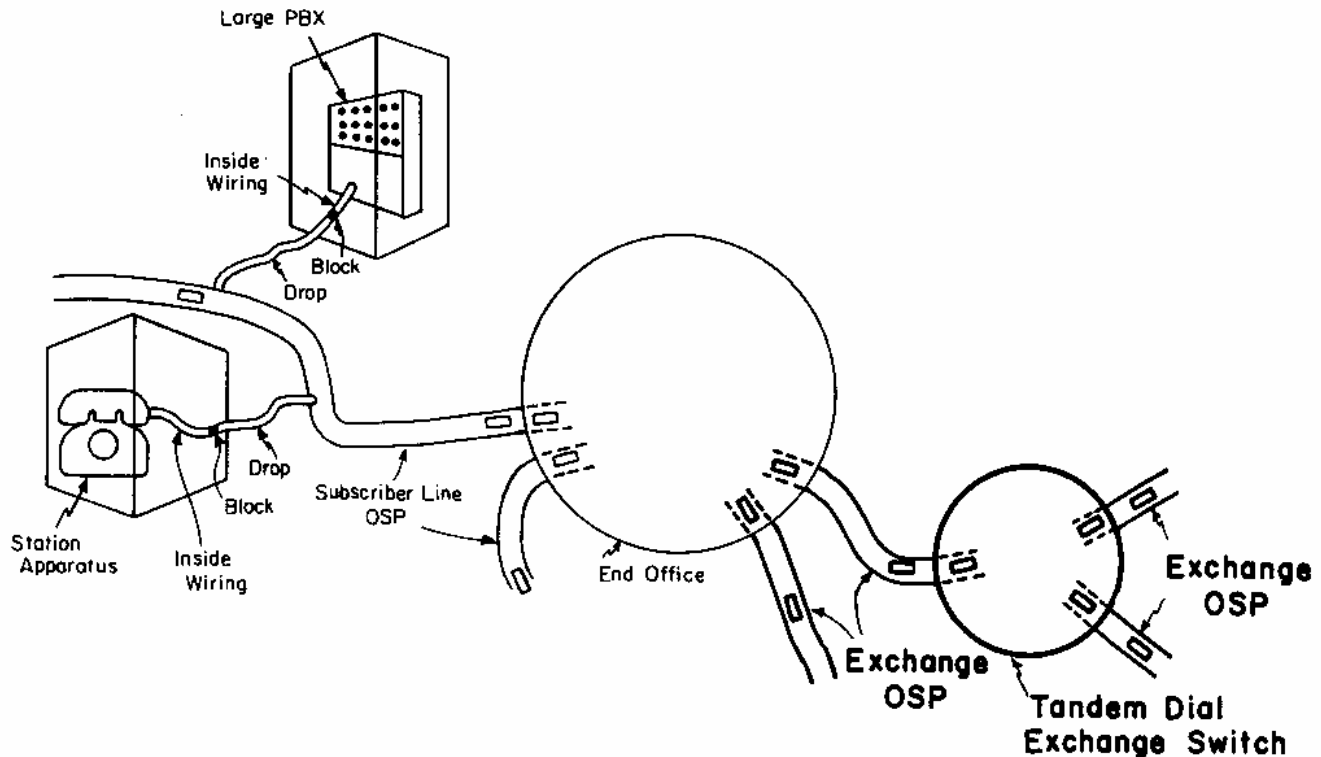
IIQ. Tandem Dial Exchange

To route calls within a local service area that contains several end offices, the switching network may require a higher

level switch to connect these end offices. In the traditional industry, the switch handling the next level up for local service is called a tandem dial exchange switch or a local tandem switch [Figure 20]. According to AT&T's Reorganization Plan of 1982:

Local Tandem Switching Systems provide a point of concentration for traffic within an exchange and make it possible to interconnect all of the serving end offices in an exchange without the use of direct trunks between each of these end office.

In this series of volumes, the term "Tandem Dial" is from an AT&T filing identifying various plant functions with their costs. This category lumps together several Separations Manual categories.* In the AT&T filing, the tandem dial exchange equipment is only a portion of a larger category called "Tandem Dial."



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Figure 20

Tandem Dial Exchange Plant

OSP and circuit equipment connect tandem dial exchange switches either to end offices or to other tandem dial exchange switches. Exchange OSP equipment and exchange circuit equipment perform the same functions as their local loop counterparts. In

*See Appendix A, pp. 88-95 of this volume for separations categories included in the Tandem Dial Label.

Figure 20 the term "exchange" refers to a function rather than to physical reality. In the actual operating plant, local loop and exchange functions may coexist in the same buildings, cables, or switches. The general term used for a direct connection between two switches is "trunk" or "trunk group."

After divestiture in 1984, the exchange portions of tandem dial, OSP, and circuit equipment became part of the equipment providing service within newly created Local Access and Transport Areas (LATAs).^{*} Divestiture opened the door for redefinitions of existing exchange services and of their relation to other services within the LATAs. The regional operating companies providing the intraLATA services needed to reconfigure their existing equipment and routing to meet the needs of both the local customers and the customers wanting access into and out of the LATA.

Eventually, some of the intraLATA equipment may be superseded by ground-based cellular mobile radio systems, microwave (satellite) systems, or lightwave (laser) systems. Well before divestiture and the creation of LATAs, the groundwork had been laid for developing cellular land mobile radio systems. In 1974, the FCC allocated frequencies for the development of cellular service.¹¹⁶ Later, the United States Court of Appeals for the District of Columbia would define land mobile service in general as:

a system in which one station is mobile (either portable or in a car) and the other station is either a normal telephone or another mobile unit.¹¹⁷

The court then compared conventional and cellular land mobile technology:

Conventional land mobile services use a single high-power transmitter in a given metropolitan area and possess a maximum capacity of 44 channels. By contrast, cellular radio . . . divides a metropolitan area into several "cells." In each cell a low-power transmitter carries up to 666 channels. As a telephone-equipped automobile or other vehicle travels from one cell to another, the transmission of the conversation is shifted from one transmitter to another. By virtue of the greater number of channels and the ability to shift transmission, cellular radio enjoys enormous advantages in both capacity and signal quality over conventional systems.¹¹⁸

In 1975 the FCC allowed both wireline carriers (local telephone companies and their affiliates) and non-wireline carriers (virtually everyone else in the telecommunications

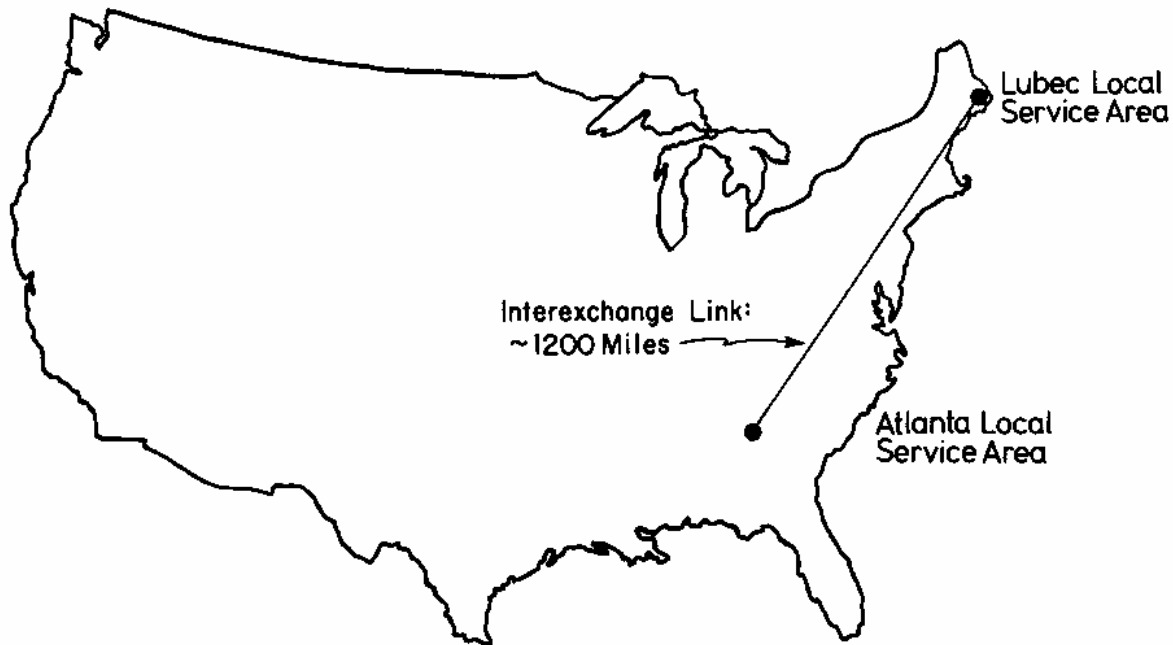
^{*}See Index: Service Areas, LATAs.

industry) to provide cellular service.¹¹⁹ In 1981, the FCC created two licenses for each cellular market area, one for wireline carriers and one for non-wireline carriers.¹²⁰ A year later, cellular applications were filed for the 30 largest U.S. markets. Starting on November 8, 1982, the filings for smaller markets followed in groups of 30.¹²¹ In each market, the wireline carriers (the traditional industry carriers) received their licenses while the non-wireline carriers battled for their licenses. The FCC provided different procedures for granting non-wireline licenses. In the 30 largest markets, non-wireline licenses would be granted in comparative hearings among the applicants. Lotteries would be held for the non-wireline carriers in the smaller markets.

The competitive nature of these markets led to battles over more than just the licenses themselves. To prevent cross-subsidization between cellular and regular telephone (wireline) services, the FCC required AT&T's cellular operations to be handled by a fully separated corporate subsidiary.¹²² Upon divestiture, AT&T turned its cellular operations over to the Regional Holding Companies, creating seven separate subsidiaries -- one for each region.¹²³ The FCC also required the wireline carriers to provide resale of cellular services to non-wireline carriers. Thus, the FCC created two tiers of competition, one tier between the approved licensees in each market (wireline and non-wireline) and another tier between the wireline carrier and its own services as marketed by the non-wireline carrier.¹²⁴ Additional battles arose over whether the wireline services could get a "head start" by building and operating facilities in advance of the non-wire carriers.¹²⁵

IIR. Tandem Dial Interexchange

Up to this point, our discussion primarily covered the equipment and the switching hierarchy used in the provision of local service. The traditional telephone industry defined calls made between local service areas as interexchange, or toll, calls. When a customer makes an interexchange call, the interexchange carrier provides the interexchange link between the two endpoints. Prior to divestiture, AT&T Long Lines Department handled interexchange calls between states (interstate toll) and each BOC handled interexchange calls within its own state (state toll). Each end point of an interexchange call lay within a local carrier's territory -- in this case a BOC local service area. The local carrier provided a link between the interexchange carrier and the customer's endpoint. For example, the equipment providing the connection between the Lubec and Atlanta local service areas provided interexchange interstate service [Figure 21].



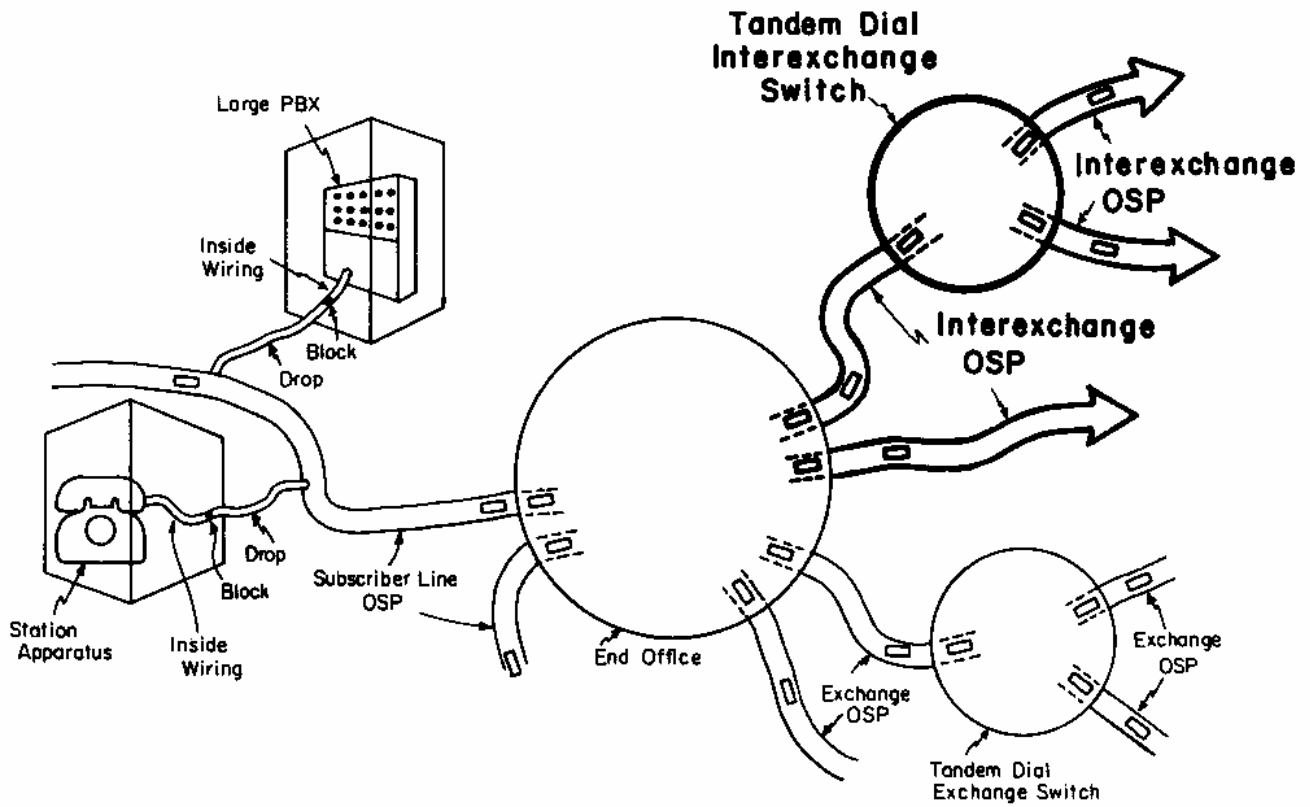
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Figure 21

Links Between Local Service Areas

The end office (class 5) switch, which provides local service, hooks up with a tandem dial interexchange (class 4) switch. This interexchange switch, and the OSP and circuit equipment associated with this switch, provide the link between local switching equipment and the interexchange (toll) switching hierarchy [Figure 22].

The hierarchy of switches in the interexchange network can be functionally separate from the hierarchy of switches within a local service area. There are two divisions of tandem dial switches: exchange and interexchange. Therefore, the tandem dial exchange switches, described on the previous pages, are excluded from this discussion on the interexchange switching hierarchy. In this volume, the term "Tandem Dial" includes switching equipment for the switches one step above the end office. Tandem dial switches which connect end offices (class 5 switches) within a local service area are called tandem dial exchange switches. Tandem dial switches which connect end offices to the interexchange network are called tandem dial interexchange (class 4) switches. In general, the term "tandem" refers only to local switches. However, the AT&T filing which provides the cost data used later in this volume combined local tandem switches and the lowest level interexchange switch under the same tandem heading.

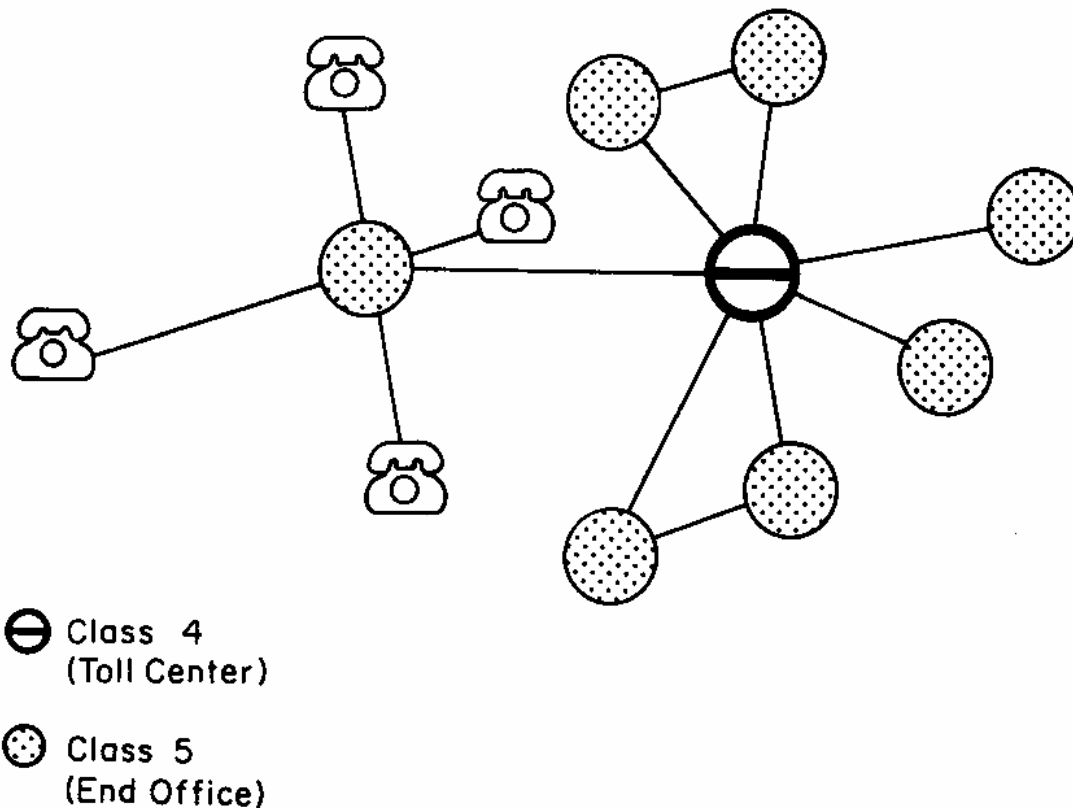


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Figure 22

Tandem Dial Interexchange Plant

Direct links between two switches in the network, whether local or interexchange, are called "trunks" or "trunk groups." The interexchange OSP equipment and the interexchange circuit equipment perform the same functions as their local loop and exchange counterparts [Figure 22]. Figure 23 shows end offices centering on a class 4 switch, also called a toll center. Interexchange calls often involve over-the-air transmissions, such as with ground-based or satellite microwave systems. In this type of transmission, the OSP line is eliminated and all the circuit equipment may be concentrated at the transmitters and the receivers. The switch might be in the satellite instead of in a ground location.



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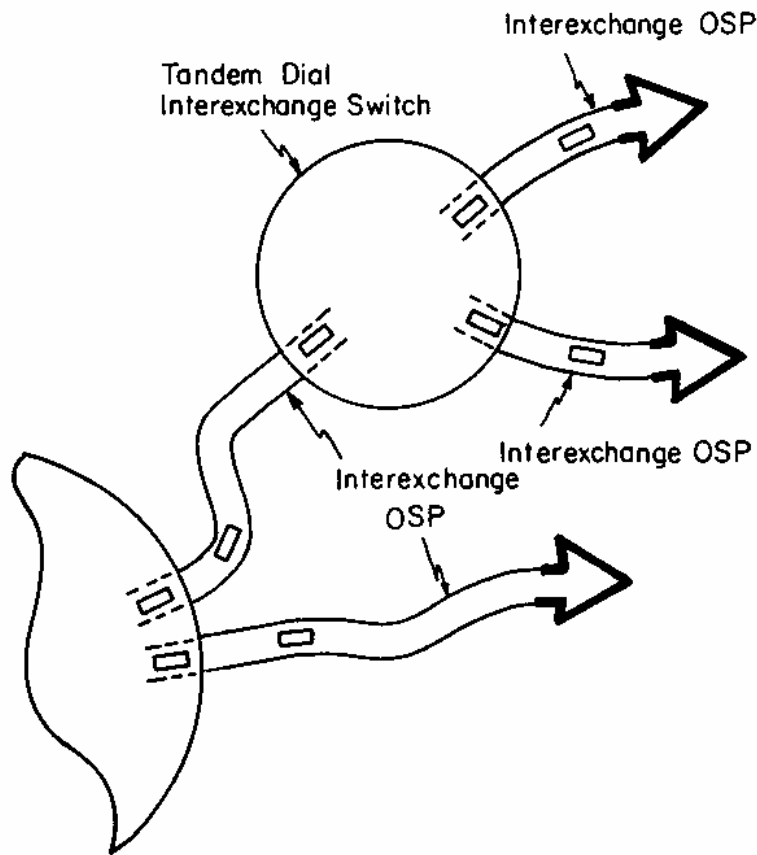
Figure 23

End Offices Centering on a
Class 4 Switch (Toll Center)

IIS. The Pre-Divestiture Interexchange Switching Hierarchy

The boldfaced arrows in Figure 24 only suggest the remaining interexchange plant. This remaining plant is a tandem switching system -- a system of switches connected by trunks. This system

includes circuit equipment, along with copper cable, coaxial cable, glass fiber, terrestrial microwave and satellite links. The switches in this portion perform switching functions above the toll center (class 4) level.



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Figure 24

The Interexchange Network

A call traveling through the interexchange hierarchy, from the lowest level to the highest level, progresses in the following manner:






end toll primary
terminal --> office --> center --> center -->

sectional regional
center --> center

The toll center (class 4) switch can mark the entry of the call into the interexchange network. In reality, a call seldom travels through each step of the hierarchy because the goal is to

use as few switches as possible in routing. This results in keeping as much traffic as possible in the lower levels.

Figure 25 shows the symbol, the level, and the number for AT&T's pre-divestiture switches, both exchange and interexchange. The numbers represent actual switching machines. When the same machine performs more than one level of switching, it is counted only once in the total for its highest level. For example, often a class 4 switch performs, or shares, class 5 functions. This switch is included in the total for class 4 and excluded from the total for class 5.

Symbol	Type of Switch	Number of Switches, Pre-Divestiture AT&T, 1982
	Regional Center (Class 1)	10
	Sectional Center (Class 2)	53
	Primary Center (Class 3)	158
	Toll Center* (Class 4)	575
	End Office (Class 5)	9811

*Toll centers include both "toll centers," which can handle operator services, and "toll points," which cannot.

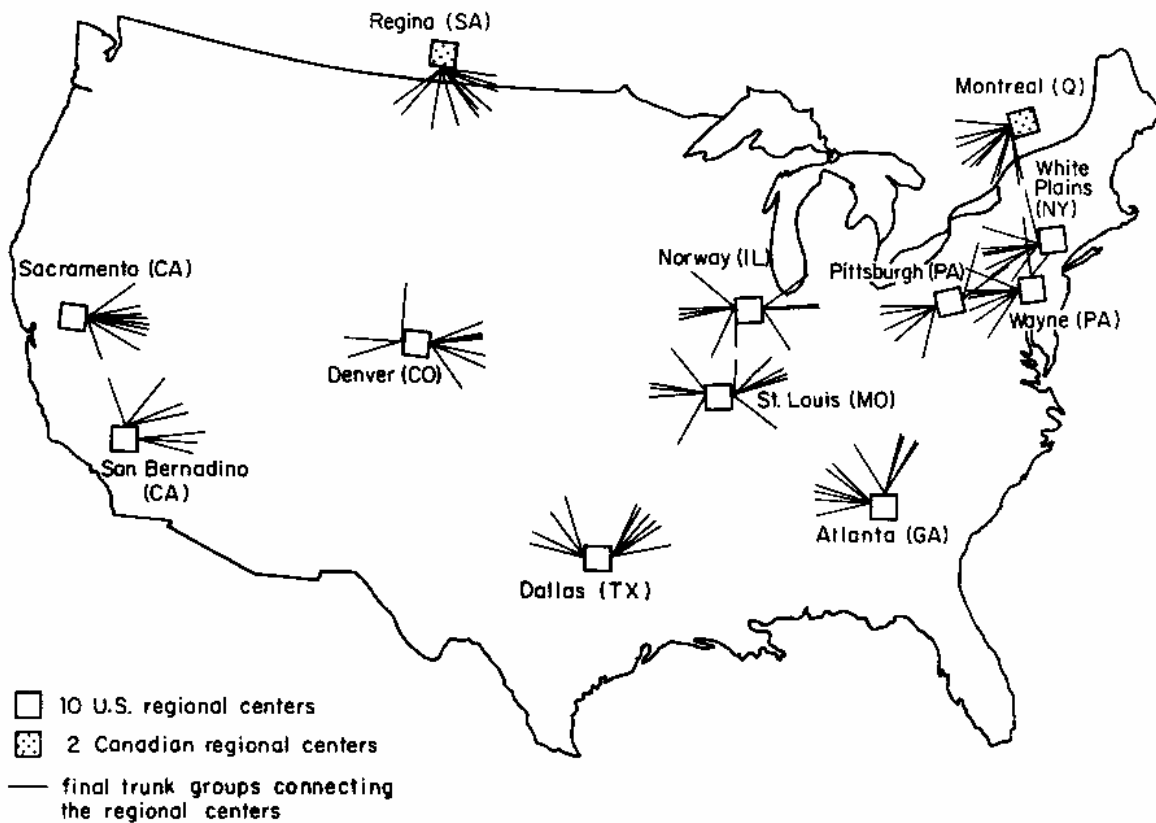
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Figure 25

Pre-Divestiture AT&T Switching Hierarchy

The pre-divestiture interexchange network was not a strict hierarchy. For instance, 12 switches are at the top level and not just one switch. AT&T owned and operated 10 of these regional centers (class 1); two other regional switches are under Canadian ownership [Figure 26]. Each regional center has a

direct connection with every other North American regional center. AT&T retained its 10 regional switches upon divestiture.



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Figure 26

The Twelve North American Regional Centers, 1983

IIT. Shared Switches

Many higher-level interexchange switches also were equipped to perform end office, or local, functions. Even the 10 pre-divestiture AT&T regional centers (class 1) performed lower level interexchange switching functions, but no end office (class 5) operations. Figure 27 shows the number of shared switching machines in the pre-divestiture AT&T in 1982.

Type of Switch	Number of Switches, Pre-Divestiture AT&T, 1982	Number of Shared Switches, Pre-Divestiture AT&T, 1982
Regional Center (Class 1)	10	-
Sectional Center (Class 2)	53	1
Primary Center (Class 3)	158	39
Toll Center* (Class 4)	575	424
End Office (Class 5)	9811	-

*Toll Center includes both "toll centers," which can handle operator services, and "toll points," which cannot.

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Figure 27

Pre-Divestiture AT&T Shared Switches, 1982

This sharing of switching functions within machines presented problems upon AT&T's divestiture of the BOCs. The sharing complicated the assignment of switches to their new ownership. The antitrust settlement divided the network among AT&T and the newly created Regional Holding Companies. This division assigned previously shared equipment to a single company, either AT&T or to a Regional Holding Company. For example, in 1982, 424 class 4 switches also performed class 5 functions. After divestiture the regional companies retained all the switches which performed solely class 5 functions. In cases where the same physical switch performed both class 4 and class 5 functions, the regional companies retained the switch. The remaining class 4 switches were assigned on the basis of use. Not all of these previously interexchange switches went to AT&T because the antitrust settlement redefined the notion of interexchange. What the settlement refers to as "exchange" and "interexchange" became known as "LATA" (Local Access and Transport Area) and "interLATA."*

*See Index: Service areas, LATAs, definition.

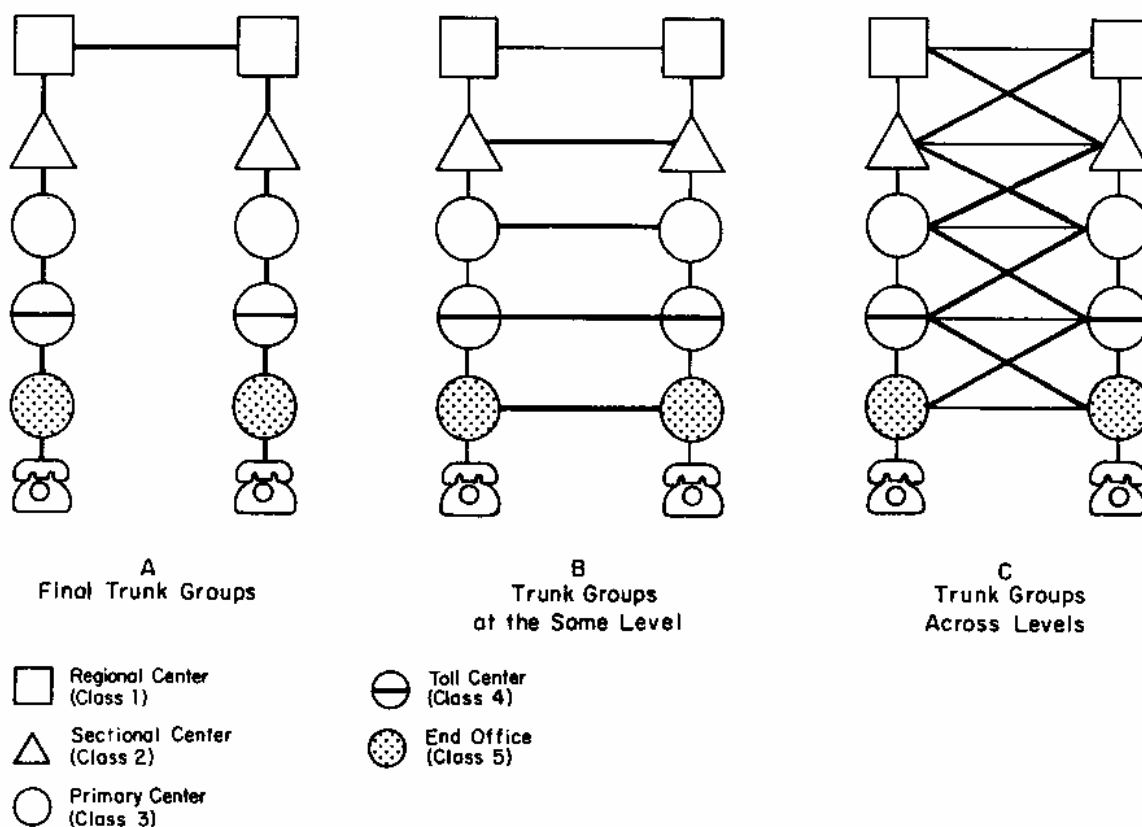
The settlement created LATAs which are larger than the previous local service areas. The settlement gave intraLATA traffic to the regional companies and interLATA traffic (both within a state and between states) to AT&T. Therefore, some of the traffic which was state interexchange (toll), and handled by regional company class 4 switches, became part of the intraLATA traffic. The remaining state interexchange traffic became interLATA traffic, handled by AT&T switches.* Switches which handled predominantly intraLATA traffic went to the regional companies; switches which handled predominantly interLATA traffic went to AT&T.

Given the new LATA divisions and the ownership of the shared switches, AT&T needed to divide its switches along the new ownership lines. The AT&T Plan of Reorganization gives details on the AT&T and Regional Holding Company post-divestiture ownership of the switching system. For example, 12 large metropolitan areas contain more than one large multifunction tandem switching system. Portions of these multifunction switches are essential for handling the large amounts of local traffic. While other switches were divided between AT&T and the regional companies on the basis of predominant use, these 12 multifunction switches were assigned on a different basis. To meet their local calling needs, the regional companies received more of these tandem switches than they would have on the sole basis of predominant use. These metropolitan areas were: Atlanta, Boston, Chicago, Dallas, Detroit, Los Angeles, Miami, Newark, New York, Philadelphia, San Francisco, and Washington, D.C.

IIU. Trunk Groups

It took at most 11 links to connect any two terminals within the traditional industry's network. Not counting the hook up of the terminal with the end office (class 5) switches, it takes at most nine links (nine connections) to route a call [Figure 28A]. The trunk groups -- that is, direct links between two switches in the network -- in Figure 28A are called final trunk groups because they continue directly through the switching hierarchy.

*LATA corridor exemptions allowed the regional companies to offer some interstate interLATA traffic. See Index: Service



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Figure 28

Trunk Groups

Since the traditional industry's network was not a strict hierarchy, the network included links other than the final trunk groups. Whenever possible, the system routed calls over trunks providing the most economical alternative to this final trunk group routing. There are trunk groups between switches at the same level [Figure 28B] or across levels [Figure 28C] on heavily used routes. The real-life configuration between any two switches is based on the amount of traffic and the economics of providing alternate routes. Figure 28C depicts some, but by no means all, of the possible connections between two network switches. For example, a trunk may directly connect a class 4 and a class 2 switch.

The trunk groups across levels enable a call to use as few as three links (or one link not counting the hook up of the terminals). These links also provide routing flexibility when portions of the network are unavailable due to traffic tie ups, such as those which occur on Christmas Day; due to natural

disasters, such as fires or hurricanes; or due to man-made emergencies, such as the accident at the Three Mile Island nuclear plant.

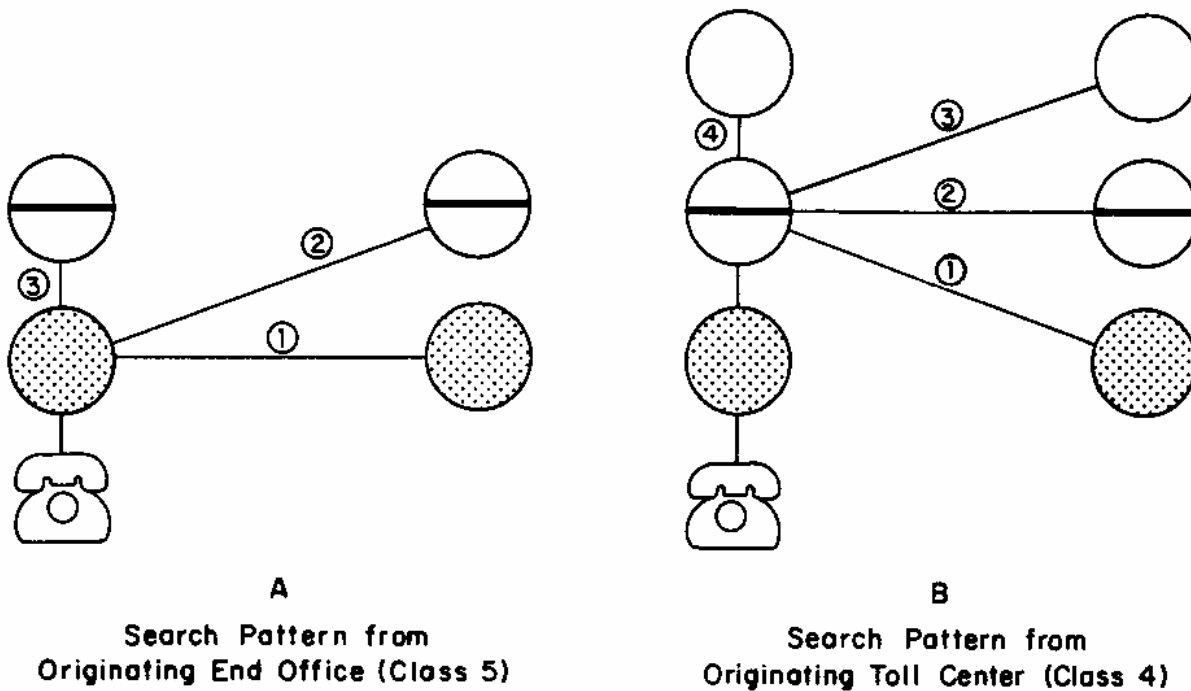
IIV. The Interexchange Network: Routing Patterns

Before divestiture, AT&T was in the process of augmenting the interexchange portion of its network with a network of high speed data links. These new links were distinct from the voice circuits used by customers.¹²⁷ This network is called Common Channel Interoffice Signaling (CCIS). One function of the CCIS network is to set up the route for a call and to test the voice path as part of this process.¹²⁸ Once the route is established, the call is routed through the voice grade trunks. CCIS supplanted the earlier practice of using the same circuits for both setting up and carrying a call.

The CCIS signaling network also made possible interstate 800 Service and state inward WATS (Wide Area Telecommunications Services).^{*} The 800 calls were routed to specialized switches, called originating screening offices (OSOs). Using the CCIS network, these specialized switches interrogate remote data bases to determine the destination of the call and whether the call is made from an authorized origination point.¹²⁹

Figure 29 shows the search pattern performed by the CCIS Network for routing an interexchange call. (Similar routing logic applies in local area routing using tandem switches.) When the routing system reaches a busy trunk group on the first try, it then tries the next level up. Eventually, a successful attempt at routing a call makes a connection at a level high enough to enable downward routing through the hierarchy toward the call's destination. Figure 29A illustrates the search pattern for a call leaving an end office. Figure 29B illustrates the search pattern for a call that has taken the third path in Figure 29A.

^{*}See Index: Services, WATS; and Network, CCIS.



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Figure 29

Routing an Interexchange Call

When a disaster removed a trunk or a switch from the pre-divestiture AT&T network, the alternate routing provided backup. On occasion, if not managed in the usual fashion, this flexibility could cause the entire system to break down. For example, if a hurricane occurs in Florida, out-of-state callers may try to reach the area. This unusually heavy use would tie up the most direct high-usage trunk groups. The network control then progressively searches higher into the hierarchy for open routes. If this progression proceeds unchecked, even regional centers may be tied up trying to route calls to Florida. The centers might then be unavailable for routing calls to and from other areas of North America. When this type of situation occurs, human network controllers intervene. They prevent an excessive number of calls to the Florida area code from leaving their nearest toll center. This routing intervention permits normal network operation.

In the past, the Bell-Independent "partnership" worked out the details of network standards, capacity, flexibility, and control. AT&T took responsibility for managing the overall network, in addition to its role in coordinating BOC and Long Lines traffic. Outside this Bell-Independent partnership, the independents arranged for traffic among themselves. Before divestiture, the traditional industry's network was fully

coordinated and integrated. The interexchange network was designed to work hand in glove with the local service network. The traditional industry decided routing patterns, construction of new facilities, accountability for disruptions in service, and rationing of equipment.

However, the antitrust settlement created a situation where more than one entity may provide long distance (interLATA) service. In addition, the settlement divested AT&T of its BOCs requiring:

each BOC [regional operating company] . . . to offer to all interexchange carriers exchange access . . . equal in type and quality to that provided for the interexchange telecommunications services of AT&T.

In the 1982 AT&T Plan of Reorganization, AT&T outlined its proposed network arrangements with the regional companies:

AT&T and the BOCs [regional operating companies] will conduct their mutual surveillance activities [network management] pursuant to contractual agreements. It is expected that network control actions to alleviate network congestion will be governed by industry agreements.

However, the breakup of AT&T also ended the partnership between AT&T and the independents. This termination of the Bell-Independent partnership, coupled with the requirement for local companies to provide equal interexchange access left the responsibility for network coordination in limbo. No single entity had authority over operations, over payments, over incentives for cooperation, or over management in time of disaster. A year after the settlement, numerous industry and government agencies were competing for a say in, if not for outright control of, planning the post-divestiture network.

Other controversies over new network configurations span economic issues and questions of national security, including the survival and reconstitution of the network following natural disasters or war.

P L A N T O W N E R S H I P

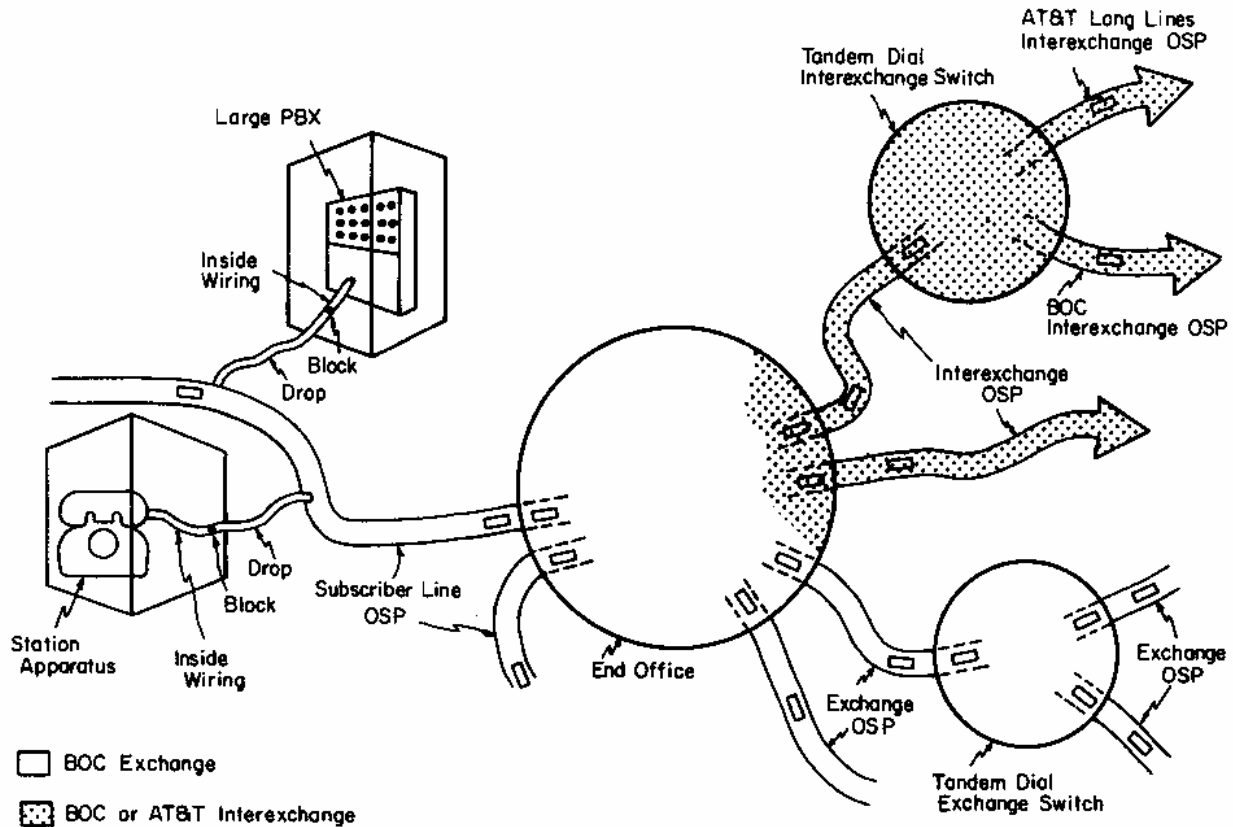
IIIA. Interexchange v. LATA

Before divestiture, AT&T's BOC subsidiaries owned and operated all the exchange plant and some of the interexchange plant under state jurisdiction. AT&T Long Lines directly owned and operated the remaining interexchange plant under federal jurisdiction.

The antitrust settlement broke up AT&T into separate corporations -- AT&T and seven regional holding companies [Figure 5]. The settlement divided plant ownership on the basis of its use for intraLATA or interLATA services. After divestiture, AT&T owned all the interLATA plant and nearly all the CPE. The Regional Holding Companies were given ownership of all the intraLATA plant. Since the LATA service areas were different from the pre-divestiture state toll (state interexchange) service areas, some state interexchange plant remained with the regional operating companies and some was given to AT&T.*

In Figure 30, the pre-divestiture BOC interexchange plant represents both state (intrastate) and federal (interstate) plant under BOC ownership. After divestiture, a portion of the state interexchange plant remained with AT&T and a portion went to the Regional Holding Companies. The remaining plant became intraLATA plant.**

*Samuel M. Epstein, A Conceptual Framework for Pre- and Post-Divestiture Telecommunications Industry Revenue Requirements, Program on Information Resources Policy, 1985.
**See Index: Costs, ownership.



• 1985 Program on Information Resources Policy, Harvard University.

Figure 30

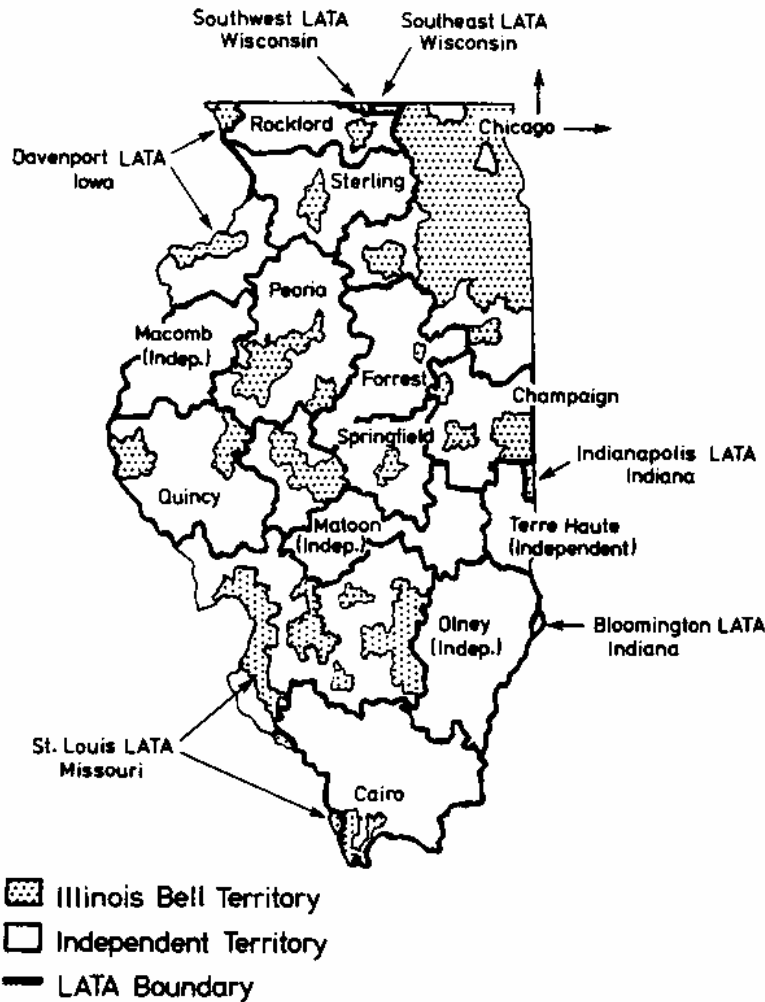
Pre-Divestiture Plant Ownership:
Exchange/Interexchange Divisions

A state may have one or more LATAs. The divestiture not only created regional operating company LATAs, but it also gave independent telephone companies the option of either joining a regional company's LATA or creating their own LATA. Figure 31 shows the LATAs for the state of Illinois.¹³² The shaded areas indicate territory served by Illinois Bell; the remaining territory is served by independent companies.*

Some LATAs cross state borders. For example, the St. Louis LATA covers territory in both Illinois and Missouri.** For the St. Louis LATA, the arrows in Figure 31 indicate that the AT&T point of presence (POP) -- which provides access into and out of the interLATA network -- lies in Missouri. Conversely, the arrows pointing outward from the Chicago LATA indicate that the AT&T POP lies within Illinois and not within Indiana or Wisconsin.

*See Index: Service Areas, LATAs, number; and Service Areas, LATAs, Illinois.

**See Index: Service Areas, LATAs, St. Louis.



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Figure 31

Illinois LATAs: Illinois Bell and Independent

IIIB. Interconnection of the OCCs

Two FCC dockets ended the traditional telephone industry transmission monopoly. Since the Above 890 decision (1959), customers may own or share microwave systems.¹³³ Since the MCI decision (1970), competitors may construct their own common carrier networks.¹³⁴ This decision eventually led to the ENFIA (Exchange Network for Interstate Access) contracts* that provided the terms for the other common carriers' (OCCs) interconnection with the pre-divestiture AT&T network.¹³⁵

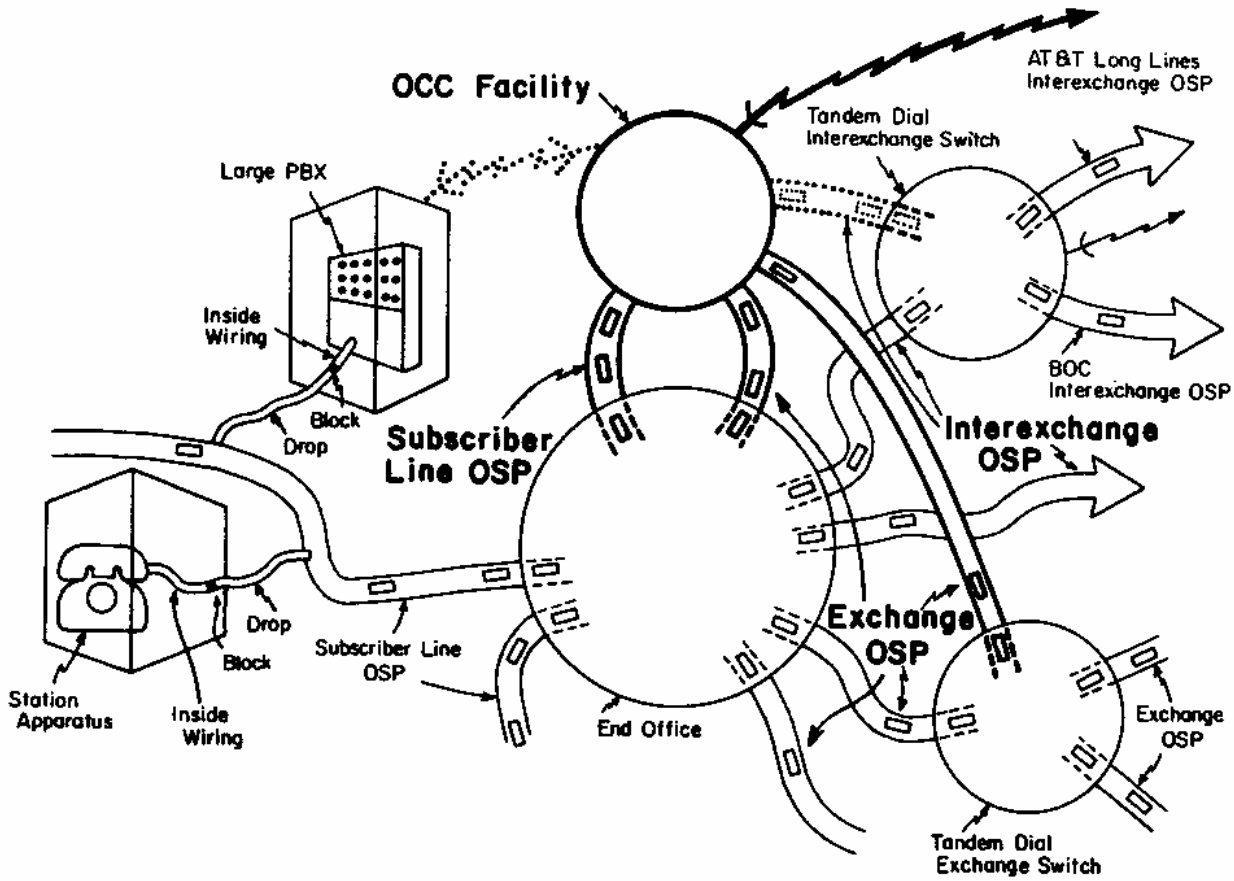
*See Index: OCC, ENFIA contracts.

After divestiture, the Regional Holding Companies became responsible for OCC interconnection. AT&T Communications resembled an OCC in that it too required access into and out of the local areas (redefined as LATAs). The FCC has authority over federal (interstate interLATA) access while individual states have authority over their own state (intrastate interLATA) access. The FCC's Access Charge Order differentiates AT&T's use of local plant from that of the OCCs. The FCC justified a premium access charge for AT&T but not for the OCCs on the following basis:

It can be argued that AT&T uses local exchange service in a way similar to OCCs. It must be recognized, however, that AT&T's use of local exchange service differs in operational terms from all others because of its premium access arrangements. This situation will continue until such time as equal access is provided by exchange carriers to all interexchange carriers.¹³⁶

The FCC also applied this premium access charge to the larger independent telephone companies which had interstate services. The disputes over competitive advantages or disadvantages stemmed from the pre-divestiture positions of AT&T, the large independents, and the OCCs.

Figure 32 indicates where the OCC 1983 networks hooked into the local portion of the traditional network. The dotted lines in Figure 32 indicate where the OCCs wanted access into the system. The dotted line between the OCC and the terminal represents a bypass of the local loop of Figure 10. For example, a microwave dish placed on the roof of a building enables the OCC to bypass the local loop and still maintain access to customers with large PBX equipment, namely the more lucrative customers. When the OCC enters local tandem dial switches or enters at the trunk (interexchange) side of the end office switch, the OCC acquires greater technical capabilities.



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Figure 32

Interconnection of the OCCs (Other Common Carriers) with the Traditional Network

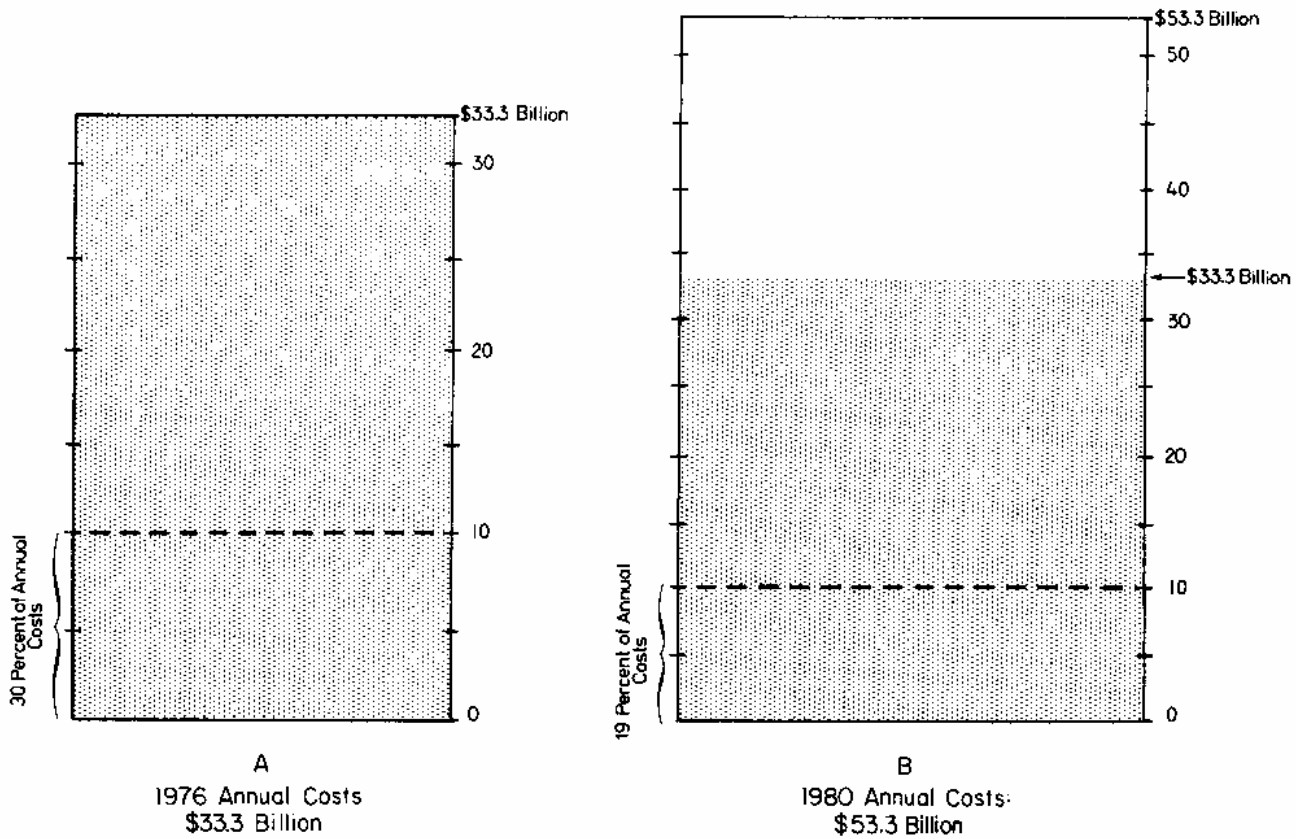
A T & T A N N U A L C O S T S

IVA. Annual Costs

The definition of costs for telephone plant equipment and the amounts of these costs are subject to contention. Initially existing definitions and accounting practices are tied to a specific technical configuration, political climate, and corporate structure. When any of these factors change, there are disputes over whether to change cost definitions, and if so, what direction to follow.

The following pages show the relation of the labels in the functional plant diagram of Figure 6 to the actual dollars recorded under these labels. In this section, a graphic representation of the amounts of plant-related costs enables comparisons among categories. This section also provides a description of non-plant-related expenses, enabling similar comparisons among categories.

Figure 33A represents the 1976 annual costs for the entire pre-divestiture AT&T and Figure 33B represents the 1980 annual costs. This cost diagram shows the costs for the 22 BOCs, the two local companies in which AT&T then held a minority interest (Cincinnati Bell and Southern New England Telephone), and AT&T Long Lines. These costs include the cost of equipment bought from Western Electric and research or development bought from Bell Labs.



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Figure 33

Pre-Divestiture AT&T Costs: 1976 and 1980

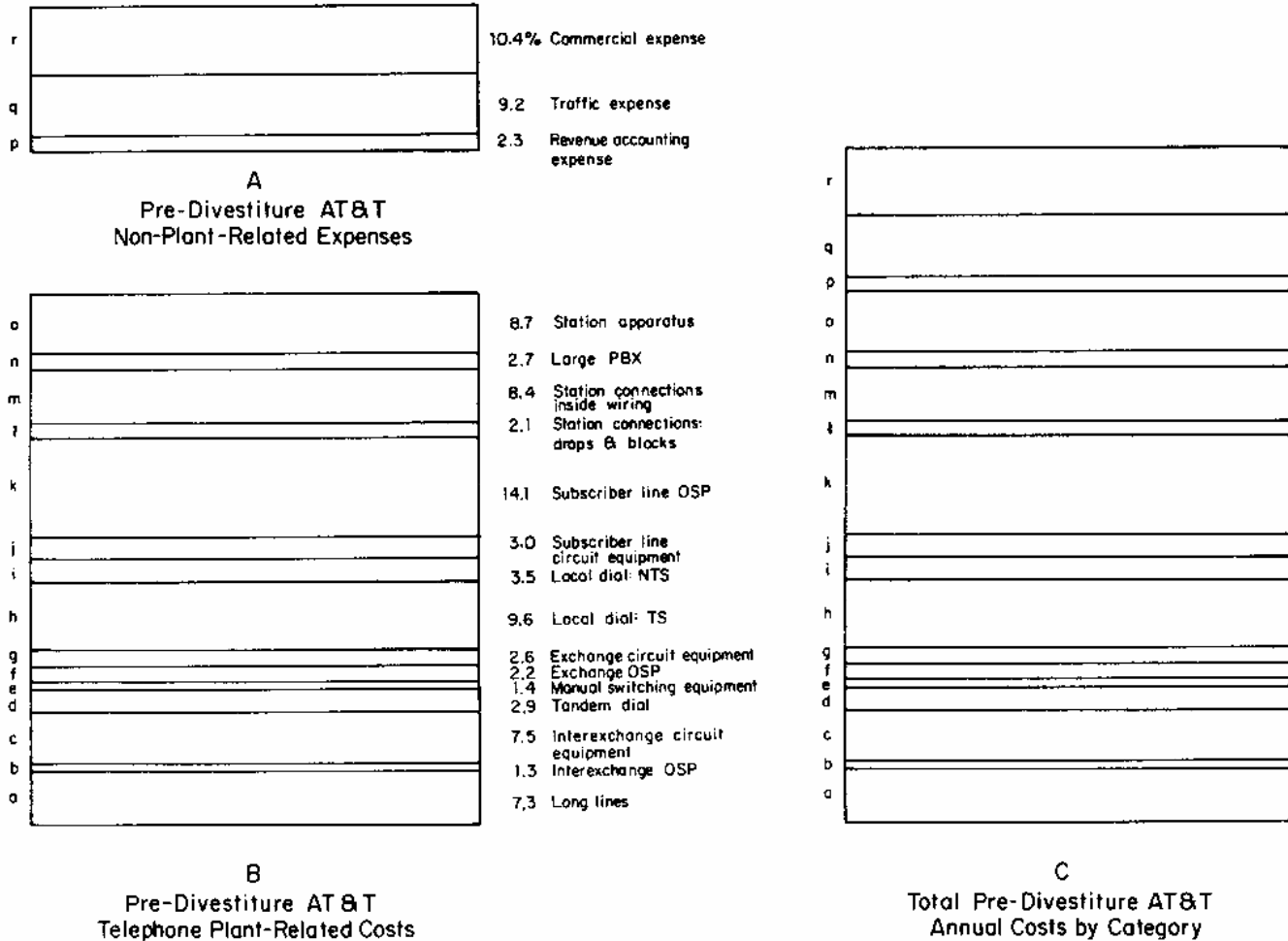
In Figure 33, the area of each rectangle represents actual dollar amounts. For example, the 1976 [Figure 33A] rectangle represents \$33.3 billion. This rectangle is subdivided by a dashed line. The area below the line represents \$10 billion dollars, while the area above it represents the remaining \$23.3 billion. This horizontal subdivision of the rectangle enables the reader to compare relative amounts of different costs at a glance. Thus in 1976, the smaller subdivision represents 30% of the total annual costs.

Figure 33B represents the 1980 annual costs of \$53.3 billion. The 1980 rectangle is 1.6 times the area of the 1976 rectangle, providing a visual comparison between the two years. The gray screen indicates an amount of \$33.3 billion in both charts. The dashed line in Figure 33B shows \$10 billion for 1980, in this case only 19% of the total annual costs.

IVB. Relative Amounts by Category

The Uniform System of Accounts (USOA) is the traditional industry's accounting system mandated by the FCC. Every regulated industry cost may be traced to a recorded amount in one or more USOA accounts. The USOA underlies all other definitions or treatment of costs, such as federal/state cost divisions or depreciation rates for specific equipment. And, as can be seen in the following discussion, the USOA accounts themselves are the product of political debates.

Figure 34 shows cost divisions for the total annual costs. There are two major groupings in Figure 34A -- plant-related costs and non-plant-related expenses. The earlier walk through the plant diagram [Figures 6 through 29] gave a partial background for the derivation of the plant-related labels.



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Figure 34

Pre-Divestiture AT&T Costs: Relative Amounts by Category

The remainder of this volume provides the derivation of individual categories shown in Figures 34A and 34B. These cost categories are taken from actual material presented during debates over key policy issues. Adapted from a unique filing in an early FCC attempt to look at deregulation, these categories provide an analytical breakdown of traditionally undifferentiated industry costs.¹³⁷ In turn, the traditional industry's accounting system (the USOA) and the guidelines for dividing total costs for federal and for state regulation (the Separations Manual) provided the basis for the numbers in this pre-divestiture filing.¹³⁸

In this series of volumes, the adoption of these analytical categories is predicated on the use made of them in continuing controversies. New accounting categories or new cost groupings arise in response to new issues. Therefore, when issues first appear, the current categories form the foundation for private and public decisions. We use these categories because prior to divestiture, the USOA accounts and the Separations Manual provided the cost foundation for the majority of the issues. The FCC filing represents unique data because an issue arose which could not be handled by the traditional cost groupings. This issue -- concerning the detariffing of CPE -- required some new groupings but the USOA and Separations Manual provided the underpinnings for these revisions.

In later volumes in this series, all the analytical categories, both plant-related and non-plant related, are lumped together in a single block [Figure 34C]. In Figures 34A, B, and C, the area of each category reflects its share of the total costs. For example, "Large PBX" at 2.7% of the total is about one third the size of "Station Apparatus" at 8.7% of the total. Although the 1980 costs represent a 60% increase over the 1976 costs, the relative proportions of the individual categories changed slightly but not enough to alter the picture. This stability of proportions held until the deregulation of CPE in 1983 and the divestiture of AT&T in 1984.

The annual costs in each category in Figures 34A, B, and C, follow the traditional telephone industry definition of annual costs:

annual costs = annual expenses + annual ROI

where annual ROI = annual ROR x total investment

and where ROR is defined as the cost of capital and where expenses include taxes.

The acronyms in the above definition are as follows: ROI is "return on investment"; ROR is "rate of return." This definition views the ROI -- or what the layman considers profit -- as a cost, the cost of money.

THE UNIFORM SYSTEM OF
ACCOUNTS (USOA)

VA. History of USOA Revisions

The USOA accounts themselves reflect policy and political objectives. As a whole, the USOA prescribes basic accounting procedures for companies in the traditional telephone industry. Therefore, the USOA in turn provides both the vocabulary and the data from which all real world cost definitions and measurements are derived. These definitions also reflect policy and political objectives. The individual categories in Figures 34A, B, and C are based on costs derived from the USOA.

In 1935, the FCC adopted a USOA based largely upon accounts previously prescribed by the Interstate Commerce Commission (ICC). Since the USOA's adoption, the regulators, in consultation with the traditional industry, define the accounting rules. The USOA mandates accounting categories for expenses, revenues, and telephone plant investment. It also provides the prescription for maintaining these accounts. Figure 35 shows the history of USOA revisions.

This section on the USOA provides examples of the decisions involved for recording plant investments and industry expenses in their appropriate USOA accounts.

Date	FCC Docket	FCC Action
1935	[ICC Docket No. 25705]	FCC adopts a USOA, based largely upon the accounts previously prescribed by the Interstate Commerce Commission.
1954	10985	FCC makes the entire cost of pensions chargeable to operating expense accounts as long as certain conditions are met.
1970	18828	FCC permits normalization accounting for income tax differential generated by the use of accelerated depreciation for income tax purposes. This allows telephone companies to take advantage of provisions in the Tax Reform Act of 1969 which allows accelerated depreciation for tax purposes on certain public utility property as long as utilities normalize the resulting tax differentials in their accounts.
1975	20489	FCC permits similar treatment of the income tax differentials occasioned by the use of depreciation based on class lives and asset depreciation ranges.
1977	19129	FCC announces that the USOA should be modified to "place the burden of all costs associated with station connections on the causative rate-payer, as opposed to the present system which places the burden on all rate-payers present and future."
1978	21230	FCC adopts amendments to subdivide telephone plant under construction into two accounts: (1) the cost of plant under construction for one year or less with no provision to accrue interest during construction, and (2) the cost of plant under construction for over one year with provision to accrue interest during construction at the prime rate. The FCC's "primary concern is to separate large, costly, longer-term projects from the smaller, less costly, shorter-term projects."
1980	20188	FCC allows companies to use straight line equal life group (SLELG) procedures for depreciation instead of the straight line vintage group method. This allows companies to accrue a greater portion of the cost of assets in earlier years. The FCC notes increased revenue requirements but concludes that this is justified and will ensure efficient service in the future.
1981	79-105	FCC orders the creation of two subaccounts for station connections: (1) station connections-inside wiring and (2) station connections-other. This paves the way for private ownership or deregulation of inside wiring. In accordance with Docket No. 19129, the CC requires the cost of new inside wiring, previously capitalized, to be treated as a current expense. (ongoing)
	78-196	FCC implements a revised USOA which applies to both a cost allocation manual and to the jurisdictional Separations Manual. The cost manual determines cost of service from recorded financial data. The Separations Manual separates cost by federal-state jurisdictions. The Commission abandons the idea of getting cost by service from the USOA directly. The FCC had previously announced that the USOA was outdated and not suited to the current "multiservice" telecommunications environment. (ongoing)

Figure 35

History of USOA Revisions

VB. USOA: Telephone Plant Investment Accounts

The telephone plant cost categories in Figure 34B are based on the nature of the plant and the functions plant performs. However, the vintage 1935 USOA account definitions provide broad characterizations which don't necessarily coincide with plant function. For example, the USOA account "Central Office Equipment (Account 221)" encompasses investments in a broad range of equipment.* These investments include four types of switching equipment -- from the old-fashioned panel switch to the current electronic switch -- and equipment associated with these switches, such as cables, batteries and generators. Account 221 also records equipment which lies outside of the physical central office location, such as " . . . remote terminals, and intervening repeaters in subscriber pair gain systems such as Subscriber Loop Multiplex (SLM)" ¹³⁹

To derive annual costs from those recorded in the investment accounts, the recorded amounts are multiplied by an appropriate percent (the annual rate of return or ROR).

Within any of the USOA plant accounts, a given type of physical equipment may serve different functions. Conversely, several types of physical equipment may be necessary to perform a single function. The Modification of Final Judgment required that, upon divestiture, all the recorded costs must be divided among AT&T and the Regional Holding Companies. The AT&T Plan of Reorganization ¹⁴⁰ specified details for this division. This plan used both physical and functional characteristics to divide Account 221 among the different companies. Figure 36 shows the eight categories used for the division of the equipment recorded in Account 221. The ripe age of the USOA intensified problems during detariffing of CPE and divestiture.

*See Appendix C, p. 98 of this volume; and Index: USOA, central office facilities.

a. Ownership of Central Office Facilities and
Outside Plant

i. Central Office Facilities

The description of the assignment of specific central office facilities has been divided into eight subsections, based on the nature of the equipment being allocated and the functions which that equipment performs in the network...These subsections are:

- (1) Switching Systems;
- (2) Transmission Equipment;
- (3) Common Central Office Equipment;
- (4) Common Channel Interoffice Signaling Equipment;
- (5) Digital Data System Equipment;
- (6) Operator Call Processing Systems and Associated Operator Work Centers;
- (7) Computer Hardware for Network Facilities Operations Systems; and
- (8) Network Management Operations Centers and Systems...

Each of these subsections identifies the accounts or subaccounts in the USOA in which the investment in such facilities appears.

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Figure 36

Assignment of Central Office Equipment for Divestiture

Although the age of the USOA created problems, no accounting scheme can serve equally well for every demand. Initially a set of categories or an accounting system fits a specific time, issue, and technology. It therefore may be inapplicable, at least directly, to other issues even upon its creation. Changes in technology or policy only exacerbate problems in practical application. The judgments and disputes over the definition and the amounts of costs begin with the inevitable translation of recorded costs into categories relevant to the specific purpose of the moment. Therefore in our derivation of analytical categories, all steps represent judgments and policies already made in the real world, and therefore represent actual approaches to specific disputes.

There is no direct correlation between plant cost categories in Figure 34B and the USOA plant accounts. Equipment providing the same function may be recorded in different USOA accounts. Take for example two towers which support the equipment which transmits radio signals between these towers. If one tower is held upright by wires on a mountain top, this tower investment is entered under "Pole Lines (Account 241)." If the other tower is

rooted in concrete -- the tower is self-supporting and lacks guy wires -- this tower investment is entered under "Buildings (Account 212)".⁴¹ Figure 37 shows how tower equipment is assigned in the AT&T Plan of Reorganization.

(3) Pole Lines, Guyed Towers, and Self-Supporting Towers

Also included among outside plant facilities are pole lines, guyed towers, and self-supporting towers. These facilities are used in the network to support aerial cables, microwave radio equipment, and other transmission equipment. Bell System investment in pole lines and guyed towers is contained in Account 241 (Pole Lines). Bell System investment in self-supporting towers is contained in Account 212 (Buildings)....

Guyed towers (Account 241) are steel frame structures, secured by guy wires that are used to support network transmission equipment, e.g., microwave antennas or mobile-radio antennas. Self-supporting towers are similar to guyed towers, but generally are larger, support more equipment, and stand without guy wires.

⁶³Self-supporting towers may be free-standing along a transmission route or may be attached to or a part of a Bell System building. The discussion here governs assignment only of those self-supporting towers that stand apart from a building. Self-supporting towers attached to or a part of a building will be assigned to the entity which will own that building. The criteria for assignment of buildings are discussed in Part I.A.3, infra.

AT&T Plan of Reorganization, Dec. 16, 1983.

* 1985 Program on Information Resources Policy, Harvard University.

Figure 37

Assignment of Tower Equipment for Divestiture

VC. USOA: Expense Accounts

Whereas the USOA telephone plant accounts record investments depreciated over time, the USOA expense accounts record expenses incurred on a yearly basis. The decision to record certain costs as expenses instead of as depreciated investments is itself a policy decision.*

*See Index: Costs, capitalize; and Costs, expense.

Just as there is no direct correlation between the plant cost categories of Figure 34B and the USOA plant accounts, so there is no one-to-one correlation between the commercial, traffic, and revenue cost categories of Figure 34A and the USOA expense accounts. For example, the commercial expenses in Figure 34A are derived from the eight major USOA accounts listed in Figure 38.

Commercial Expenses	
General Commercial Administration	640
Advertising	642
Sales Expense	643
Connecting Company Relations	644
Local Commercial Operations	645
Public Telephone Commissions	648
Directory Expenses	649
Other Commercial Expenses	650

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Figure 38

USOA Commercial Expense Accounts

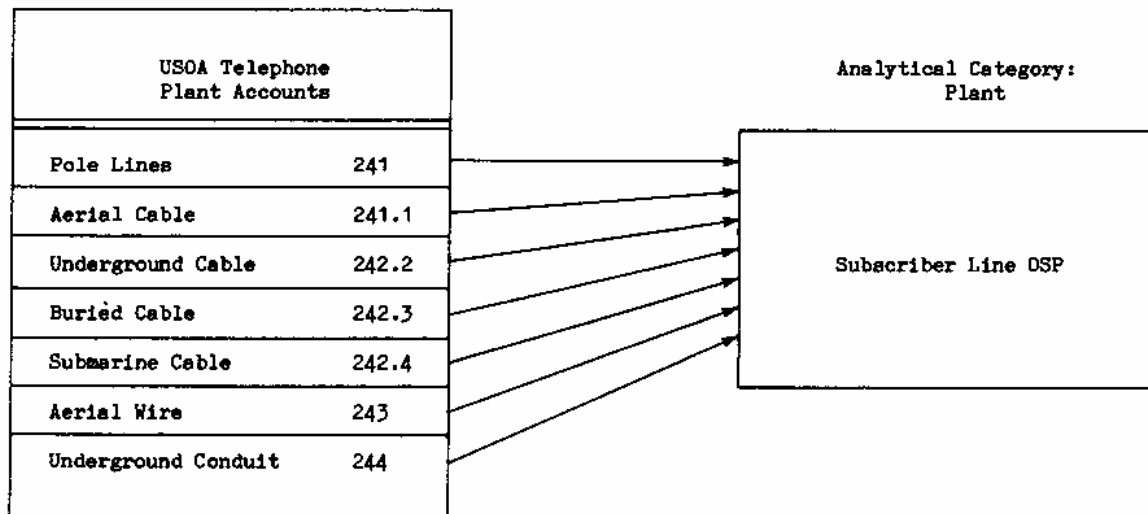
DERIVATION OF ANALYTICAL
COST CATEGORIES

VIA. USOA Records

The USOA accounts focus on bookkeeping -- or how to keep track of all the pieces. However, other cost groupings may be necessary. For example, to deal with policy issues involving access charges, the subscriber line OSP (outside plant) must be differentiated from the exchange OSP and the interexchange OSP. The labels in Figure 6, including the OSP labels, name groupings of plant functions. The same labels name the costs in dollars associated with providing functions, grouped under the same name.

The analytical categories in Figure 34 are groupings useful for shedding light on actual debates over dollars -- both in regulatory proceedings and in court cases.*

Because the USOA accounts contain the only basic records, any new category must be derived from the USOA accounts. Seven USOA accounts [Figure 39] provide the records for determining the equipment investments in all OSP. Subscriber line OSP constitutes only a portion of each of these USOA accounts.



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Figure 39

USOA Equipment Investment in Subscriber Line OSP (Outside Plant)

*For details on the relationships among USOA accounts, separations categories and items, and analytical categories, see Appendix C, pp. 98-102 of this volume and Index: USOA.

VIB. Separations Categories and Items

The Separations Manual prescribes how a telephone company is to partition dollars in the USOA accounts listed in Figure 40 into costs assigned to either federal or state jurisdictions. The regulators use these assigned costs as one ingredient in determining whether prices for services are "just and reasonable."¹⁴²

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Plant
Pole Lines 241	<p style="text-align: center;">OUTSIDE PLANT</p> <p>Exchange Wideband Exchange Trunk and Loop Exchange Trunk Excluding Wideband</p> <p>Interexchange Plant Furnished to another Company for Interstate Use Wideband Services</p> <p>Subscriber Subscriber Line Excluding Wideband All Other</p>	<p>Exchange OSP (f)</p> <p>Interexchange (b)</p> <p>Subscriber Line OSP (k)</p>
Aerial Cable 242.1		
Underground Cable 242.2		
Buried Cable 242.3		
Submarine Cable 242.4		
Aerial Wire 243		
Underground Conduit 244		

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Figure 40

Derivation of Analytical Cost Categories:
Separations Costs for OSP (Outside Plant)

This particular method of dividing responsibility for total costs between federal and state agencies is legitimized by the economic concept of joint use of certain kinds of plant by both exchange and interexchange carriers.*

The separations categories were used for debates on issues other than separations because, at the time, these were the only available categories.

Figure 40 shows the USOA accounts which form the basis for the outside plant (OSP) categories "exchange," "interexchange," and "all other" categories. These separations categories correspond to the analytical categories involving OSP. "Subscriber line" OSP more explicitly labels the "all other" separations category.

Figure 34C shows annual costs by analytical categories which are based mainly on the separations categories and items. In

*See Index: Costing Methods, station-to-station.

industry and regulatory jargon, separations "categories" refers to types of telephone plant; separations "items" refers to types of expenses. The analytical categories are labelled according to the labels in the diagram of the functional plant [Figure 6].

Separations "items" refer to expenses. Figure 41 shows the major USOA expense accounts included under the separations "commercial expense" item. In the analytical categories listed in Figure 34A, the "commercial expense" category corresponds directly to the separations "commercial expense" item. Traditional commercial expense costs included those incurred for advertising and for publishing the Yellow Pages.

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>Commercial expenses are included in the following accounts:</p> <p>General Commercial Administration 640</p> <p>Advertising 642</p> <p>Sales Expense 643</p> <p>Connecting Company Relations 644</p> <p>Local Commercial Operations 645</p> <p>Public Telephone Commissions 648</p> <p>Directory Expenses 649</p> <p>Other Commercial Expenses 650</p>	<p>Commercial</p> <p>(a) Advertising, Sales and Connecting Company Relations</p> <p>(b) Local Operations</p> <p>(c) Public Telephone Commissions</p> <p>(d) Directory Expenses</p> <p>(e) General Administration</p> <p>(f) Other</p>	<p>Commercial Expenses (r)</p>

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Figure 41

Derivation of Analytical Cost Categories:
Separations Items for Commercial Expenses

Figure 34A contains two other expense categories: "traffic expense" and "revenue accounting expense." Traffic expense includes the costs for operators and for supervision of the network. Revenue accounting expense includes costs for billing and for collecting revenues.

Some of the analytical categories of Figure 34C do not directly correspond to the separations categories. For example, the investments in the USOA accounts "Land (Account 211)" and "Buildings (Account 212)" correspond to the separations category "Land and Buildings." This separations category has no direct equivalent in the analytical categories. Instead, the appropriate portions of the land and buildings investments are distributed among the analytical plant categories [Figure 42].

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Plant
Land 211 Buildings 212	LAND AND BUILDINGS Operating Room and Central Office Equipment Space Operators' Quarters Office Space (a) General Traffic Supervision (b) Commercial (c) Revenue Accounting (d) General Office Space Used by another Company for Interstate Operations Garages, Storerooms, Warehouses and Pole Yards Space Constructed for another Company for Interstate Operations Space Rented to Others Antenna Supporting Structures	(The Separations Categories are distributed among the appropriate analytical plant categories)

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Figure 42

Derivation of Analytical Cost Categories:
 Distribution of Separations Costs for Land and Buildings

Portions of certain expenses, such as maintenance and depreciation, are also distributed among the analytical plant categories [Figure 43].

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>Maintenance expenses are included in the following accounts:</p> <p>Repairs of Pole Lines 602.1</p> <p>Repairs of Aerial Cable 602.2</p> <p>Repairs of Underground Cable 602.3</p> <p>Repairs of Buried Cable 602.4</p> <p>Repairs of Submarine Cable 602.5</p> <p>Repairs of Aerial Wire 602.6</p> <p>Repairs of Underground Conduit 602.7</p> <p>Shop Repairs and Salvage Adjustments 602.8</p> <p>Test Desk Work 603</p> <p>Repairs of Central Office Equipment 604</p> <p>Repairs of Station Equipment 605</p> <p>Repairs of Buildings and Grounds 606</p> <p>Maintaining Transmission Power 610</p> <p>Employment Stabilization 611</p> <p>Other Maintenance Expenses 612</p>	<p>Maintenance and Depreciation</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Depreciation and Amortization expenses are included in the following accounts:</p> <p>Depreciation 608</p> <p>Extraordinary Retirements 609</p> <p>Amortization of Intangible Property 613</p> <p>Amortization of Telephone Plant Acquisition Adjustment 614</p>		

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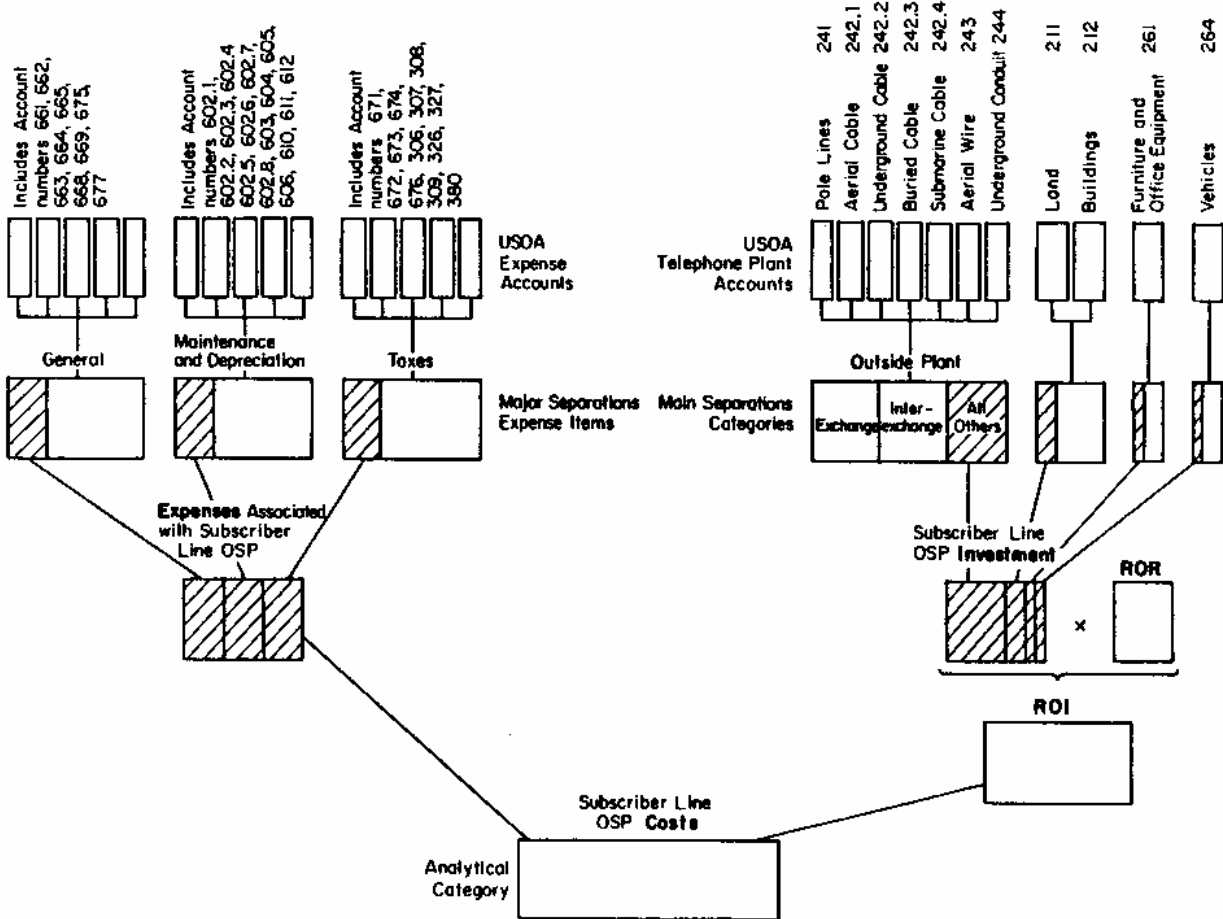
Figure 43

Derivation of Analytical Cost Categories:
Distribution of Separations Items for Maintenance and Depreciation

VIC. Derivation of Subscriber Line OSP Cost Category

The Separations Manual provides the rules for distributing costs recorded in USOA accounts into separations categories and items. The telephone plant accounts form the basis for deriving the investment in subscriber line OSP, and the expense accounts

form the basis for deriving the annual expenses associated with subscriber line OSP. Figure 44 summarizes the derivation of annual costs, but only for subscriber line OSP, not for all the other categories.*



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Figure 44

Derivation of Analytical Cost Category: Subscriber Line OSP

Our analytical cost categories in Figures 34A, B, and C are based on the Separations Manual and a filing in FCC Docket No. 20981.¹⁴³ The majority of the analytical categories are equivalent to those in AT&T's response to a Joint-Board request for data in that FCC inquiry; these categories in turn were derived from the Separations Manual categories. Two of our categories differ from those in AT&T's filing: "station connections" is subdivided into "inside wiring" and "drops and blocks" portions; "local dial" is subdivided into "NTS (non-traffic-sensitive)" and "TS (traffic-sensitive)" portions.

*See Appendix C, p. 98 of this volume; and Index: USOA.

The choice of particular categories, such as USOA or Separations Manual, is a political judgment. Likewise the choice of a particular set of rules or procedures, such as the federal/state cost separations, is a political judgment.

VID. Costs as Baseline for the Future

No matter what the debate, some judgment-laden process -- like that made explicit in Figure 44 -- is always present. Once established, the mechanism for deriving a particular cost may be handled by clerks, but setting up such a scheme is making policy and requires decisions on how to carry it out. The issues change, creating disparities between existing procedures and current desires.

By definition, the issues arise before the mechanisms exist to sort them out. Therefore, the previous schemes have an impact on the future. They provide the springboard for new changes. Even in the rare situation where old schemes are completely discarded or face sweeping revisions, as with the divestiture, these schemes provide the baseline for the transition, and their ghosts or even their substance linger on in the new schemes. All of the categories described in this volume play a role in transitional periods that began in the early '80s and may never quite end.

A P P E N D I X A

VIIA. Swings between Monopoly and Competition, 1870s-1930s

- 1875 Alexander Graham Bell (A.G. Bell) obtained financing for his research from Thomas Sanders and Gardiner G. Hubbard. A rudimentary corporate agreement, defining what later was called the Bell Patent Association, gave the partners a share in any of A.G. Bell's patents. ¹⁴⁵
- 1876 Patent for first telephone was issued to A.G. Bell on March 7 (U.S. No. 174,465). ¹⁴⁸
- 1877 Second telephone patent covering improvements in the original telephone was issued to A.G. Bell on January 30 (U.S. No. 186,787). ¹⁴⁷
- July 9 marked the formal organization of the telephone business. The Bell Telephone Company, an unincorporated Massachusetts company, superseded the earlier Bell Patent Association. ¹⁴⁸
- 1878 The summer of 1878 saw direct competition among exchange telephone companies. Bell Telephone and Western Union clashed in numerous cities including Chicago, Cincinnati, Hartford, New Haven, Trenton and Syracuse. On September 12, the Bell Telephone Company filed suit in court to protect the Bell patents against infringements by Western Union subsidiaries. A year later on November 10, the suit was settled with Western Union agreeing to stay out of the telephone business and with Bell Telephone agreeing to stay out of the public message telegraph business in Western Union territories. ¹⁴⁹
- On February 12, the New England Telephone Company became a Massachusetts corporation, with responsibility for licensing agents and for building local telephone business in the New England area. While Bell Telephone was initially limited to recruiting and licensing agents for the territory outside of New England, on July 30, Bell Telephone was formally incorporated as a means for attracting capital from the Boston financial community. ¹⁵⁰
- 1879 The organization of the National Bell company marked the consolidation of Bell Telephone and New England Telephone. ¹⁵¹
- 1880 American Bell Telephone Company was incorporated in Massachusetts and superseded National Bell Telephone. ¹⁵²

1883

The introduction of telephone exchange competition in Hawaii foreshadowed later events on the U.S. mainland. Hawaii was an independent kingdom until 1893, and this territory was annexed by the U.S. only in 1898. Therefore, Hawaii's telephone operations were governed by laws different from those of the mainland U.S.¹⁵³

On August 16, 1883, the Hawaiian government broke the monopoly of the Hawaiian Bell Company -- an independent telephone company, even though it contained "Bell" in its name. (Then, as today, non-Bell System telephone companies were called "independents.")¹⁵⁴ In response to protests over high telephone rates, the Hawaiian government allowed a second telephone company, the Mutual Telephone Company, to set up business.¹⁵⁵ As the rivalry between the two companies gained momentum, local customers found themselves caught in the crossfire:

storekeepers and merchants . . . found themselves compelled to patronize both [telephone companies] if they wished to be within reach of their customers. The more astute ones made an effort to corral the same number on both lines. While few included their telephone numbers in their business cards, those who did, like the Consolidated Soda Water Works, mentioned both exchanges:¹⁵⁶

"Bell Telephone 71"
"Mutual Telephone 71"

While the local rates fell, an editorial in the morning paper predicted that:

"the dividend paid by each Company [was] less than one alone would earn as the cost of working and maintenance [was] doubled."¹⁵⁷

In November 1894, after five years of negotiations, the two competing companies merged and, as the local newspaper reported, "The Mutualls can now call the Bells, and Bells the Mutualls."¹⁵⁸

1885

On March 3, American Telephone and Telegraph Company (AT&T) was incorporated to provide interconnection among the exchanges of various cities. While initially a wholly-owned subsidiary of American Bell, AT&T became the parent company superseding American Bell on December 31, 1899. (Financial incentives made incorporation more favorable in New York than in Massachusetts.)¹⁵⁹

1893 After 17 years, the first Bell patent expired on March 7, opening the door to competition. A year later the second Bell patents expired.¹⁶⁰ American Bell's attempt to continue its monopoly through the Berliner patent (a microphone transmitter, U.S. No. 463,569), failed. American Bell had applied for the Berliner patent in 1877, but the Patent Office waited until November 1891 before granting it. A Justice Department attempt to annul the Berliner patent eventually failed in 1897. However, a subsequent court decision defined the Berliner patent monopoly in such narrow terms as to destroy its use in prolonging the Bell monopoly.¹⁶¹

1894 Prior to the expiration of the Bell patents, 125 competing companies, later called independent companies, existed. However, few of these companies progressed beyond selling stock to investors, and only a small number of independent telephone messages were ever sent. The expiration of Bell's monopoly over manufacturing in 1894 heralded the start of competition. Within three years more than 6000 independent telephone companies entered the market. As with the Bell companies, the independents provided telephone service and sold telephone equipment.¹⁶²

1895 Competition among telephone companies arose in the exchange markets. The first independents operated primarily in rural areas which lacked telephone service. However, as early as 1895, independents competed in Bell territory. In some cases,¹⁶³ two or more companies competed for the same customers.

As with the earlier Hawaiian case, the independents initially offered service at rates lower than those of the Bell companies.

In the 1890's typical Bell charges had been between \$125 a \$150 a year for a business telephone and around \$100 a year for a residence telephone, although this varied widely between cities. The independents offered service at considerably lower rates, some as low,^{as} \$40 a year, but not usually for long.¹⁶⁴

1896 The independent companies in Ohio formed an association to present¹⁶⁵ a united front against the Bell companies.

1897 Following the lead of the Ohio independents, on May 27, the independent companies formed a national association, called the Independent Telephone Association. This association

provided "a forum to discuss ideas and exchange information, as well as a united front in dealing with the Bell System and the government."¹⁶⁶

1900 In the early 1900s, there were approximately 3200 Bell exchanges and 6600 independent exchanges.¹⁶⁷ Competition was fierce, the Bell companies had 800 thousand telephones in service and over \$120 million in assets compared to the independents 600 thousand telephones and \$55 million in assets.¹⁶⁸

By this time, the battles encountered earlier in Hawaii surfaced nationwide. According to the telephone historian John Brooks:

Virgin territory -- places where there was no telephone service and enough potential customers to make it profitable -- was getting to be in short supply; as a result, head-on competition, in the form of two or even three telephone systems operating simultaneously in a single town or city became increasingly common. There were three main results: competitive rate-cutting, wasteful duplication, and public inconvenience.¹⁶⁹

Acquisition and merger were becoming major avenues of growth for AT&T and for some of the independents.

1908 A change in the manufacturing contract between Western Electric and AT&T allowed Western Electric to sell equipment to the independents. Since the loss of patent protection, it was in Western Electric's best interest to be able to provide equipment to the entire industry and not solely to the Bell companies. While sales of telephone equipment were made among telephone companies, customers of these companies could not purchase telephones. In general when telephone companies (usually independents) tried to allow or permit private ownership of equipment, private ownership was forbidden by state laws or regulations.¹⁷⁰

1910 The Mann-Elkins Act gave the Interstate Commerce Commission (ICC) jurisdiction over interstate rates charged by telegraph, telephone, and cable companies.¹⁷¹

1911 As a result of emerging state regulation and problems of operational integration, AT&T began the consolidation of newly acquired independent companies and existing Bell associated companies into its newly developed functional management structure. Over a 20-year period these

companies eventually were recast into the Bell Operating Companies (BOCs) which became state and regional company forms of the Bell System.¹⁷² From this period until the 1984 breakup of AT&T, the term Bell System referred to AT&T (the parent company) and to its subsidiaries (the BOCs, Western Electric, and Bell Laboratories).

- 1913 In response to complaints over AT&T's acquisition of independent telephone companies between 1907 and 1913, the Justice Department, followed by the ICC, started investigations. Triggered by a Bell company's acquisition of an independent (Northwestern Long Distance Company), the Justice Department filed an antitrust suit against AT&T and the Pacific Telephone & Telegraph Company on July 24, 1913.¹⁷³ To forestall a negative outcome of these antitrust actions, Nathan C. Kingsbury, an AT&T vice president, sent a letter to the Attorney General of the United States on December 19, 1913. In this letter, called the "Kingsbury Commitment," AT&T promised to dispose of its stock in Western Union Telegraph Co., to provide the independents with interconnection to the Bell companies' toll lines, and not to buy independent companies. This letter effectively ended both Justice Department and ICC actions against AT&T. Soon, the restriction on AT&T's acquisitions changed: AT&T was allowed to purchase independent companies so long as the ICC approved.¹⁷⁴
- 1918 During World War I, the federal government "effectively 'nationalized' the telephone industry and placed it under the jurisdiction of the Postmaster General [who] sought to eliminate competition and generally to unify service wherever possible."¹⁷⁵
- 1920 Shortly after the telephone industry was returned to private control, Congress passed the Transportation Act of 1920, restating the ICC's authority to regulate interstate telephone traffic. This Act restated the ICC jurisdiction as encompassing "the transmission of intelligence by wire or wireless."¹⁷⁶
- 1921 Congress continued its trend favoring a telephone monopoly by passing the Willis-Graham Act which amended the Transportation Act of 1920. Superseding the Kingsbury Commitment, this Act exempted the telephone industry from antitrust action on consolidations and mergers if found in the public interest by the ICC (later by the FCC).¹⁷⁷ The House Report on the bill echoed the complaints in the earlier Hawaiian telephone company battle. The report states:

In many cities of the United States, and in rural communities as well, there are dual and competing telephone systems, doing both local

and long-distance business. Wherever there are such dual systems . . . patrons . . . are put to endless annoyance and increased expense.¹⁷⁸

The Willis-Graham Act basically extended the freedom of the telephone companies. The Kingsbury Commitment had only limited AT&T's acquisitions rather than halting them altogether. Prior to the Kingsbury Commitment (1895-1913), AT&T acquired more than 1000 independent companies, including approximately 400 thousand independent telephones. Between the Kingsbury Commitment and the Willis-Graham Act (1914-1921), AT&T acquired fewer than 100 independent companies, nearly one tenth the number of its earlier acquisitions. However, this smaller number of acquisitions included approximately 500 thousand independent telephones. While the actual number of acquired companies was smaller in the seven years after the Kingsbury Commitment, the net additions to AT&T were greater than those in the 19 years before the commitment. Therefore, AT&T grew larger in a shorter period of time.¹⁷⁹

1922 According to E.K. Hall, an AT&T vice president:

The passage of the Graham Act . . . established for the first time an orderly and official procedure for working out a normal solution of competitive situations.¹⁸⁰

On June 14, Hall sent a letter to F.B. MacKinnon, President of the U.S. Independent Telephone Association (USITA).¹⁸¹ Called the Hall Memorandum, this letter represented negotiations between AT&T and the independents concerning future AT&T acquisitions and mergers. The Hall Memorandum set out four methods for resolving conflicts between AT&T and the independents:

- (a) by the sale of [AT&T] property;
- (b) the purchase by [AT&T] of the [independent] company's property;
- (c) by some method of consolidation of the [two] companies; or
- (d) by working out some division of territory.¹⁸²

AT&T promised that in cases of consolidations and mergers that it:

would give any [independent companies] whose interests might be affected by the result of such negotiations a full opportunity to be heard and of making sure that their own connections and interests are preserved [emphasis added].¹⁸³

By the end of the year, approximately 4.5 million independent telephones interconnected with the 10 million Bell System telephones.¹⁸⁴ Beginning with the Kingsbury Commitment, there was a trend toward accommodation between the Bell companies and the independents. The Hall Memorandum forwarded this trend which culminated in the Bell-Independent "partnership," a partnership that lasted until the breakup of AT&T in 1984.

- 1927 Congress passed the Radio Act of 1927 which forbade radio licensees to acquire telephone or telegraph systems and forbid telephone or telegraph systems to acquire radio stations, thereby creating a monopoly.¹⁸⁵
- 1934 Congress passed the Communications Act of 1934 which created the Federal Communications Commission (FCC). In addition to the authority over telecommunications previously vested in the ICC and in the Federal Radio Commission, the FCC was given a wider range of authority. The FCC's broad mandate could be interpreted according to the political climate. The same act was in effect during the growth of the traditional Bell-Independent network (1930s-1980s) and during the introduction of competition to this traditional network (1950s-1980s).¹⁸⁶
- 1939 Between 1934 and 1939, the FCC conducted an investigation of the telephone industry. The investigation spawned further controversies over the structure of this industry. According to AT&T, the early proposals (the Walker Report and the FCC's proposed 1939 report) "continued to mischaracterize the history of telecommunications and the Bell System's business practices."¹⁸⁷ However, the FCC's 1939 official report fostered the growth of the telephone monopoly during the 1940s. The FCC found the existing laws adequate for telephone regulation:

This Commission [possesses] inclusive statutory authority and, as a direct result of the telephone investigation, [has] basic data sufficient to serve as a firm foundation for . . . continuous and efficient administrative processes in this . . . field.¹⁸⁸

And the Commission used the term "natural monopoly" to characterize the telephone industry:

The necessary attributes of a so-called natural monopoly which ordinarily attend efficient and economical telephone service . . . and the public interest in the . . . development of . . . effective and economical communication facilities

are . . . factors which disclose the underlying character¹⁸⁹ of this business as an essential public utility.

Section IB of this volume,* picks up the controversies over monopoly and competition arising in the 1940s.

*See Section IB: An Overview: The Introduction of Competition. pp. 2-12.

A P P E N D I X B

VIIIA. Antitrust Suits Filed Against IBM, 1932-1984

Suit Filed	Suit Ended	Government Actions	Private Industry Actions	Result of Suit and General Comments
1932	1936	<u>U.S. v. IBM</u> [13 F. Supp. 11 (1935), US 131 (1936)]		Suit initiated by Roosevelt administration. Decided in favor of plaintiff -- the U.S. government.
1932	1937		<u>Remington Rand v. IBM</u> [N.Y. Sup. Ct. 1937, 3 NYS 2d 515 (1937)]	
1952	1956	<u>U.S. v. IBM</u> (SDNY Civil No. 72-344, Jan. 25, 1956)		Suit initiated by Truman administration. Resolved by 1956 Consent Decree by IBM.
1955	1956		<u>Remington Rand v. IBM</u>	Dropped by the plaintiff -- Remington Rand.
1968	1973		<u>Control Data v. IBM</u> (DC MINN Third Div. Civil No. 3-68-312, Dec. 11, 1968)	Settled. CDC acquired Service Bureau Corp. from IBM.
1969	1982	<u>U.S. v. IBM</u> (SDNY Civil No. 59-200, Jan. 17, 1969)		Suit initiated by Johnson administration. Dropped Reagan administration.
1969	1970		<u>Data Processing Financial & General Corp. (Control Data Corp.) v. IBM</u> [306 F. Supp. 839 (1969), 421 F. 2d 323 (1970), aff'd, 430 F. 2d 1277 (1970)]	Suit dismissed.
1970	1970		<u>Levin-Townsend v. IBM</u> (SDNY 70 Civ. 1654, June 29, 1970)	Dropped by plaintiff -- Levin-Townsend.
1971	1973		<u>Potter Corp. v. IBM</u> (Civil No. 9863/1971)	Settled.
1972	1972		<u>Advanced Memory Systems v. IBM, Intel v. IBM</u> [N.D.C. Civil No. C-72-245 LHB (1972)]	Intel joined Advanced Memory Systems' suit against IBM. Settled.
1972	1981		<u>Greyhound Computer Leasing v. IBM</u> [559 F. 2d 488 (1977), cert. denied, 434 US 1040 (1977)]	Settled in 1981 before retrial. IBM paid Greyhound \$17.7 million.

Suit Filed	Suit Ended	Government Actions	Private Industry Actions	Result of Suit and General Comments
1973	1975		<u>Telex v. IBM</u> [367 F. Supp. 258 (1973), <u>aff'd in part and rev'd in part</u> , 510 F. 2d 894 (1975), <u>Cert. dism.</u> , 423 US 802 (1975)]	Injunctions were issued against both parties.
1973	1979		<u>California Computer Products v. IBM</u> [613 F. 2d 727 (1979)] <u>Marshall Industries v. IBM</u> (C.D.C. Civil No. 73-3043, Dec. 26, 1973)	The court ruled in favor of the defendant -- IBM. Settled.
1973	1984		<u>Hudson v. IBM</u> (C.D.C. Civil No. 73-27960 JWC, Nov. 30, 1973)	Settled.
1973	1978		<u>Memorex v. IBM</u> [458 F. Supp. 423 (1978), <u>aff'd</u> 636 F. 2d 1188 (1980), <u>cert. denied</u> 452 US 972 (1981)]	The court ruled in favor of the defendant -- IBM.
1973	1980		<u>Symbolic Control v. IBM</u> [643 F. 2d 1359 (1980)]	Settled.
1974	Pending as of 1984		<u>Porro Precision v. IBM</u> [673 F. 2d 1045 (1982), <u>aff'd</u> 745 F. 2d 1283 (1984)]	Suit pending rehearing.
1974	1976		<u>Memory Technology v. IBM</u> (D.C.D.M. Civil No. 74-5051-5, Nov. 4, 1974)	Settled.
1975	1977		<u>Sanders Associates v. IBM</u> (DNH Civil No. 75-14, Jan. 7, 1975)	Settled.
1975	1975		<u>Xerox v. IBM</u> [DCNY No. Civil 1596 (DNE), (1975)]	Settled for \$25 million in favor of the plaintiff -- Xerox.
1978	1979		<u>TransAmerica v. IBM</u> [481 F. Supp. 965 (1979), <u>aff'd</u> 698 F. 2d 1377 (1983), <u>cert. denied</u> , 104 S. Ct. 370 (1983)]	Court ruled in favor of the defendant -- IBM.

A P P E N D I X C

IXA. Derivation of Analytical Cost Categories for Telephone Plant

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Plant*
Station Apparatus 231 Large PBXs 234 Station Connections 232	STATION EQUIPMENT TWX Equipment Private Line Equipment Station Identification Equipment Wideband Other	Station Apparatus (o) Large PBX (n) Station Connections: Inside Wiring (m) Station Connections: Drops and Blocks (l)
Pole Lines 241 Aerial Cable 242.1 Underground Cable 242.2 Buried Cable 242.3 Submarine Cable 242.4 Aerial Wire 243 Underground Conduit 244	OUTSIDE PLANT Exchange Wideband Exchange Trunk and Loop Exchange Trunk Excluding Wideband Interexchange Plant Furnished to another Company for Interstate Use Wideband Services Subscriber Subscriber Line Excluding Wideband All Other	Exchange OSP (f) Interexchange OSP (b) Subscriber Line OSP (k)
Central Office Equipment 224	CENTRAL OFFICE EQUIPMENT Local Dial Switching Equipment Manual Switching Equipment Dial Tandem Switching Equipment Intertoll Dial Switching Equipment Automatic Message Recording Equipment Other Toll Dial Switching Equipment Special Services Switching Equipment Circuit Equipment	Local Dial: NTS (i) Local Dial: TS (h) Manual Switching Equipment (e) Tandem Dial (d) Subscriber Line Circuit Equipment (j) Exchange Circuit Equipment (g) Interexchange Circuit Equipment (c)

* This list excludes the "All Other Plant" category from AT&T's January 10, 1977 filing in FCC Docket No. 20981. "All Other Plant" is the telephone plant built by the BOCs expressly for AT&T Long Lines use and the expenses associated with this plant.

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Figure 45

Derivation of Analytical Cost Categories:
 Terminal Equipment (CPE), Station Connections Equipment,
 OSP Equipment, and Central Office Equipment

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Plant*
Land 211 Buildings 212	LAND AND BUILDINGS Operating Room and Central Office Equipment Space Operators' Quarters Office Space (a) General Traffic Supervision (b) Commercial (c) Revenue Accounting (d) General Office Space Used by another Company for Interstate Operations Garages, Storerooms, Warehouses and Pole Yards Space Constructed for another Company for Interstate Operations Space Rented to Others Antenna Supporting Structures	(The Separations Categories are distributed among the appropriate analytical plant categories)
Furniture and Office Equipment 261	FURNITURE AND OFFICE EQUIPMENT Data Processing Equipment Other	(The Separations Categories are distributed among the appropriate analytical plant categories)
Vehicles and Other Work Equipment 264	VEHICLES AND OTHER WORK EQUIPMENT	(The Separations Categories are distributed among the appropriate analytical plant categories)

* This list excludes the "All Other Plant" category from AT&T's January 10, 1977 filing in FCC Docket No. 20891. "All Other Plant" is the telephone plant built by the BOCs expressly for AT&T Long Lines use and the expenses associated with this plant.

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Figure 46

Derivation of Analytical Cost Categories:
 Distribution of Separations Costs for Land and Buildings,
 Furniture and Office Equipment, and Vehicles and Other Work
 Equipment

IXB. Derivation of Analytical Cost Categories for Non-Plant-Related Expenses

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>Commercial expenses are included in the following accounts:</p> <p>General Commercial</p> <p>Administration 640</p> <p>Advertising 642</p> <p>Sales Expense 643</p> <p>Connecting Company Relations 644</p> <p>Local Commercial Operations 645</p> <p>Public Telephone Commissions 648</p> <p>Directory Expenses 649</p> <p>Other Commercial Expenses 650</p>	<p>Commercial</p> <p>(a) Advertising, Sales and Connecting Company Relations</p> <p>(b) Local Operations</p> <p>(c) Public Telephone Commissions</p> <p>(d) Directory Expenses</p> <p>(e) General Administration</p> <p>(f) Other</p>	<p>Commercial Expenses (r)</p>
<p>Traffic expenses are included in the following accounts:</p> <p>General Traffic Supervision 621</p> <p>Service Inspection and Customer Instruction 622</p> <p>Operators' Wages 624</p> <p>Rest and Lunch Rooms 626</p> <p>Operators' Employment and Training 627</p> <p>Central Office Stationery and Printing 629</p> <p>Central Office House Service 630</p> <p>Miscellaneous Central Office Expenses 631</p> <p>Public Telephone Expenses 632</p> <p>Other Traffic Expenses 633</p> <p>Joint Traffic Expenses-- Debtor 634</p> <p>Joint Traffic Expenses-- Creditor 635</p>	<p>Traffic</p> <p>(a) General Traffic Supervision-- Engineering</p> <p>(b) Service Inspection and Customer Instruction</p> <p>(1) PBX</p> <p>(2) Customer Instruction and Miscellaneous</p> <p>(c) All Other</p>	<p>Traffic Expenses (q)</p>
<p>Revenue accounting expenses comprise the salaries and other expenses in Account 662 (Accounting Department) directly assignable or allocable to the billing of customers and the accounting for revenues, including the supervisor of such work.</p>	<p>Revenue Accounting</p>	<p>Revenue Accounting Expenses (p)</p>

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Figure 47

Derivation of Analytical Cost Categories:
 Separations Items for Commercial Expense, Traffic Expense,
 and Revenue Accounting Expense

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>General expenses are included in the following accounts:</p> <p>Executive Department 661 Accounting Department 662* Treasury Department 663 Law Department 664 Other General Office Salaries and Expenses 665 Insurance 668 Accidents and Damages 669 Other Expenses 675 Expenses Charged Construction—Creditor 677</p> <p>*Excluding Revenue Accounting Expenses</p>	<p>General Expenses</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Maintenance expenses are included in the following accounts:</p> <p>Repairs of Pole Lines 602.1 Repairs of Aerial Cable 602.2 Repairs of Underground Cable 602.3 Repairs of Buried Cable 602.4 Repairs of Submarine Cable 602.5 Repairs of Aerial Wire 602.6 Repairs of Underground Conduit 602.7 Shop Repairs and Salvage Adjustments 602.8 Test Desk Work 603 Repairs of Central Office Equipment 604 Repairs of Station Equipment 605 Repairs of Buildings and Grounds 606 Maintaining Transmission Power 610 Employment Stabilization 611 Other Maintenance Expenses 612</p>	<p>Maintenance and Depreciation</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Depreciation and amortization expenses are included in the following accounts:</p> <p>Depreciation 608 Extraordinary Retirements 609 Amortization of Intangible Property 613 Amortization of Telephone Plant Acquisition Adjustment 614</p>		

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Figure 48

Derivation of Analytical Cost Categories:
Distribution of Separations Items for General Expenses
and for Maintenance and Depreciation

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>Other operating expenses are included in the following accounts:</p> <p>Operating Rents 671 Relief and Pensions 672 Telephone Franchise Requirements 673 General Services and Licenses 674 Telephone Franchise Requirements--Creditors 676</p>	<p>Relief and Pensions and Social Security Taxes Property and Miscellaneous Taxes Gross Earnings Taxes Income Taxes</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Taxes are included in the following accounts:</p> <p>Federal Income Taxes-- Operating 306 Other Operating Taxes 307 Taxes Deferred; Accelerated Tax Depreciation 308 Income Credits Resulting from Prior Deferrals of Federal Income Taxes 309 Federal Income Taxes-- Non-operating 326 Other Non-operating Taxes 327 Income Tax Effect of Extraordinary and Delayed Items--Net 380</p>		

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Figure 49

Derivation of Analytical Cost Categories:
 Distribution of Separations Items for Taxes

A P P E N D I X D

XA. Acronyms

AIS	AT&T Information Systems
AT&T	American Telephone and Telegraph Co.
BOC	Bell Operating Company
Bellcore	Bell Communications Research (see CSO)
CATV	Cable Television
CCIS	Common Channel Interoffice Signaling
CEO	Chief Executive Officer
CPE	Customer Premises Equipment
CSO	Central Services Organization (see Bellcore)
CSU	Channel Service Unit
DOD	Department of Defense
DOV	Data Over Voice
ENFIA	Exchange Network Facilities for Interstate Access
FCC	Federal Communications Commission
GTE	General Telephone & Electronics
ICC	Interstate Commerce Commission
IEEE	Institute of Electrical and Electronics Engineers
IBM	IBM Corp.
IRC	International Record Carrier
LADT	Local Area Data Transport
LATA	Local Access and Transport Area
LDE	Local Dial Equipment
MCI	MCI Telecommunications, Inc.
MFJ	Modification of Final Judgment
MTS	Message Telecommunications Services
NARUC	National Association of Regulatory Utility Commissioners
NCTE	Network Channel Terminating Equipment
NTS	Non-Traffic Sensitive
OCC	Other Common Carrier
OSO	Originating Screening Office
OSP	Outside Plant
PBX	Private Branch Exchange
PCI	Packet Communications Inc.
POP	Point of Presence
RHC	Regional Holding Company
ROI	Return on Investment
ROR	Rate of Return
SLELG	Straight Line Equal Life Group
TS	Traffic Sensitive
USOA	Uniform System of Accounts
WATS	Wide Area Telecommunications Services

NOTES

XIA. Text

¹ Hush-A-Phone Corp. v. AT&T Co. et al., FCC Docket No. 9189, [hereinafter cited as Hush-a-Phone], Decision and Order, December 21, 1955; Decision and Order on Remand, 22 FCC 112 (1957).

² Arthur N. Holcombe. Public Ownership of Telephones on the Continent of Europe, Houghton Mifflin Co., Boston, Mass., 1911, preface, p. ix.

³ AT&T. "Some Observations on Modern Tendencies," an address by Theodore Vail to the National Association of Railway Commissioners, San Francisco, Ca., October, 1915.

⁴ Advertisement, The Wall Street Journal, The Bell System, February 28, 1983, p. 3.

⁵ Allocation of Frequencies in the Band Above 890 Mc., FCC Docket No. 11866, Report and Order, 27 FCC 359 (1959); Memorandum Opinion and Order, 29 FCC 825 (1960) [hereinafter cited as Above 890].

Microwave Communications, Inc. (MCI), FCC Docket No. 16509, Decision, 18 FCC 2d 953 (1969), Memorandum Opinion and Order 21 FCC 2d 190 (1970). The FCC determined that MCI could offer a limited service, designed to meet the interoffice and interplant communications needs of small businesses.

⁶ An act to amend the Transportation Act of 1920 (Willis-Graham Act), 42 Stat. 27, Pub. L. No. 15 (1921) (codified at 47 USC Section 221) [hereinafter cited as Willis-Graham Act].

⁷ Consolidation of Telephone Systems, House of Representatives, Committee on Interstate and Foreign Commerce, Report No. 109, 67th Congress, 1st Session, p. 2 (1921).

⁸ Amending the Transportation Act of 1920, Senate, Committee on Interstate Commerce, Report No. 75, 67th Congress, 1st Session, p. 1 (1921).

⁹ House of Representatives, Report No. 109, supra note 7, at p. 1.

¹⁰ United States Independent Telephone Association, "Statistical Summary of the Telephone Industry in the United States," Independent Telephone Statistics, Vol. 1, Washington, D.C., 1980.

¹¹ Communications Act of 1934, 48 Stat 1064, Pub. L. No. 416 (1934). (Codified at 47 USC Section 151 et seq.).

¹² Communications Act of 1934, supra note 11, at Section 221, p. 1080.

The Kingsbury Commitment of 1913 had the effect of limiting the number of acquisitions by AT&T. While AT&T acquired a smaller number of independent companies after the Kingsbury Commitment, the total size of these acquisitions was larger. Subsequently, the Willis-Graham Act overrode the constraints set by the Kingsbury Commitment.

See, letter from N.C. Kingsbury, Vice President of AT&T, to J.C. McReynolds, Attorney General of the United States, dated December 16, 1913. The letter settled an antitrust suit filed by the Justice Department, U.S. v. AT&T, Equity No. 6082, (D.Or. 1913).

For more information on the Kingsbury Commitment, See Appendix A of this volume.

Section 407 of The Transportation Act of 1920, Publ. L. No. 152, 41 Stat. 456 (1920) (which amends Section 5 of the Interstate Commerce Act) was revised in 1921 by the Willis-Graham Act, Publ. L. No. 15, 42 Stat. 27 (1921). The Willis-Graham Act amended the earlier legislation to provide for administrative review (by the Interstate Commerce Commission or ICC) of all applications for merger, stock acquisition, or other consolidations between telephone companies. The ICC had the authority to approve or disapprove proposed mergers. In 1934, this authority transferred to the FCC, overriding the earlier provisions of the Interstate Commerce Act (which includes both the Willis-Graham Act and the Transportation Act of 1920), Communications Act of 1934, supra note 11, at Section 221, p. 1080, and at Section 602, p. 1102.

¹³ U.S. v. AT&T, Modification of Final Judgment, 552 F. Supp. 131 at Sec. I(D), p. 227 (D.D.C. 1982), aff'd mem., 103 S.Ct. 1240 (1983), [hereinafter cited as Modification of Final Judgment]. The court allowed AT&T to retain its minority interest in Cincinnati Bell and in Southern New England Telephone.

The Modification of Final Judgment was a modification of the 1956 consent judgment in U.S. v. Western Electric Co. and AT&T, Civil Action No. 17-49, 13 RR 2143; 161 USPQ (BNA) 705; 1956 Trade Cas. (CCH) sec. 68246 at p. 71134 (D.C.N.J. 1956). However, the 1982 agreement encompasses far more than just a modification of the 1956 Final Judgment [hereinafter cited as the 1956 Consent Decree]. The 1956 Consent Decree itself

settled a complaint filed by AT&T with the U.S. District Court (New Jersey) on January 14, 1949.

The Modification of Final Judgment terminated a monopolization complaint filed against AT&T by the Justice Department in 1974, U.S. v. AT&T, Civil Action No. 74-1698 (D.C. Cir. 1974). In these proceedings, the earlier Western Electric action was transferred from the New Jersey District Court to the District of Columbia District Court and was docketed as U.S. v. Western Electric Co., Civil Action No. 82-0192.

In the 1982 Modification of Final Judgment, the parties agreed that technological, economic, and regulatory changes necessitated this modification. At this same time, the Justice Department and AT&T requested a dismissal of the 1974 case without prejudice. The court accepted the consent agreement and dismissed the case on August 24, 1982. However, after the divestiture of the BOCs from AT&T, the court continued to monitor the implementation of the Modification of Final Judgment.

¹⁴ 1956 Consent Decree, supra note 13.

¹⁵ 1956 Consent Decree, supra note 13, at p. 71137, 137138. AT&T was granted specific exemptions from the prohibitions of the 1956 Consent Decree. A significant exception allowed AT&T to furnish anything required by the federal government. AT&T could also provide devices for the handicapped and could enter businesses ancillary to communications, such as Yellow Pages services.

¹⁶ At a later time, the FCC attempted to separate the data processing and telecommunications industries. In the Matter of Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), FCC Docket No. 20828 [hereinafter cited as Computer Inquiry II]; Notice of Inquiry and Proposed Rulemaking, 61 FCC 2d 103 (1976); Final Decision, 77 FCC 2d 384 (1980); Memorandum Opinion and Order, 84 FCC 2d 50 (1980); Memorandum Opinion and Order on Further Reconsideration, 88 FCC 2d 512 (1981); aff'd sub nom., Computer and Communication Industry Assoc. v. FCC, 693 F.2d 198 (D.C. Cir. 1982). This ruling held that AT&T's non-embedded customer premise equipment should be detariffed, that the company should be allowed to enter data processing markets on a deregulated basis, and that both deregulated classes of service should be fully separated in a company of its own, to prevent the cross-subsidization of these services by AT&T's monopoly telephone network services; cert. denied, Louisiana Public Service Commission v. FCC, and NARUC v. FCC, 103 S. Ct. 2109 (1983). The Final Decision of Computer Inquiry II created a basic/enhanced boundary separating the telecommunications and computer industries. Seven months later, 34 parties sought "clarification or expansion of the definition of basic service." Computer Inquiry II, Memorandum

Opinion and Order, supra, at p. 51. In her concurring opinion on the "Reconsideration of the Final Decision in the Second Computer Inquiry," FCC Commissioner Anne P. Jones stated:

I believe that our Basic/Enhanced definitional structure draws a bright line in the correct place between basic services, which we may continue to regulate, and enhanced services, which will be provided on an unregulated basis [emphasis added]. supra at p. 119.

However, the continuing controversy over this basic/enhanced boundary points toward a blurring of this boundary rather than a clear, sharp division.

- ¹⁷ Hush-A-Phone, supra note 1, Decision and Order on Remand, pp. 112-113. See in particular footnote 1 of this decision for a discussion of AT&T's "foreign attachment" tariff regulations.
- ¹⁸ For example, see In the Matter of Use of Recording Devices in Connection With Telephone Service, Docket No. 6787, 11 FCC 1033 (1947); In the Matter of Jordaphone Corp. of America and Mohawk Business Machines Corp. v. AT&T, Docket No. 9383, 18 FCC 644 (1954); U.S. v. Western Electric Co., Civil Action No. 74-1698, supra note 13, Defendants' Third Statement of Contentions and Proof, Volume 1, pp. 366-370 [hereinafter cited as U.S. v. Western Electric, Defendants' Third Statement].
- ¹⁹ Hush-A-Phone Corp., supra note 1.
- ²⁰ Hush-A-Phone Corp. v. United States, 238 F. 2d 266, 268-269 (D.C. Cir. 1956).
- ²¹ In the Matter of Use of the Carterfone Device in Message Toll Telephone Service, FCC Docket Nos. 16942, 17073, [hereinafter cited as Carterfone], Decision 13 FCC 2d 420 (1968); reconsideration denied, Memorandum Opinion and Order, 14 FCC 2d 571 (1968).
- ²² "Foreign Attachment" Tariff Revisions, FCC 68-1234, Memorandum Opinion and Order, 15 FCC 2d 605 (1968), petition for reconsideration denied, FCC 69-897, Memorandum Opinion and Order, 18 FCC 2d 871 (1969); North Carolina Util. Com'n v. FCC, 537 F. 2d 787 (4th Cir., 1976); North Carolina Util. Com'n v. FCC, 522 F. 2d 1036 (4th Cir., 1977).
- ²³ Harm has been debated in terms of both technical harm and economic harm.

Arguments over technical harm are summarized in National Academy of Sciences, Computer Science and Engineering Board, A Technical Analysis of The Common Carrier/User Interconnections Area, Washington, D.C. (June 1970); and in Lee M. Paschall, Network Management Policy, Program on Information Resources

Policy, Harvard University, Cambridge, Mass, Publication P-81-8, November 1981.

Arguments over economic harm are spread throughout the record in Customer Interconnection, FCC Docket 20003, Notice of Inquiry, 46 FCC 2d 214, 217 (1974), First Supplemental Notice, 50 FCC 2d 574, 576 (1974), First Report, 61 FCC 2d 766, 769-777 (1976), Second Report, 75 FCC 2d 506, 510-512 (1980); and in Congressional reactions to FCC pricing decisions: see The Impact of the FCC's Telephone Access Charge Decision: Hearings Before the Subcommittee on Government Information of the House Committee on Government Operations, 98th Cong., 1st Sess., May 18, June 22, September 21 and 27, 1983.

²⁴ Howard Frank, President and CEO of Contel Information Systems, "Expectation versus Reality: The Emerging Crisis in the Communications World," News briefing at the IEEE Centennial Policy Meeting, Washington, D.C., February 22, 1984, p. 2.

²⁵ Supra at p. 3.

²⁶ Above 890, supra note 5.

²⁷ The statutory language is from An Amendment to the Communications Act of 1934, 50 Stat. 189, Pub. L. No. 97 (1937). The authorization for sharing is spelled out in Above 890, supra note 5, Report and Order, at p. 408.

²⁸ In the Matter of TELPAK Tariff Sharing Provisions of AT&T and The Western Union Telegraph Co., Docket No. 17457, Decision, 23 FCC 2d 606, 19 RR 2d 381 (adopted June 10, 1970).

For a further discussion of the TELPAK tariffs see U.S. v. Western Electric, Civil Action No. 74-1698, supra note 13, Defendants' Third Statement of Contentions and Proof, Volume II, at pp. 844-882.

²⁹ AT&T language spelling out private line services available only to the elect under Above 890 is, for example, in AT&T Tariff FCC No. 260, Part 2.2.1, February 10, 1977.

Even though the FCC expanded TELPAK to allow for unlimited sharing, AT&T chose not to expand its TELPAK service. Therefore, the FCC initiated further proceedings.

Resale and Shared Use of Common Carrier Domestic Public Switched Network Services, CC Docket No. 80-54, Notice of Proposed Rulemaking, 77 FCC 2d 274 (1980), Report and Order, 83 FCC 2d 167 (1980). Permitted shared use and resale of MTS, WATS and competitive equivalents.

Resale and Shared Use of Common Carrier International Communications Services, CC Docket No. 80-176, Notice of

Proposed Rulemaking, 77 FCC 2d 831 (1980). Considering resale and shared use of international leased, or private, lines.

³⁰ Packet Communications, Inc., FCC File No. P-C-8533, Memorandum Opinion, Order and Certificate, 43 FCC 2d 922 (1973). The pioneer in packet-switching, PCI, went out of business. The FCC subsequently authorized Graphnet and GTE Telenet; both remained operational in 1983.

³¹ American Trucking Assn., Inc., v. AT&T, Docket No. 19746 and Docket No. 20097, Notice of Inquiry and Proposed Rulemaking, 47 FCC 2d 644 (1974).

Resale and Shared Use of Common Carrier Services and Facilities, FCC Docket No. 20097, Report and Order, 60 FCC 2d 261 (1976), recon. 62 FCC 2d 588 (1977), aff'd sub nom. AT&T v. FCC 572 F.2d 17 (2d Cir. 1978), cert. denied, 439 U.S. 875 (1978). Permitted domestic shared use and resale of private lines.

³² MCI was founded in 1963. The FCC granted MCI a license to construct its system in 1969. Some of the relevant decisions with respect to MCI follow:

Microwave Communications, Inc., supra note 5.

Specialized Common Carrier Services, FCC Docket No. 18920, Notice of Inquiry, Notice of Proposed Rule Making, and Order, 24 FCC 2d 318 (1970), First Report and Order, 29 FCC 2d 870 (1971). Attempted to deal with multiple applications on a consistent basis; paved the way for competition in the private line market.

Execunet, FCC Docket No. 20640, Decision, 60 FCC 2d 25 (1976). The FCC determined that MCI was not authorized to offer Execunet, which the Commission concluded was "essentially a switched public message telephone service" rather than a private line service (Order, FCC 75-799, July 2, 1975). Execunet service enabled MCI's customers to use any telephone in the Bell local exchange area to call any telephone in another city; Bell claimed the service as an invasion of its MTS monopoly.

MCI Telecommunications Corp. v. FCC, 561 F. 2d 365 (D.C. Cir. 1977), cert. denied, 434 U.S. 1040 (1978), (Execunet I). Overturned the Commission's Execunet decision; the Court found that the FCC had never determined that the public interest would be served by a Bell monopoly in MTS and WATS services. MCI Telecommunications Corp. v. FCC, 580 F.2d 590 (D.C. Cir. 1978), cert. denied, 439 US 980 (1978), (Execunet II). Required local telephone companies to provide OCCs interconnections with local network.

The FCC continued to investigate the proper market structure for these services in MTS and WATS Market Structure Inquiry, CC Docket No. 78-72;

Notice of Inquiry and Proposed Rulemaking, 67 FCC 2d 757, (1978);
Supplemental Notice, 73 FCC 2d 222 (1979);
Memorandum Opinion and Order, 75 FCC 2d 644 (1980);
Second Supplemental Notice, 77 FCC 2d 224 (1980);
Third Supplemental Notice, 81 FCC 2d 177 (1980);
Fourth Supplemental Notice, 90 FCC 2d 135 (1982);
Second Report and Order, 92 FCC 2d 787 (1982);
Phase I: Third Report and Order, 93 FCC 2d 241 (1982) (Access Order);
Supplemental Order, 94 FCC 2d 852 (1983);
Phase III: Notice of Proposed Rulemaking, 94 FCC 2d 292 (1983);
Phase IV: Notice of Proposed Rulemaking, 94 FCC 2d 396 (1983);
Final Rule, 48 Fed. Reg. 10319 (March 11, 1983),
Final Rule, 48 Fed. Reg. 42984 (September 21, 1983) (Reconsideration Order);
Memorandum Opinion and Order, 49 Fed. Reg. 7810 (March 2, 1984) (Further Reconsideration Order);
aff'd in part, remanded in part, NARUC v. FCC, No. 83-1225, 737 F.2d 1095 (D.C. Cir 1984) reh'g denied, August 23, 1984; petition for cert. filed, September 7, 1984, No. 84-504.
Further Notice of Proposed Rulemaking, 49 Fed. Reg. 18318, (April 30, 1984);
Memorandum Opinion and Order, 49 Fed. Reg. 23924 (June 8, 1984).

³³ Bell System Tariff Offerings, FCC Docket No. 19896, Decision, 46 FCC 2d 413 (1974), aff'd, 503 F.2d 1250 (3rd Cir. 1974), cert. denied, 422 U.S. 1026 (1974) reh'g. denied, 423 U.S. 886 (1975). Imposed a legal obligation for interconnection of local companies' facilities with specialized carriers' (OCC) facilities.

Facilities for Use by Other Common Carriers, FCC Docket No. 20099, Memorandum Opinion and Order, 52 FCC 2d 727 (1975). Implemented by a negotiated settlement the legal obligation imposed by Bell System Tariff Offerings.

ENFIA Agreement (Interim Settlement Agreement), 43 Fed Reg. 59129, 59130 (December 19, 1978). AT&T and the Bell System Operating Companies Tariff No. 8 (BSOC 8), Transmittal No. 53, Exchange Network Facilities for Interstate Access (ENFIA), CC Docket No. 78-371, Memorandum Opinion and Order, 71 FCC 2d 440 (1979); Order on Reconsideration, 93 FCC 2d 739 (1983); Memorandum Opinion and Order, 91 FCC 2d 1079 (1982); Memorandum

Opinion and Order, 90 FCC 2d 202 (1982) [hereinafter cited as ENFIA (Exchange Network for Interstate Access)]. Interim agreements under which competitive interstate common carriers reimburse Bell operating companies for the costs the latter incurs to provide exchange connection; will expire when FCC formulates competitive system of nationwide access charges.

MCI Telecommunications Corp. v. FCC, 712 F. 2d 517,524 (D.C. Cir. 1983).

³⁴ Computer Inquiry I, FCC Docket 16979, Notice of Inquiry 7 FCC 2d 11 (1966), Supplemental Notice of Inquiry 7 FCC 2d 19 (1967), Report and Further Notice of Inquiry, 17 FCC 2d 587 (1969), Tentative Decision, 28 FCC 2d 291 (1970), Final Decision and Order, 28 FCC 2d 267 (1971).

³⁵ Supra.

³⁶ Computer Inquiry II, supra note 16.

³⁷ American Telephone & Telegraph, Memorandum Opinion and Order (Tat-4), 37 FCC 115 (1964). Formally established the dichotomy between voice and data services industries; limits AT&T to provide voice-only service on the international market. IRCs were already providing alternate voice data. Overseas Communications Services, CC Docket No. 80-632, Notice of Proposed Rulemaking, 84 FCC 2d 622 (1980), Report and Order, 92 FCC 2d 641 (1982). Allowed AT&T to offer international data services and the IRCs to offer international voice services. See also Western Union International (Datel), FCC Docket No. 19558, Memorandum, Opinion, Order and Authorization, (76 FCC 2d 166 (1980), aff'd, 673 F.2d 539 D.C. Cir. (1982). Permitted IRC customers to use the IRCs international Datel lines to transmit voice.

³⁸ U.S. v. AT&T, Civil Action No. 74-1698, supra note 13.

³⁹ AT&T and the Justice Department announced on January 8, 1982, that they had reached agreement on a consent decree proposing modification of the 1956 Consent Decree. The proposal was filed with the U.S. District Court (Newark, NJ) the same day, and later formed the basis of the Modification of Final Judgment.

⁴⁰ 1956 Consent Decree, supra note 13.

Modification of Final Judgment, supra note 13, at p. 171.

In lifting the restrictions imposed by the 1956 Consent Decree, the court freed AT&T in some areas and kept restraints in other areas. AT&T was allowed to enter into manufacturing and marketing of computers and other electronic equipment (at Sec. VI, pp. 178-179) and to enter computer, computer-related, and information service markets so long as AT&T did not create

or control the information being transmitted. (at Sec. VI, pp. 179, 185). Seven years after 1984, AT&T would be freed from this final restriction over information content and allowed to compete in the electronic publishing industry (at Sec. VI, p. 186, and at Sec. VIII(D), p. 231).

⁴¹Wall Street Journal, May 3, 1984, p. 43.

⁴²AT&T.

⁴³Wall Street Journal, supra note 41.

⁴⁴U.S. v. Western Electric Co., Civil Action No. 82-0192 (following Modification of Final Judgment, supra note 13), Appendix to Application of BOCs for Approval of LATAs, Volume I, October 4, 1982, Section B, p. 40-47; Section C, pp. 12, 14; and Section D, p. 30-36.

Updated by AT&T.

⁴⁵Computer Inquiry II, Final Decision, supra note 16.

⁴⁶Supra at pp. 404-405.

⁴⁷AT&T.

⁴⁸Modification of Final Judgment, supra note 13.

⁴⁹Supra at Sec. I(A)(1), p. 226; Sec. II(D)(3), p. 228.

⁵⁰Supra at Sec. VIII(A), p. 231.

⁵¹Computer Inquiry II, Final Decision, supra note 16, at p. 388-389; 439; aff'd sub nom., Computer and Communications Industry Assoc. v. FCC, supra note 16; cert. denied, Louisiana Public Service Commission v. FCC and NARUC v. FCC, supra note 16.

⁵²Modification of Final Judgment, supra note 13, at Sec. VIII(D), p. 231, which provides that AT&T shall not engage in electronic publishing over its own transmission facilities, except for the publishing of electronic directory services. Upon application of AT&T, this restriction shall be removed after seven years from the date of entry of the decree, unless the Court finds that competitive conditions clearly require its extension.

⁵³U.S. v. Western Electric Co., Civil Action No. 82-0192, 569 F. Supp. 1057 at Section III, p. 1074 (D.C.C. 1983).

⁵⁴Modification of Final Judgment, supra note 13, at Sec. I(B), p. 227.

See also AT&T Plan of Reorganization (December 16, 1982), at p. 360-416, submitted by AT&T pursuant to Sec. VIII(J) of the Modification of Final Judgment, supra note 13, 15 p. 226. For example, centralized services will include accounting support functions, at 391-393, and technical evaluations and support, at 375-376, 379-380). This plan was modified by Judge Harold H. Greene of the District Court for the District of Columbia, the new plan providing that AT&T would be required to reimburse the newly formed operating companies some costs related to the divestiture. AT&T and the Justice Department accepted these modifications on August 3, 1983. The divestiture took place January 1, 1984.

See also U.S. v. Western Electric, supra note 53.

⁵⁵ Modification of Final Judgment, supra note 13, at Sec. I(B), p. 227. See also AT&T Plan of Reorganization, supra note 54, at pp. 418-424.

⁵⁶ The court distinguished the concepts of LATA and exchange in U.S. v. Western Electric, Civil Action No. 82-0192, 569 F. Supp. 990, Section IA, pp. 993-995 (D.D.C. 1983).

⁵⁷ Modification of Final Judgment, supra note 13, at Sec. II (D), p. 227. U.S. v. Western Elec., supra, note 53, at p. 1107. Also, See U.S. v. Western Electric, Application of BOCs for Approval of LATA's, supra note 44.

⁵⁸ See Modification of Final Judgment, supra note 13.

⁵⁹ Impact of Customer Provision of Terminal Equipment on Jurisdictional Separations, FCC Docket No. 20981, Notice of Inquiry, Proposed Rulemaking and Creation of Federal-State Joint Board, 63 FCC 2d 202 (1976), Request No. JB-40, of the Federal-State Joint Board (January 10, 1977). AT&T submission, June 14, 1977.

⁶⁰ National Association of Regulatory Utility Commissioners (NARUC), NARUC-FCC Committee on Communications, Separations Manual: Standard Procedures for Separating Telephone Property Costs, Revenues, Expenses, Taxes and Reserves, Washington, D.C., February 1971 [hereinafter cited as Separations Manual]. Codified at Title 47, Part 67, of the Code of Federal Regulations (revised as of October 1, 1982). The FCC incorporated the Ozark Plan's Separations Manual in: Prescription of Procedures for Separating and Allocating Plant Investment, Operating Expenses, Taxes and Reserves Between the Intrastate and Interstate Operations of Telephone Companies, Docket No. 18866, Recommended Report and Order of Joint Board, 26 FCC 2d 248 (1970); Report and Order, 26 FCC 2d 247 (1970).

⁶¹ For accounting changes for inside wiring:

Amendment of Part 31, Uniform System of Accounts for Class A and Class B Telephone Companies, CC Docket No. 79-105 [hereinafter cited as Amendment of Part 31, USOA], First Report and Order, 85 FCC 2d 818 (1980); Memorandum Opinion and Order, 89 FCC 2d 1094 (1982); Second Reconsideration, 92 FCC 2d 864 (1982), [hereinafter cited as Amendment of Part 31, USOA], aff'd, Virginia State Corp. Comm'n v. FCC, No. 83-1136, 737 F.2d 388 (4th Cir. 1984); reh'g denied, July 2, 1984.

For detariffing of inside wiring:

Amendment of Part 31, Uniform System of Accounts for Class A and Class B Telephone Companies, of the Commission's Rules and Regulations with Respect to Accounting for Station Connections, Optional Payment Plan Revenues and Customer Provided Equipment and Sale of Terminal Equipment, CC Docket No. 79-105, Further Notice of Inquiry, 86 FCC 2d 885 (1981). By creating two subaccounts for station connections, this inquiry paves the way for detariffing of inside wiring. For detariffing of simple wiring, see Petitions Seeking Amendment of Part 68 of the Commission's Rules Concerning Connection of Telephone Equipment, Systems and Protective Apparatus to the Telephone Network, CC Docket No. 81-216, [hereinafter cited as Customer-Provided Equipment and Connecting Arrangements], Notice of Proposed Rulemaking and Notice of Inquiry, 85 FCC 2d 868 (1981); Second Notice of Proposed Rulemaking and Order, 92 FCC 2d 1 (1982); Third Notice of Proposed Rulemaking, 94 FCC 2d 5 (1983). For detariffing of complex wiring, see Modifications to the Uniform System of Accounts for Class A and Class B Telephone Companies, CC Docket No. 82-681, [hereinafter cited as Modifications to the USOA]. Notice of Proposed Rulemaking, 47 Fed. Reg. 44770 (October 12, 1982).

⁶² Uniform System of Accounts, 47 CFR Part 31 at Sec. 31.231, Sec. 31.234 (1981).

⁶³ Carterfone, supra note 21.

⁶⁴ With the respect to detariffing of traditional CPE, the FCC stated:

We concluded [in the Final Decision] . . . that we have jurisdiction over terminal equipment, . . . that we can forbear from regulation of CPE and that our preemption of state authority over CPE does not violate the Communications Act or any other laws [emphasis added].

Computer Inquiry II, Memorandum Opinion and Order, supra note 16, at p. 98.

⁶⁵ In Computer Inquiry II, Final Decision, supra note 16, the FCC adopted a bifurcated scheme which detariffed new terminal equipment immediately, while it left the installed base of CPE

to further deliberations in Computer Inquiry Implementation Proceeding, CC Docket No. 81-893, Notice of Inquiry, 89 FCC 2d 694 (1982). In 1983, the FCC approved a two-year plan that partially returns CPE to regulation. Under the plan, state regulators may order independent telephone companies to furnish CPE on an untariffed basis (Telecommunications Reports, Vol. 49, No. 19, May 16, 1983 at 1).

The FCC ordered AT&T to expense the costs of terminal equipment installation, including new inside wiring, in AT&T General Rate Case, FCC Docket No. 19129, Phase II Final Decision and Order, 64 FCC 2d 1 (1977). In a separate docket, the Board continues to examine the plan for changing the accounting treatment of this equipment in the telephone company accounts, Amendment of Part 31, USOA, supra note 61. The Board also continues to consider the detariffing of customer premise inside wiring in Deregulation of Customer Premises Inside Wiring, supra note 61; Customer-Provided Equipment and Connecting Arrangements, supra note 61; and Modifications to the USOA, supra note 61.

In an interim decision in Customer-Provided Equipment and Connecting Arrangements, the Board permitted business and residential customers to install their own inside wiring in one- and two-line telephone systems.

Telephone companies may also sell customers the in-place CPE and inside wiring. This equipment was previously installed by the local company and considered a component of basic local service.

⁶⁶ Amendment of Part 31, USOA, supra note 61.

Customer-Provided Equipment and Connecting Arrangements, supra note 61.

Modifications to the USOA, supra note 61.

⁶⁷ Computer Inquiry II, Final Decision, supra note 16, at pp. 436-439 and at p. 437, n. 47.

⁶⁸ Supra, at pp. 439, 461-466. The FCC "separated [CPE] from a carrier's basic transmission services," at p. 439.

⁶⁹ Supra, at p. 438.

⁷⁰ Modifications to the USOA, supra note 61.

Customer-Provided Equipment and Connecting Arrangements, supra note 61.

⁷¹ Customer-Provided Equipment and Connecting Arrangements, Notice of Proposed Rulemaking and Notice of Inquiry, supra note 61.

While this initial inquiry covers CSU (channel service unit), the Third Notice of Proposed Rulemaking, supra note 61, equates CSU to digital NCTE. The FCC states:

AT&T characterizes the digital NCTE in a manner that leads us to conclude that it is functionally, if not electrically, identical to the CSU.

Supra, p. 13, n. 15.

The FCC further states:

Our determination in this proceeding encompasses those CSU-like devices that serve the function equivalent of a CSU and which a carrier might seek to provide in conjunction with its offering of digital transmission capacity. Consistent with this, in this order we shall use the terms "CSU", "CSU-like", and "digital NCTE" interchangeably.

Supra, pp. 13-14.

⁷² Customer-Provided Equipment and Connecting Arrangements, Third Notice of Proposed Rulemaking, supra note 61 at p. 5.

⁷³ Supra, at p. 21.

⁷⁴ Supra, at p. 21.

The result of this proceeding is to reject the notion that NCTE be supplied exclusively by carriers on a regulated basis [emphasis added].

⁷⁵ Modification of Final Judgment, supra note 13, at Sec. II(B)(3), p. 228; Sec. I(A)(1), p. 226; Sec. II(A), p. 227.

Also, AT&T Plan of Reorganization, supra note 54, pp. 86-87, gave the BOCs:

Account 232, Station Connections, consisting of inside wiring for station apparatus and PBXs, connecting blocks, station protectors, other material and labor costs incurred in the installation of station apparatus and inside wiring, does not contain customer premises equipment, and therefore, will remain with the BOCs.

⁷⁶ Modification of Final Judgment, supra note 13 at Sec. VIII(A), p. 231; Sec. II(D)(1), p. 227; and Sec. II(D)(2), p. 227. The regional companies can sell new CPE but are prohibited from manufacturing CPE.

⁷⁷AT&T Plan of Reorganization, supra note 54, at p. 86:

station apparatus, inside wiring and related activities [are] on the customer's side of an on-premises network demarcation point (usually the protector block).

⁷⁸Customer-Provided Equipment and Connecting Arrangements, Third Notice of Proposed Rulemaking, supra note 61, at pp. 15, 19-20, 23.

⁷⁹Bell Telephone Laboratories, Engineering and Operations in the Bell System, 1977, p. 149, [hereinafter cited as Engineering and Operations].

⁸⁰Customer-Provided Equipment and Connecting Arrangements, Notice of Proposed Rulemaking and Notice of Inquiry, supra note 61, at pp. 887, 889; and Third Notice of Proposed Rulemaking, at pp. 6, 11, 13-14, 22.

Computer Inquiry II, Final Decision, supra note 16, at p. 447 footnote 57:

Excluded from CPE is . . . multiplexing equipment to deliver multiple channels to the customer.

Modification of Final Judgment, supra note 13, at Sec. IV(E), p. 228:

"Customer premises equipment" . . . does not include equipment used to multiplex.

Also, AT&T Plan of Reorganization, supra note 54, at p. 86.

⁸¹The FCC stated in Computer Inquiry II:

We find that only AT&T and GTE present a sufficiently substantial threat such that they should be required to establish separate corporate entities for the provision of enhanced services and customer-premises equipment In reaching this conclusion we recognize that a reasonable balance can be struck only following a weighing of all appropriate circumstances bearing upon the risks that largely captive monopoly ratepayers will be burdened by anti-competitive conduct on the one hand and that opportunities for economic efficiencies redounding to their benefit may be lost on the other Because we have the flexibility under the Communications Act to adjust the balance as circumstances change or additional evidence is brought to light, we opt for a solution in which only AT&T and GT&E must form separate subsidiaries to offer ENHANCED service of CPE.

Computer Inquiry II, Final Decision, supra note 16, p. 389.

⁸²Supra, at p. 419.

⁸³Supra, at p. 420.

⁸⁴Supra, at p. 420.

⁸⁵1956 Consent Decree, supra note 13.

⁸⁶Packet Communications Inc., supra note 30, at p. 922.

⁸⁷Supra.

⁸⁸American Trucking Assn., Inc. v. AT&T, supra note 31, at p. 646.

⁸⁹Computer Inquiry II, Final Decision, supra note 16, at p. 420, n. 33.

⁹⁰Supra, at p. 422.

Section 64.702(a) of the Commission's Rules and Regulations (47 CFR 727, October 1983) states the following:

the term "enhanced service" shall refer to services, offered over common carrier transmission facilities used in interstate communications, which employ computer processing applications that act on the format, content, code, protocol or similar aspects of the subscriber's transmitted information; provide the subscriber additional, different, or restructured information; or involve subscriber interaction with stored information. Enhanced services are not regulated under Title II of the Act. [emphasis added].

⁹¹Communications Protocols under Section 64.702 of the Commission's Rules and Regulations, Gen. Docket No. 80-756, [hereinafter cited as Communications Protocols], Memorandum Opinion, Order, and Statement of Principles, 95 FCC 2d 584 (1983); Notice of Inquiry, 83 FCC 2d 318 (1980).

⁹²Supra, Memorandum Opinion, Order, and Statement of Principles, at p. 591.

⁹³Supra.

⁹⁴Supra.

⁹⁵Supra, at pp. 591-592, 595-596.

⁹⁶Communications Protocols, Notice of Inquiry, supra note 91.

⁹⁷Communications Protocols, Memorandum Opinion, Order, and Statement of Principles, supra note 91, at p. 596.

Clarification is warranted that protocol processing involved in the initiation, routing and termination of calls (or subelements of calls, e.g. packets) is inherent in switched transmission and is not within the definition of enhanced service.

⁹⁸The Commission stated:

If any waiver is to be granted, it [will] be granted solely on condition that underlying transparent transmission facilities, which are comparable in price, quality and conditions of service to that built into the offering to be associated with protocol processing, remain available generally and unencumbered by protocol conversion.

Supra, at p. 595.

⁹⁹Supra, at pp. 595-596.

¹⁰⁰The 14 companies are as follows: Southern Bell and South Central Bell in a joint petition, New Jersey Bell, New York Telephone and New England Telephone in a joint petition, the five Ameritech operating companies in a joint petition, Pacific Bell, Pacific Northwest Bell, Northwestern Bell, and Southwestern Bell. Southern Bell Telephone & Telegraph Company, Revisions to Florida P.S.C. Tariff No. A29, Comments, July 26, 1983, p. 2.

¹⁰¹Southern Bell Telephone & Telegraph Co., Revisions to Florida P.S.C. Tariff A29 Data Transport Service, Docket No. 830160-TP, issued February 14, 1983 [hereinafter cited as Southern Bell, LADT Tariff]. Tariff is for the provision of Local Area Data Transport (LADT) Service.

¹⁰²Southern Bell Telephone & Telegraph Company, Revisions to Florida P.S.C. Tariff No. A29, Request of IBM for Declaratory Ruling, before the FCC, June 27, 1983.

This request included an IBM letter to the Florida Public Service Commission requesting suspension and investigation of this tariff (March 31, 1982).

¹⁰³Southern Bell, LADT Tariff, supra note 101, Executive Summary, Attachment A, p. 1.

¹⁰⁴A protocol includes all the factors, or characteristics of a call, that allow its completion, such as the code in the header of the packet, enabling the call to reach the proper destination, or such as the length of the packet itself.

The asynchronous-to-X.25 protocol conversion enables a terminal to interface with a packet-switched network. That is, the conversion to the X.25 protocol, or the reverse enables a terminal to send or to receive a message from a packet-switched network. By the same token, the X.25-to-X.75 protocol conversion enables two packet-switched networks to interface: The X.75 protocol enables a message to travel between two different networks.

The transmission of a message between two different terminals, each linked to a different packet-switched network, requires the following conversions:

1. An asynchronous-to-X.25 conversion to move the message from the originating terminal into the first packet-switched network.
2. A conversion from X.25 to X.75 and back to X.25, moving the message across the interface between the first and second packet networks.
3. An X.25-to-asynchronous conversion to move the message from the second packet network to the end terminal.

Under the guidelines of Computer Inquiry II, protocol conversions performed by a regional operating company, such as a change from X.25 to X.75 protocols, must be done by a separate subsidiary. In November 1984, the FCC allowed the regional operating companies to provide X.25-to-X.75 protocol conversion as part of their regulated services. The FCC waived its separate subsidiary rule for this limited type of protocol conversion.

In the Matters of Pacific Bell, Southern Bell and South Central Bell, et. al., Petitions for Waiver of Section 64-702 of the Commission's Rules and Regulations to Provide Certain Types of Protocol Conversion Within Their Basic Telephone Networks, Memorandum Opinion and Order, FCC 84-561 (adopted November 21, 1984, released November 28, 1984).

Computer Inquiry II, Final Decision, supra note 16.

Communications Protocols, supra note 91.

¹⁰⁵ Policy and Rules Concerning the Furnishing of Customer Premises Equipment, Enhanced Services and Cellular Communications Services by the Bell Operating Companies, CC Docket No. 83-115, [hereinafter cited as BOC Customer Premises Equipment and Enhanced Services], Notice of Proposed Rulemaking, 93 FCC 2d, 722.

Computer Inquiry II, Final Decision, supra note 16.

In the Matter of An Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and

Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems [hereinafter cited as Cellular Communications Systems], CC Docket No. 79-318, Report and Order, 86 FCC 2d 469 (1981); Memorandum Opinion and Order on Reconsideration, 89 FCC 2d 58, 73 (1982); On Further Reconsideration, 90 FCC 2d 571 (1982).

¹⁰⁶ BOC Customer Premises Equipment and Enhanced Services, supra note 105, at pp. 726-727.

The FCC illustrates this point at p. 727, n. 10.:

Compare Response of the United States to Public Comments on Proposed Modification of Final Judgment, May 20, 1982 at 49-50 (Department of Justice states that the BOCs would not be able to provide Custom Calling Services II) with AT&T, 88 FCC 2d 1 (1981) (the Commission finds Custom Calling Services II to be an enhanced service).

¹⁰⁷ Modification of Final Judgment, supra note 13, at Sec. II(D), pp. 227-228; and Sec. VIII(A), p. 231; and Sec. VIII(B), p. 231.

¹⁰⁸ The court stated:

The restrictions imposed upon the separated BOCs by virtue of section II(D) shall be removed upon a showing by the petitioning BOC that there is no substantial possibility that it could use its monopoly power to impede competition in the market it seeks to enter.

Supra, at Sec. VIII(C), p. 231.

¹⁰⁹ In December of 1984, the court approved 13 requests for waiver of the line of business restrictions. The requests granted were as follows:

1. Bell Atlantic's motion to enter the equipment leasing market.
2. Bell Atlantic's motion to enter the computer sales and services business.
3. NYNEX's motion to enter foreign business venture.
4. NYNEX's motion to provide office equipment and related services through retail stores.
5. Bell South's motion to provide office equipment.
6. Pacific Telesis' motion to establish a real estate subsidiary.
7. Pacific Telesis' motion to provide office equipment through retail stores.

8. Ameritech's motion to provide foreign consulting services.
9. Ameritech's motion to provide cellular services and to invest in cellular systems outside of the U.S.
10. Pacific Bell's and Nevada Bell's motion to enter into foreign business ventures.
11. US West's motion to enter foreign business ventures.
12. US West's and NewVector's motion to construct and operate a cellular radio system in the Gulf of Mexico.
13. US West's motion to provide real estate services and to engage in real estate transactions and investments.

U.S. v. Western Electric, Civil Action No. 82-0192, supra note 13, Slip Opinion, (D.D.C. Dec 14, 1984).

Ever since the approval of the Modification of Final Judgment, the court has found itself inundated with litigation concerning the restructuring of the telecommunications industry. In addition to the waiver of line of business restrictions, the court has had to contend with other issues. Some of these issues (filed under Civil Action No. 82-0192) are:

1. division of assets between the Regional Holding Companies and AT&T.
2. boundary changes between LATAs.
3. approval of independent company market areas.
4. equal access
5. enforcement of the Modification of Final Judgment regarding intralATA toll competition.
6. break up of AT&T's exclusive intrastate 800 Service.

With respect to 800 Service, Judge Harold Greene ruled on January 9, 1985, that AT&T does not have to give the regional operating companies or the other common carriers (OCCs) access to AT&T's system for intrastate 800 Service.

An additional issue confronting the court is the nature of the costs and services provided among the Regional Holding Companies, the independent companies, the OCCs, and AT&T. Some examples of these issues are:

1. the nature and cost of the provision of equal access.
2. billing of intrastate 800 Service.
3. provision of directory and other operator services.

4. whether the Regional Holding Companies have the exclusive right to deal with end users for their interLATA and intraLATA requirements.

¹¹⁰ Modification of Final Judgment, supra note 13, at Sec. VIII(C), p. 231.

In addition to the requirement that a separate subsidiary carry out new business unless a line of business waiver is granted, the court established three other "safeguards" for line of business waivers:

1. independent financing by the subsidiary.
2. agreement that the monitoring and visitorial provisions of Section VI of the Modification of Final Judgment will apply to the new activities.
3. a limit on the line of business investment not to exceed 10% of a Regional Holding Company's estimated net revenues.

U.S. v. Western Electric, Civil Action No. 82-0192, supra note 13, 592 F. Supp. 846, at pp. 870-872 (D.D.C. 1984).

¹¹¹ AT&T Plan of Reorganization, supra note 54, at p. 28:

An operator call processing system typically consists of a central processing unit or an electromechanical switching system that is connected to clusters of operator positions. Each cluster of operator positions is organized around an operator work center, which consists of equipment bays, operator consoles, data base retrieval systems, and other support equipment within a work center building or at a remote location.

¹¹² One example of an enriched Centrex offering is the one approved by the Illinois State Commerce Commission on September 14, 1984, for Illinois Bell. Centrex service was enhanced by including such previously optional features as Touch-Tone dialing, add-on conferencing, and tracking of outgoing calls.

Proposed Restructuring of Centrex Service Applicable to All Exchanges of the Company, Illinois State Commerce Commission, Doc. No. 84-0111 (1984).

¹¹³ In earlier days the loop included all terminal equipment recorded as Station Apparatus and some of the equipment recorded as Large PBX. The loop excludes carrier-owned terminal equipment installed on the customer's premises.

¹¹⁴ AT&T Plan of Reorganization, supra note 54, at p. 15.

115 Request No. JB-40, AT&T submission, supra note 59.

116 In the Matter of An Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz; and Amendment of Parts 2, 18, 21, 73, 74, 89, 91, and 93 of the Rules Relative to Operations in the Land Mobile Service between 806 and 960 MHz, Docket No. 18262, [hereinafter referred to as Land Mobile Radio Service], Second Report and Order 46 FCC 2d 752, 756 (1974); reconsideration, Memorandum Opinion and Order, 51 FCC 2d 945 (1975); clarified, Memorandum Opinion and Order, 55 FCC 2d 771 (1975).

117 MCI Cellular Telephone Co. v. FCC, No. 83-1408; No. 83-1720, 738 F. 2d 1322, 1324 (D.C. Cir. 1984).

118 Supra.

119 Land Mobile Radio Service, reconsideration, Memorandum Opinion and Order, supra note 116, at pp. 951-956.

120 Cellular Communications Systems, supra note 105.

121 The filing deadlines for cellular applications were: Markets 31-60-November 8, 1982; Markets 61-90 - March 8, 1983; Markets 91-120-July 16, 1984; all other markets through 301 will have deadlines announced in groups of 30. See McGuinn, Connors and Cannon Cellular Radio Telecommunications; Regulating an Emergency Industry, 1983 B.Y.U. L. Rev. 305, 318-319 (1983).

122 Cellular Communications Systems, supra note 105, Memorandum Opinion and Order on Reconsideration at pp. 77-80, 99-100, modifying Report and Order at p. 493.

123 As the District Court stated:

Section I of the proposed decree would provide for significant structural changes in AT&T. In essence, it would remove from the Bell System the function of supplying local telephone service by requiring AT&T to divest itself of the portions of its twenty-two Operating Companies which perform that function.

Modification of Final Judgment, supra note 13, at p. 141. Local telephone service includes regular wireline and cellular services.

See also Note, Cellular Communications Services: Wireline Delivery or Delay?, 72 Georgetown L.J. 1183, 1188 (1984); MCI Cellular Telephone Co. v. FCC, supra note 117, at p. 1327, n. 4.

- ¹²⁴ Cellular Communications Systems, Memorandum Opinion and Order on Reconsideration, supra note 105, at p. 75.
- ¹²⁵ Cellular Communications Systems, supra note 105, MCI Cellular Telephone v. FCC, supra note 117.
- ¹²⁶ AT&T Plan of Reorganization, supra note 54, at pp. 14-17.
- ¹²⁷ Supra, at pp. 25-26.
- ¹²⁸ Engineering and Operations, supra note 79, pp. 176-179.
- ¹²⁹ Telecommunications Reports, Vol. 50, No. 2, Jan. 16, 1984, p. 3.
- ¹³⁰ Modification of Final Judgment, supra note 13, at Sec. I(A)(1), p. 226, and Appendix B, Sec. A(1), pp. 232-233.
- ¹³¹ AT&T Plan of Reorganization, supra note 54, at p. 44.
- ¹³² U.S. v. Western Electric Co., Appendix to Application of BOCs for Approval of LATAs, supra note 44, Volume II, October 4, 1982, Section L, pp. 1-37.
- Updated by AT&T.
- ¹³³ Above 890, supra note 5.
- ¹³⁴ MCI Telecommunications Corp. v. FCC, supra note 32.
ENFIA, supra note 33.
- ¹³⁵ ENFIA, supra note 33.
Bell System Tariff Offerings, supra note 33;
Facilities for Use by Other Common Carriers, supra note 33.
- ¹³⁶ MTS and WATS Market Structure, Final Rule, (Reconsideration Order), supra note 32, at 48 Fed. Reg. 42984, n. 74.
- ¹³⁷ Request No. JB-40, AT&T submission, supra note 59.
- ¹³⁸ Uniform System of Accounts, supra note 62.
Separations Manual, supra note 60.
- ¹³⁹ AT&T Plan of Reorganization, supra note 54, at p. 18.
- ¹⁴⁰ See generally AT&T Plan of Reorganization, supra note 54.
- ¹⁴¹ AT&T Plan of Reorganization, supra note 54 at pp. 52-53.

142 Communications Act of 1934, supra note 11, at Section 201(b), p. 1070.

143 Request No. JB-40, AT&T submission, supra note 59.

144 For a history of state regulation and development of cost separations between the federal and state jurisdiction (1910-1943), see James W. Sichter, Separations Procedures in the Telephone Industry: The Historical Origins of a Public Policy, Program on Information Resources Policy, Harvard University, Cambridge, Massachusetts, Publication P-77-2, January 1977. For a history of cost separations (1920s-1980s), see Volume 3 of this series.

For a history of the structure of the U.S. Communications industry between the 1960s and the 1970s, see Kurt Borchardt, Structure and Performance of the U.S. Communications Industry: Government Regulation and Company Planning, Graduate School of Business Administration, Harvard University, Boston, Massachusetts, 1970.

For technical details of the early telephone system (1875-1925), see M.D. Fagen (Editor), A History of Engineering & Science in the Bell System: The Early Years (1875-1925), Bell Telephone Laboratories, Inc., 1975 [hereinafter cited as History of Engineering].

145 History of Engineering, supra note 144, pp. 25-26.

146 U.S. Patent Office Official Gazette, March 7, 1876, p. 474.

AT&T, Events in Telecommunications History, AT&T, New York, N.Y., p. 3 [hereinafter cited as Events].

147 U.S. Patent Office Official Gazette, January 30, 1877, p. 175.

Events, supra, note 146, at p. 4.

148 History of Engineering, supra, note 144, at pp. 25-36 and Figure 2-1, p. 27.

149 Events, supra note 146, at pp. 6, 9.

Contract between Western Union Telegraph Company and the National Bell Telephone Company, November 10, 1979.

AT&T.

150 History of Engineering, supra note 144, at pp. 29-30 and Figure 2-1, p. 27.

AT&T.

- 151 History of Engineering, supra note 144, at p. 30 and Figure 2-1, p. 27. Patent filed on April 4, 1877, and issued on November 17, 1891.

AT&T.

- 152 History of Engineering, supra note 144, at Figure 2-1, p. 27.

- 153 William A. Simonds, The Hawaiian Telephone Story, written for the Seventy-Fifth Anniversary of the Founding of Hawaiian Telephone Company, Hawaiian Telephone Company, 1958, pp. 1-28 [hereinafter cited as Hawaiian Telephone].

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- 154 Hawaiian Telephone, supra note 153, at p. 9.

- 155 Supra, at pp. 12-19.

- 156 Supra, at p. 17.

- 157 Supra, at p. 15.

- 158 Supra, at p. 25.

- 159 History of Engineering, supra note 144, at pp. 34-35 and Figure 2-1, p. 27.

AT&T.

- 160 Events, supra note 146, at p. 14.

- 161 History of Engineering, supra note 144, at p. 70.

John Brooks, Telephone: The First Hundred Years, Harper & Row, New York, N.Y., 1976, pp. 102-103, 105 [hereinafter cited as Telephone].

In 1883, the U.S. Department of Justice filed suit on behalf of the Massachusetts Department of Justice. In this action, the U.S. sought to have American Bell's Berliner patent (U.S. No. 463, 569) declared void and unenforceable. The court ruled against American Bell who then appealed to the U.S. Court of Appeals, First Circuit, which reversed the lower court's decision. The Supreme Court upheld the U.S. Court of Appeals ruling.

Later, American Bell initiated a suit against National Telephone Manufacturing Company for infringement of the Berliner patent. The courts dismissed the complaint.

U.S. v. American Bell Telephone Co. 65 Fed. Rep. 86 (1895); aff'd, 33 U.S. App. 236; aff'd U.S. v. American Bell Telephone Co. 167 U.S. 224 (1897).

American Bell v. National Telephone Manufacturing Co. 109 F. 976 (1901); aff'd 119 F. 893 (1903).

¹⁶²United States Telephone Association, The Ring of Success, Commemorative Edition, Washington, D.C., January 1984, pp. 3-4 [hereinafter cited as Ring of Success].

"Noblesville, Indiana, claimed the distinction of having the first independent telephone exchange in the United States." Telephone, supra note 161, at p. 104.

¹⁶³"As early as 1895, a small independent system competing with Bell's was operating in Washington, D.C." Telephone, supra note 161, at p. 105.

¹⁶⁴Kenneth P. Todd, Jr., A Capsule History of the Bell System, 1976, at p. 33 [hereinafter cited as Capsule].

¹⁶⁵Ring of Success, supra note 162, at p. 5.

¹⁶⁶Ring of Success, supra note 162, at p. 5.

¹⁶⁷AT&T.

United States Telephone Association.

¹⁶⁸Telephone, supra note 161, at p. 108.

¹⁶⁹Telephone, supra note 161, at p. 109.

¹⁷⁰Capsule, supra note 164, at p. 39.

U.S. v. Western Electric, Defendants' Third Statement, supra note 18.

¹⁷¹Mann-Elkins Act, Pub. L. No. 218, 36 Stat. 539 (1910).

¹⁷²R. W. Garnet, The Telephone Enterprise: The Evolution of the Bell System's Horizontal Structure, 1876-1909, unpublished manuscript, Johns Hopkins University, pp. 233-235.

AT&T.

Telephone, supra note 161, at p. 133.

¹⁷³U.S. v. Western Electric, Defendants' Third Statement, supra note 18, at pp. 163-164.

¹⁷⁴Letter from N.C. Kingsbury, AT&T, to J.C. McReynolds, Attorney General, Justice Department, December 19, 1913.

U.S. v. Western Electric, Defendant's Third Statement, supra note 18, pp. 164-165.

- 175 U.S. v. Western Electric, Defendants' Third Statement, supra note 18, at pp. 168-169.
- 176 Transportation Act of 1920, Pub. L. No. 152, 41 Stat. 456 (1920).
- U.S. v. Western Electric, Defendants' Third Statement, at pp. 169-170.
- 177 Willis-Graham Act, supra note 6.
- 178 Consolidation of Telephone Systems, supra note 7, p. 1. Also in U.S. v. Western Electric, Defendants' Third Statement, supra note 18, at pp. 167, 170.
- 179 AT&T.
- 180 Letter from E.K. Hall, Vice President, AT&T, to Matt. B. Jones, President, New England Telephone & Telegraph Co., May 3, 1922.
- 181 Letter from E.K. Hall, Vice President, AT&T, to F.B. MacKinnon, President of the U.S. Independent Telephone Association (USITA), June 14, 1922, called the Hall Memorandum.
- 182 Supra, at p. 181.
- 183 Supra, at p. 2.
- 184 AT&T, Report of the Board of Directors to the Stockholders for the Year 1932, New York, N.Y., 1933, p. 3.
- 185 Radio Act of 1927, Pub. L. No. 632, 44 Stat. 1162 (1927), at Sec. 17, pp. 1169-1170.
- 186 Communications Act of 1934, supra note 11.
- 187 U.S. v. Western Electric, Defendants' Third Statement, supra note 18, at p. 183-186.
- 188 Report of the FCC on the Investigation of the Telephone Industry in the United States, H.R. Doc. No. 340, 76th Cong., 1st. Sess. 602, (1939) [hereinafter cited as Investigation of the Telephone Industry]. See also U.S. v. Western Electric, Defendants' Third Statement, supra note 18, at p. 186.
- 189 Investigation of the Telephone Industry, supra note 188, at p. 597. See also U.S. v. Western Electric, Defendants' Third Statement, supra note 18, at p. 185.

XIB. Figures

Figure	Source:
1	1910: Mann-Elkins Act, Pub. L. No. 218, 36 Stat. 539 (1910).
	1920: Transportation Act of 1920, Pub. L. No. 152, 41 Stat. 456 (1920).
	1921: Willis-Graham Act, Pub. L. No. 15, 42 Stat. 27 (1921).
	1927: Radio Act of 1927, Pub. L. No. 632, 44 Stat. 1162 (1927).
	1934: Communications Act of 1934, Pub. L. No. 416, 48 Stat. 1064 (1934).
	1943: Amendments to the Communications Act of 1934, Pub. L. No. 4, 57 Stat. 5 (1943).
	1949: Amendment to the Rural Electrification Act of 1936, Pub. L. No. 423, 63 Stat. 948 (1949).
	1962: Amendment to the Rural Electrification Act of 1936, Pub. L. No. 87-862, 76 Stat. 1140 (1962).
	1971: Federal State Communications Joint Board Act, Pub. L. No. 92-131, 85 Stat. 363 (1971).
	Amendment to the Rural Electrification Act of 1936, Pub. L. No. 92-12, 85 Stat. 29 (1971).
	1972: Amendment to the Rural Electrification Act of 1936, Pub. L. No. 92-324, 86 Stat. 390 (1972).
	1976: Amendment to the Communications Act of 1934, Pub. L. No. 94-376, 90 Stat. 1080 (1976).
	1981: Record Carrier Competition Act of 1981, Pub. L. No. 97-130, 95 Stat. 1687 (1981).
	1984: Cable Communications Policy Act of 1984, Pub. L. No. 98-549, 98 Stat. 2779 (1984).

Figure:	Source:	
2	1976:	H.R. 12323, 94th Cong., 2d Sess. Introduced 3/4/76
		Referred to Interstate and Foreign Commerce Committee 3/7/76
		Reintroduced as H.R. 8, H.R. 513
	1977:	H.R. 8, 95th Cong., 1st Sess. Introduced 1/4/77
		Referred to Interstate and Foreign Commerce Committee 1/4/77
		Revised and reintroduced as H.R. 513
		H.R. 513, 95th Cong., 1st Sess. Introduced 1/4/77
		Referred to Interstate and Foreign Commerce Committee 1/4/77
		S.J. Res. 30, 95th Cong., 1st Sess. Introduced 2/22/77
	Referred to Commerce, Science and Transportation Committee 2/22/77	
	H.R.J. Res. 285, 95th Cong., 1st Sess. Introduced 2/24/77	
		Referred to Interstate and Foreign Commerce Committee 2/24/77
		H.R.J. Res. 512, 95th Cong., 1st Sess. Introduced 6/6/77
	Referred to Interstate and Foreign Commerce Committee 6/6/77	
	1978:	H.R. 13105, 95th Cong., 2d Sess. Introduced 6/7/78
		Referred to Interstate and Foreign Commerce Committee 6/7/78
		Hearing in House 7/18/78
Reintroduced in modified form in 1979 as H.R. 3333, H.R. 6121		
1979:	H. R. 3333, 96th Cong., 1st Sess. Introduced 3/29/79	
	Referred to Interstate and Foreign Commerce Committee 3/29/79	
	Hearings Began in House 4/24/79	

Figure: Source:

	H.R. 6121, 96th Cong., 1st Sess. Introduced	12/13/79
	Referred to Interstate and Foreign Commerce Committee	12/13/79
	Reported with Amendments, House Report No. 96-1252 Pt.1	8/25/80
	Referred to House Committee on Judiciary	8/25/80
	Hearings Began in House	9/9/80
1980:	S. 2827, 96th Cong., 2d Sess. Introduced	6/12/80
	Referred to Commerce, Science and Transportation Committee	6/12/80
1981:	S. 898, 97th Cong., 1st Sess. Introduced	4/7/81
	Referred to Commerce, Science and Transportation Committee	4/7/81
	Hearings Began in Senate	6/2/81
	Reported with Amendments, S. Report No. 97-170	7/27/81
	Amended on Senate Floor (voice)	10/5/81
	Amended on Senate Floor	10/6/81
	Amended on Senate Floor	10/7/81
	Passed Senate as Amended (roll call)	10/7/81
	Referred to Committee on Energy and Commerce	10/20/81
	H.R. 5158, 97th Cong., 1st Sess. Introduced	12/10/81
	Referred to Energy and Commerce Committee	12/10/81
	Hearings Began in House	2/2/81
1982:	S. 2469, 97th Cong., 2d Sess. Introduced	5/3/82
	Referred to Commerce, Science and Transportation Committee	5/3/82
	Hearings Began in Senate	6/14/82
	Reported, Amended, S. Report No. 97-669	11/30/82
1983:	S. 999, 98th Cong., 1st Sess. Introduced	4/7/83
	Referred to Commerce Committee	4/7/83
	Hearings Begun by Subcommittee	5/10/83
	H.R. 4464, 98th Cong., 1st Sess. Introduced	11/17/83

Figure: Source:

Referred to Energy and Commerce Committee	11/17/83
Hearings Begun by Telecommunica- tions Subcommittee	6/13/84
S. 607, 98th Cong., 1st Sess. Introduced	
Referred to Commerce Committee	2/28/83
Hearings Begun by Communications Subcommittee	3/9/83
Ordered Reported with Amendments	3/22/83
Reported with Amendments, S. Report No. 98-60	4/15/83
S. 1382, 98th Cong., 1st Sess. Introduced	5/25/83
Referred to Commerce, Science and Transportation Committee	5/25/83
H.R. 3621, 98th Cong., 1st Sess. Introduced	7/21/83
Referred to Energy and Commerce Committee	7/21/83
Hearings Begun by Committee	7/28/83
Approved with Amendments by Telecommunications Subcommittee	9/28/83
Clean Bill Approved by Committee, see 4102 for further action	10/6/83
S. 1660, 98th Cong., 1st Sess. Introduced	7/21/83
Referred to Commerce Committee	7/21/83
Hearings Begun by Committee	7/28/83
Committee Began Markup	9/20/83
Ordered Reported with Amendments	9/30/83
Reported with Amendments, S. Report No. 98-270	
Senate Began Consideration	1/23/84
Senate Continued Consideration	1/24/84
Senate Continued Consideration	1/25/84
Tabled Motion to Proceed to Consider (44 to 40; S. Leg. 1)	1/26/84
H.R. 4102, 98th Cong., 1st Sess. Introduced as Clean Bill, see H.R. 3621 for prior action	10/6/83
Referred to Energy and Commerce Committee	10/6/83
Committee Began Markup	10/18/83
Ordered Reported with Amendments	10/27/83

Figure: Source:

Reported with Amendments, H.
Report No. 98-479 11/3/83
Rule Granted Allowing Limited
Amendments (H. Res. 363) 11/8/83
Amendments Adopted (text of H.R.
4295) (voice) 11/10/83
Amendments Adopted (voice) 11/10/83
Amendments Rejected (142 to 264;
H. Leg. 488) 11/10/83
Amendments Rejected (122 to 270;
H. Leg. 489) 11/10/83
Passed by House 11/10/83
Placed on Senate Calendar 11/15/83

1984: S. 66, 98th Cong., 2d Sess.
Passed by House, Amended to
contain H. 4103 as Reported
(voice) 10/1/84
House Insisted on its Amendments
and Requested Conference
(voice) 10/1/84
Senate Agreed to Amendments by
House with Amendments (voice) 10/11/84
House Agreed to Amendments by
Senate (voice) 10/11/84
Signed by President 10/30/84
Public Law 98-549 10/30/84

S. 2282, 98th Cong., 2d Sess.
Introduced 2/9/84
Referred to Commerce, Science
and Transportation Committee 2/9/84

S. 2618, 98th Cong., 2d Sess.
Introduced 5/1/84
Referred to Senate Finance
Committee 5/1/84
Hearings Begun by Taxation
Subcommittee 9/12/84

H.R. 4103, 98th Cong., 2d Sess.
Introduced 10/6/83
Hearings Began 11/3/83
Energy and Commerce Committee
Began Markup 6/26/84
Reported with Amendments, H.
Report 98-934, by Energy
and Commerce Committee 8/1/84
Passed under Suspension of Rules
by two-thirds vote (voice) 10/1/84

Figure: Source:

Passage Vacated and S. 66 Passed in lieu Tabled	10/1/84 10/1/84
H.R. 5724, 98th Cong., 2d Sess. Introduced Referred to House Energy and Commerce Committee Hearings Begun by Telecommuni- cations Subcommittee	5/24/84 5/24/84 6/13/84
H.R. 4840, 98th Cong., 2d Sess. Introduced Referred to Energy and Commerce Committee	2/9/84 2/9/84
H.R. 6155, 98th Cong., 2d Sess. Introduced Referred to Energy and Commerce	8/10/84 8/10/84

3 AT&T.

4 AT&T.

5 New York Times, "AT&T Would Set Up Seven Units,"
February 20, 1982, p. 31.

6 National Association of Regulatory Utility
Commissioners (NARUC), NARUC-FCC Committee on
Communications, Separations Manual: Standard
Procedures for Separating Telephone Property Costs,
Revenues, Expenses, Taxes and Reserves, Washington,
D.C., February 1971 [hereinafter cited as Separations
Manual]. Codified at Title 47, Part 67, of the Code
of Federal Regulations (revised as of October 1,
1982). The FCC incorporated the Ozark Plan's
Separations Manual in: Prescription of Procedures
for Separating and Allocating Plant Investment,
Operating Expenses, Taxes and Reserves Between the
Intrastate and Interstate Operations of Telephone
Companies, Docket No. 18866, Recommended Report and
Order of Joint Board, 26 FCC 2d 248 (1970); Report
and Order, 26 FCC 2d 247 (1970).

Uniform System of Accounts, 47 CFR Part 31 (1982).

Impact of Customer Provision of Terminal Equipment on
Jurisdictional Separations, FCC Docket No. 20981,
Notice of Inquiry, Proposed Rulemaking, and Creation
of Federal-State Joint Board, 63 FCC 2d 202 (1976),
Request No. JB-40 of the Federal-State Joint Board
(January 10, 1977). AT&T Submission, June 14, 1977.

7 Supra.

Figure: Source:

- 8 Supra.
- 9 Supra.
- 10 Supra.
- 11 Supra.
- 12 Supra, figure note 6.

AT&T Plan of Reorganization (December 16, 1982) submitted by AT&T pursuant to Section I(A), p. 226, of the Modification of Final Judgment [U.S. v. AT&T, Modification of Final Judgment, 552 F. Supp. 131 (D.D.C. 1982), aff'd mem., 103 S. Ct. 1240 (1983).] The AT&T Plan of Reorganization was altered by Judge Harold H. Greene of the District Court for the District of Columbia, the new plan providing that AT&T would be required to reimburse the newly formed operating companies some costs related to the divestiture. AT&T and the Justice Department accepted these modifications on August 3, 1983. The divestiture took place January 1984. The AT&T Plan of Reorganization defines circuit equipment at pp. 17, 22.

- 13 Supra, figure note 6.

AT&T Plan of Reorganization, supra figure note 12, at p. 28.

- 14 Supra, figure note 6.

AT&T Plan of Reorganization, supra figure note 12, at p. 22.

- 19 New England Telephone and Telegraph Company, Document No. 236-31755 (1982).

Southern Bell Telephone & Telegraph Company.

AT&T.

- 20 Supra, figure note 6.

- 21 Map: The Times Atlas of the World: Comprehensive Edition, Times Books, New York, N.Y., 1980, Plate 102.

Scale of map is: 1:12, 500,000 .

Distance: 6" ~ 1200 miles or ~ 1950 kilometers.

Figure: Source:

25 AT&T.

AT&T Plan of Reorganization, supra figure note 12, pp. 14-15.

26 AT&T.

AT&T Plan of Reorganization, supra figure note 12, at p. 42.

27 AT&T.

AT&T Plan of Reorganization, supra figure note 12, at pp. 14-15.

28 AT&T.

30 Supra, figure note 6.

31 AT&T.

U.S. v. Western Electric Company, Inc., Civil Action No. 82-0192, (following Modification of Final Judgment, supra figure note 12), Appendix to Application of BOCs for Approval of LATAs, Volume II, October 4, 1982, Section L, pp. 1-37.

32 Microwave Communications, Inc. (MCI), FCC Docket No. 16509, Decision 18 FCC 2d 953 (1969), Memorandum Opinion and Order 21 FCC 2d 190 (1970). The FCC determined that MCI could offer a limited service, designed to meet the interoffice and interplant communications needs of small businesses.

Execunet, FCC Docket No. 20640, Decision, 60 FCC 2d 25 (1976). The FCC determined that MCI was not authorized to offer Execunet, which the Commission concluded was "essentially a switched public message telephone service" rather than a private line service (Order, FCC 75-799, July 2, 1975). Execunet service enabled MCI's customers to use any telephone in the Bell local exchange area to call any telephone in another city; Bell claimed the service an invasion of its MTS monopoly.

MCI Telecommunications Corp. v. FCC, 561 F. 2d 365 (D.C. Cir. 1977), cert. denied, 434 U.S. 1040 (1978), (Execunet I). Overturned the Commission's Execunet decision; the Court found that the FCC had never determined that the public interest would be served by a Bell monopoly in MTS and WATS services. MCI Telecommunications Corp. v. FCC, 580 F.2d 590 (D.C. Cir. 1978), cert. denied, 439 US 980 (1978), (Execunet II). Required local telephone companies to provide OCCs interconnections with local network.

Figure: Source:

Bell System Tariff Offerings, FCC Docket No. 19896, Decision, 46 FCC 2d 413 (1974), aff'd, 503 F.2d 1250 (3rd Cir. 1974), cert. denied, 422 U.S. 1026 (1974) reh'g. denied, 423 U.S. 886 (1975). Imposed a legal obligation for interconnection of local companies' facilities with specialized carriers' (OCC) facilities.

Facilities for Use by Other Common Carriers, FCC Docket No. 20099, Memorandum Opinion and Order, 52 FCC 2d 727 (1975). Implemented by a negotiated settlement the legal obligation imposed by Bell System Tariff Offerings.

ENFIA Agreement (Interim Settlement Agreement), 43 Fed. Reg. 59129 (December 19, 1978). AT&T and the Bell System Operating Companies Tariff No. 8 (BSOC 8), Transmittal No. 53, Exchange Network Facilities for Interstate Access (ENFIA), CC Docket No. 78-371, Memorandum Opinion and Order, 71 FCC 2d 440 (1979); Order on Reconsideration, 93 FCC 2d 739 (1983); Memorandum Opinion and Order, 91 FCC 2d 1079 (1982); Memorandum Opinion and Order, 90 FCC 2d 202 (1982) [hereinafter cited as ENFIA (Exchange Network for Interstate Access)]. Interim agreements under which competitive interstate common carriers reimburse Bell operating companies for the costs the latter incurs to provide exchange connection; will expire when FCC formulates competitive system of nationwide access charges.

MCI Telecommunications Corp. v. FCC, 712 F. 2d 517, 524 (D.C. Cir. 1983).

33 AT&T.

Federal Communications Commission, Statistics of Communications Common Carriers (Washington, D.C. 1976) p. 30, Table 16.

Request No. JB-40, AT&T Submission, supra figure note 6.

Separations Manual, supra figure note 6, at pp. 25-30, 31-38, 39-40, 73, 77, 79.

34 Supra.

35 1935: In FCC Order No. 7-B, 1 FCC 43 (1935). The FCC adopted Interstate Commerce Commission (ICC) accounting rules for telephone companies, ICC Docket No. 25705 issued November 12, 1932.

Figure: Source:

- 1954: Amendment of Parts 31, 34, and 35, Uniform System of Accounts, of the Commission's Rules and Regulations, FCC Docket No. 10985, Memorandum Opinion and Order, 42 FCC 96 (1954).
- 1970: Amendment of Parts 31 and 33, Uniform System of Accounts, of the Commission's Rules to Provide for Deferral Accounting for Income Tax Differentials Occasioned by the Use of Accelerated Depreciation for Income Tax Purposes; Also to Make Related Changes in Annual Report Form M and to Provide for Interim Reporting on Monthly Report Form 901, FCC Docket No. 18828, Report and Order, 24 FCC 2d 357 (1970).
- 1975: Amendment of Parts 31 and 33, Uniform System of Accounts, of the Commission's Rules to Provide for Deferral Accounting for Income Tax Differentials Occasioned by the Use of Depreciation Based on Class Lives and Asset Depreciation Ranges for Income Tax Purposes and to Provide for Below-the-Line Accounting in Certain Instances for Investment Credits Made Available by the Revenue Act of 1971, FCC Docket No. 20489, Notice of Proposed Rule Making, 53 FCC 2d 667 (1975).
- 1977: American Telephone and Telegraph Company, The Associated Bell System Companies, Charges for Interstate Telephone Service, FCC Docket No. 19129, Phase II Final Decision and Order, 64 FCC 2d 1 (1977).
- 1978: Amendment of Part 31, Uniform System of Accounts, FCC Docket No. 21230, Report and Order, 68 FCC 2d 902 (1978).
- 1980: Amendment of Part 31, Uniform System of Accounts, so as to Permit Depreciable Property to be Placed in Groups Comprised of Units with Expected Equal Life for Depreciation Under the Straight-Line Method, FCC Docket No. 20188, Report and Order, 83 FCC 2d 267 (1980).
- 1981: Amendment of Part 31, Uniform System of Accounts, of the Commission's Rules and Regulations with Respect to Accounting for Station Connections, Optional Payment Plan Revenues and Related Capital Costs, Customer Provided Equipment and Sale of Terminal Equipment, CC Docket No. 79-105, First Report and Order, 85 FCC 2d 818 (1981).

Figure: Source:

Revision of the Uniform System of Accounts and Financial Reporting Requirements for Telephone Companies (Parts 31, 33, 42 and 43 of the FCC's Rules), CC Docket No. 78-196, Second Supplemental Notice of Proposed Rulemaking and Order, 88 FCC 2d 83 (1981).

36 AT&T Plan of Reorganization, supra figure note 12, at pp. 12-13.

37 AT&T Plan of Reorganization, supra figure note 12, at pp. 52-53.

38 Uniform System of Accounts, supra figure note 6, at Sections 31.640-31.650.

Separations Manual, supra figure note 6, at pp. 77-78.

39 Uniform System of Accounts, supra figure note 6, at Sections 31.241-31.244.

Separations Manual, supra figure note 6, at pp. 25-30.

40 AT&T.

Request No. JB-40, AT&T Submission, supra figure note 6.

Uniform System of Accounts, supra figure note 6, at Sections 31.241-31.244.

Separations Manual, supra figure note 6, at pp. 25-39.

41 AT&T.

Request No. JB-40, AT&T Submission, supra figure note 6.

Uniform System of Accounts, supra figure note 6, at Sections 31.640-31.650.

Separations Manual, supra figure note 6, at pp. 77-78.

42 AT&T.

Request No. JB-40, AT&T Submission, supra figure note 6.

Uniform System of Accounts, supra figure note 6, at Sections 31.211-31.212.

Figure: Source:

- 43 Separations Manual, supra figure note 6, at pp. 21-23.
- AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6, at Sections 31.602:1-31.614.
- Separations Manual, supra figure note 6, at pp. 65-71.
- 44 AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6.
- Separations Manual, supra figure note 6.
- 45 AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6, at Sections 31.221-31.244.
- Separations Manual, supra figure note 6, at pp. 25-40.
- 46 AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6, at Sections 31.211-31.212, 31.261-31.264.
- Separations Manual, supra figure note 6, at pp. 21-23,41.
- 47 AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6, at Sections 31.621-31.650, 31.662.

Figure: Source:

- 48 Separations Manual, supra figure note 6, at pp. 73-80.
- AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6, at Sections 31.661-31.665, 31.602:1-31.614.
- 49 Separations Manual, supra figure note 6, at pp. 65-71,81.
- AT&T.
- Request No. JB-40, AT&T Submission, supra figure note 6.
- Uniform System of Accounts, supra figure note 6, at Sections 31.671-31.676, 31.306-31.309, 31.326-31.327, 31.380.
- Separations Manual, supra figure note 6, at pp. 83-86.