

**Universal Service in a Competitive Local Exchange
Telecommunications Environment**

by

Donald M. Gale

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**UNIVERSAL SERVICE IN A COMPETITIVE
LOCAL EXCHANGE TELECOMMUNICATIONS ENVIRONMENT**

by

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M.B.A., University of Massachusetts Dartmouth, 1988

B.S., University of Massachusetts Dartmouth, 1979

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Faculty of the Graduate School of the
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Universal Service in a Competitive Local Exchange Environment

Thesis directed by Professor James H. Alleman

The telecommunications industry has evolved into a very competitive industry since 1980. Aggressive competition is the norm in the long distance, equipment, operator services and many other segments of the industry. The remaining segment of the market without widespread meaningful competition is the “last-mile” wireline service to the customer premise. Incumbent local exchange carriers enjoy a monopoly to serve nearly all residences and most business customers, collecting over 99% of all local exchange service revenues. Using their monopoly status, incumbents have developed a cross-subsidy system which uses the rates paid by some customers to lower the rates paid by others to support a policy known as “universal service.” This policy has resulted in telephone service reaching 94% of America’s households. Carriers claim that this policy cost them \$20 billion annually, potential entrants claim the true cost is as low as \$4 billion and the rest is profit.

In the Telecommunications Act of 1996, Congress ordered the end of the local exchange monopoly and opened the local markets to competition. Congress also specified the continuation of universal service, specified that telephone penetration should be increased and specified that the universal service concept will be applied to America’s schools, libraries and rural health centers. Congress also specified that, unlike today, all carriers will contribute fairly and equitably to the universal service fund and that all carriers providing local service, including new competitors, will be eligible to receive support from the fund. The cost to meet these requirements in a competitive environment totals \$7.2 billion, or 5.1% of net carrier revenue.

This thesis addresses the definition of universal service and the services that should be eligible for support, the new competitive environment, how to collect the universal service support fund, and how to best distribute the funds to customers targeted to receive support from the system: those in high-cost areas, low-income consumers, and schools and libraries for advanced communications services.

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Chapter I Introduction

“Cross-subsidization is probably the most fundamental problem in telecommunications policy for, if it did not exist, one seriously could entertain the notion that the entire field [should] be open to competition”¹

Leland Johnson - 1978

1.1. Objective

The purpose of this thesis is to examine the goals of universal service and to explore methods of achieving certain desirable societal goals as local exchange competition renders the current subsidy system obsolete. The thesis will also address the changing expectations of society from their information and communications services as we continue to evolve toward an information society.

Universal service is the major regulatory hurdle to free and open competition for local service. Yet, it has never been defined. In the monopoly environment, our universal service system developed into a system of internal subsidies and methods of sharing subsidies among the monopolies. The introductions of new technologies have led to invalidation of the natural monopoly concept in telecommunications, allowing private networks to bypass the public network and create competition. Bypass and competition based on new technologies has opened up various segments of the communications market, most notably in the long distance segment. Today, the last vestige of monopoly is the loop, or the “last-mile” to the customer premise from the public network. Technology is now available to open the loop to competition. Currently, technology for true number portability among competing local vendors is being tested, which when deployed will mark the end of the ability of the local exchange carrier (LEC) to control a customer by controlling their directory number.

¹ Leland Johnson, “Boundaries to Monopoly and Regulation in Modern Telecommunications,” in Communications for Tomorrow: Policy Perspectives for the 1980s, ed. Glen O. Robinson. (New York: Praeger, 1978).

This thesis will focus on four policy questions, then recommend a course of action which supports the goals defined in the Communications Act of 1934 and the Telecommunications Act of 1996. The four questions are:

- What services constitute basic universal service?
- What market participants will provide these services?
- How will the subsidy funds be collected?
- How will the subsidy funds be distributed?

The Telecommunications Act of 1996 (1996 Act) has identified local competition as a national goal (Sec. 101 (a)). The Act also identifies delivery of advanced information services to health and educational facilities nationwide as a goal and requires carriers to provide these services at a discount (Sec. 254 (h)(1)(A and B)). This will result in extensive capital expenditures which may not be supportable by revenues from rural areas without subsidized assistance. Under our present universal service system, this provision will burden carriers unevenly.

The 1996 Act directs the FCC to establish a Federal-State Joint Board to adopt rules to create equity in providing universal service and advanced services for health and educational facilities. This thesis will study these questions, evaluate the options and recommend the best solution to each of these questions.

1.2. Background

The concept of universal service has evolved over the past 90 years. The term was first attributed to AT&T President Theodore Vail around 1907. At its inception, the term referred to a single entity which would provide end-to-end switched telephone service. This concept was embodied in AT&T's slogan: "one system, one policy, universal service."² The goal of universal service at that time was a phone in every home, a goal which appealed to politicians and regulators. By 1914, the definition had evolved to mean interconnectability of all of the telephone service provider

² Milton Mueller, "Universal Service in Telephone History: A Reconstruction" *Telecommunications Policy*, 17(July 1993), pp. 353-362. Also referenced by Mark Jamison, "Traditional Support for "Universal Service:" Implications for Lifting IntraLATA Restrictions," unpublished paper, revised December 27, 1993.

networks to AT&T's Bell System.³ With the resulting cooperation, competition was replaced by exchange monopolies. The Communications Act of 1934 incorporated the added concept of telephone service to all at "reasonable charges."⁴

Over the years, more services have been added to the basic service package. In Pennsylvania, consumers are offered four choices for residential service:

1. Basic service has no monthly fee, but a charge for all calls.
2. Standard service which includes a local call allowance in the monthly fee, and a "per-call" charge beyond the allowance.
3. Unlimited service with all local calls included in the monthly fee, and
4. Metro calling which includes all calls within the Philadelphia or Pittsburgh and their suburbs in the monthly fee.

In Massachusetts, Measured Local and Unlimited Local calling are similar to Pennsylvania's Standard and Unlimited services, with options to add selected nearby exchanges to the local calling area for a fixed monthly fee. There are also Measured and Unlimited Circle calling which expands the calling area to all exchanges within a specified radius, Metro services available in the Boston, Providence and Springfield areas which add include those cities and suburbs in the local calling areas, and LATA-wide calling plans including Bay State East and Call Around 413. In most states, basic service is usually similar to Pennsylvania's Standard service or Massachusetts' Measured Local, with an option for unlimited local calling, which is available at a small incremental price. Basic services usually include equal access to interexchange carriers and the ability to presubscribe to the carrier of your choice, access to the operator, repair service, local emergency services, government services, a listing in the directory service and a printed copy of the directory listings annually.

Public safety issues have been used to justify subsidies for cheap residential telephone service, resulting in "lifeline" rates nationwide and "Enhanced-911" (E911) services

³ Gerald R. Faulhaber, Telecommunications in Turmoil: Technology and Public Policy, (Cambridge: Ballinger, 1986), p. 6.

⁴ Communications Act of 1934, U. S. Code, vol. 47, sec. 151.

in several states. In some states, the basic service charge includes “Touch-tone”⁵ dialing. Some education advocates are pressing to expand the definition of universal service to include broadband access to all schools and homes for video and Internet access.⁶

This evolution has resulted in a complex, multi-billion dollar⁷ system of cross-subsidy transfers designed to provide low-priced telephone service to high-cost rural areas and to low-income consumers. The subsidy system has achieved the goal of extending telephone service to nearly the maximum possible market penetration, serving many consumers who would otherwise do without if they had to pay full cost.

New market entrants have developed the capability to provide service directly to end user customers. These entrants are providing a range of telecommunications services in competition with incumbent local exchange carriers (ILECs) by using new technologies, selecting lower cost equipment or operating their networks more efficiently than the ILEC. They are able to price their service to customers closer to the cost of service than the ILEC, which is usually burdened with the obligation to subsidize other customers.

In the name of universal service, subsidies have been directed to broad classes of customers through rate averaging. This has resulted in subsidies for telephones for children in affluent suburbs, for rural vacation homes of affluent people, and for expansive buffalo ranches owned by media moguls. These subsidies may not get telephone service to poor families in poor urban neighborhoods.

⁵ Touch-tone dialing is dual-tone multiple frequency (DTMF) signaling used with push button phones. The name “Touch-tone” is a trademark name of Lucent Technologies for DTMF but is widely used as a generic term. The FCC Notice of Proposed Rulemaking on universal service defines Touch-tone as a generic term for DTMF (FCC 96-93 and CC Docket 96-45 par. 19).

⁶ Alliance for Public Technology, Connecting Each to All: Principles to Implement the Goal of Advanced Universal Service, 1995.

⁷ Carol Weinhaus, Teresa Pitts, Mark Jamison, Apples and Oranges: Differences Between Various Subsidy Studies, (Boston: Telecommunications Industry Analysis Project), 1994. The study notes several different studies which use difference methods to calculate the cost of universal service. The studies result in different dollar amounts due to the varying definitions and parameters in the studies.

There are three broad categories of subsidies. They are:

1. Urban to rural,
2. Business to residential,
3. Long distance to local service.

The first two subsidy categories may be accomplished within the LEC by averaging the rates of all customers within a study area. LECs that are primarily rural or residential often have line costs that are higher than the national average. LEC study areas with average line costs more than 15% over the national average are eligible for receive external subsidies.⁸ The third subsidy category purports to compensate the LEC for providing access from the long distance network to the end user customers. However, these charges are set significantly above cost to create the subsidy.⁹ A second long distance subsidy funds the USF which is distributed to LECs serving high-cost areas.

For almost all residential consumers, there is no wired alternative connection to the telephone network. Current wireless solutions do not provide a competitively priced option for basic service. Cable television systems have yet to successfully deploy telephony solutions on a large scale, although several trials have been attempted.¹⁰ As a result, the incumbent local exchange carrier (ILEC) controls a physical bottleneck facility and has no incentive to be efficient in providing these facilities or

⁸ LEC study areas with average common line costs which are 15% over the national average are eligible for support from the Universal Service Fund. This fund is administered by the National Exchange Carriers Association, a LEC controlled association which collects the cost data submitted by member carriers.

⁹ G. R. Evans and Frank Gumper, "NYNEX Price Cap Review," ex parte presentation at the FCC, Washington, January 13,1995. The excess of price over cost in access charges is offset by a similar excess of cost over price in residential services.

¹⁰ Several trials have been considered a partial success, especially a technical trial by Jones Intercable in Alexandria, VA where Jones has about 250 residential telephone subscribers on its cable plant. A trial of interactive services by Time Warner Cable over its cable plant in the Orlando area was not generally acknowledged as a success. In early 1995, Sprint Telecom Venture (a partnership of Comcast, Cox, Sprint and TCI) offered lucrative incentives to all cable companies who deploy telephony capabilities on their cable networks, but dropped the plan in February 1996.

services. As a result of the lack of incentive for efficiency and the existence of cross subsidies, the incumbent may easily overinvest in loop plant. ILECs expect to be compensated for their investment through depreciation and a return in the investment, under the monopoly rules in place at the time the investment was made.¹¹ However, there is a question about the prudence of the total investment made in the name of universal service. ILECs claim that universal service costs them more than \$20 billion a year.¹² One study shows that the most efficient network designed to current technology standards would require \$4 billion annually to support universal service.¹³ The FCC reported IXC access payments to LECs of \$34.7 billion¹⁴ in 1994 which includes part of the subsidies paid by IXCs. The wide variation between actual costs and an efficient model network indicates substantial excess investment in the local exchange infrastructure leaving much room for increased efficiency and cost savings. While some, including USTA and OPASTCO, claim that the efficient model cited by MCI is idealistic and unattainable,¹⁵ the model does indicate a substantial degree of excess ILEC investment.

Businesses and individuals are always seeking methods to cut their costs to remain competitive. The more competitive a business the more incentive they have to reduce expenses. Large end users have used many methods to reduce their communications

¹¹ Under traditional rate-of-return ratemaking rules, a utility's profits are directly related to its investment in property, plant and equipment (with several minor adjustments). The more a utility invests in its plant, the higher its profit. This results in a clear incentive for a monopoly to overinvest in plant and recover from its captive customers known as Averch-Johnson effect. Harvey Averch and Leland L. Johnson, "Behavior of the Firm under Regulatory Constraint." *American Economic Review*, 52 (December, 1962): 1052-69.

¹² Calvin S. Monson and Jeffrey H. Rohlfs, The \$20 Billion Impact of Local Competition in Telecommunications, July 16, 1993. This study was commissioned by the United States Telephone Association, the ILEC lobbying organization.

¹³ MCI Communications Corp., Defining and Funding Basic Universal Service, July 1994. Also reference MCI's Web Site at <http://competition.mci.com>, where they claim that the legitimate costs to provide basic universal service is \$4-6 billion, the LECs actually collect \$14 billion, and the difference as pure profit.

¹⁴ Federal Communications Commission, "Telecommunications Industry Revenue: TRS Fund Worksheet Data, February 1996". Worksheets present data for 1994.

¹⁵ The study cited by MCI includes a substantial adjustment to compensate for rural costs noted in these claims.

costs or gain a competitive advantage through the increased use of information technology. The advent of microwave technology created the opportunity for large businesses to bypass the ILEC with a private network.¹⁶ Additional networks were developed to provide microwave capacity for resale. The resulting private networks have created a demand for alternative local transport (ALT) providers. Long distance carriers compete on cost and service and have an incentive to use a competitive access provider (CAP), if available, to reduce the cost of access to the customer.

Currently, CAP companies have built high-speed fiberoptic networks in almost all major markets, and many mid-size markets. These networks are usually designed as self-healing rings to provide high capacity services at high reliability levels, which the ILEC often could not or would not provide.

The subsidy system unfairly burdens some market participants. ILECs are obligated to charge the same rates to all of its similarly situated customers without regard to the actual cost to serve that customer. Therefore, some customers are paying more than cost for service while others paid less than cost. This has resulted in the incentive for customers to seek alternative service providers which are not burdened with the obligation to collect subsidies. This further erodes the subsidy mechanism. Two large local carriers have sold a substantial number of high cost rural exchanges to reduce the average cost of serving their remaining subscribers.¹⁷

In conclusion, we have developed a confusing system of hidden subsidies which only became more explicit in the breakup of the Bell System. In the increasingly

¹⁶ Beginning in 1959 with FCC "Above 890" decision, "In the Matter of Allocations of Frequencies in the Bands Above 890 MC," Report and Order, 27 FCC 359, 1959.

¹⁷ Nationwide, GTE sold rural exchanges accounting for 530,000 lines in 1993, 448,000 lines in 1994, and 10,000 lines in 1995 according to its 1995 annual report to the SEC on Form 10-K. Some of the exchanges sold by GTE were already receiving USF payments and its impact on the high-cost fund was not substantial. USWest sold about 380 rural exchanges in 14 states through mid-1996 to companies eligible for USF high-cost payments. Most of the USWest exchanges were not receiving USF support prior to the sale but would be eligible for over \$32 Million annually under new ownership (See Appendix IV). These transactions were large enough to generate concern at the FCC that they could jeopardize adequate funding to other recipients of USF funds. In the "Eagle" order (FCC 95-4) the FCC capped the annual impact of any future transaction on USF high cost support at 1% of the Fund.

competitive environment, the current subsidy system unfairly burdens some market participants with the obligation to subsidize some customers, while others can bypass the obligation, pass the savings onto customers and increase their market share. The subsidy may inhibit competition in the subsidized markets by unfairly supporting some participants to the detriment of competition and consumer choice.

Many of the technical issues to implement interconnection, such as number portability, are being addressed with some form of solution, although some of these are interim solutions. This leaves the issue of defining and funding universal service as a key regulatory hurdle to full and fair competition in the local exchange market.

1.3. Scope

The scope of this thesis will be limited to the four questions above. The analysis will be limited to the reviewing the various possibilities to achieve the goals. Many industry participants and interested parties have documented their positions on these matters in recent filings with the Federal-State Joint Board on Universal Service.

Some recommendations propose very expensive capital investments, some which cannot be supported locally and will require outside contributions under the current structure.

The benefits to society from certain advanced information services in schools, libraries and health facilities are assumed to be a given. Since these entities have been designated by the 1996 Act to be recipients of these services, this thesis will only discuss the mechanics of funding as they relate to the Universal Service Fund.

The resulting recommendations are based on the analysis and will consist of either a specific recommendation or a range of acceptable recommendations which will achieve the desired goals.

1.4. Thesis Organization

Chapter II examines the concept of universal service. It reviews the evolution from the original interconnectivity goal to our current system of welfare and subsidies. The chapter addresses the definition of basic telecommunications service, the optional

advanced services which should be available to consumers and continued evolution of how these new services will impact the definition of universal service in the future.

Chapter III examines the emerging competitive environment and how the developments are quickly making the current subsidy system obsolete. The chapter looks at the new competitors, their technologies, strategies, and the incentives that are driving them. The chapter also addresses cream skimming, the carrier of last resort obligation, stranded investment in property plant and equipment, new technologies, and federal and state policies which encourage a competitive communications market. While new entrants are having a significant impact in those limited areas where they have constructed facilities; they are not ubiquitous. This chapter looks at how some ILECs are embracing the resale of services to new entrants to support its loop plant investment rather than lose 100% of the support to bypass.

Chapter IV quantifies the current implicit and explicit subsidy collection system. As the subsidy burden becomes increasingly inequitable, the incentive for bypass grows, making it increasingly easy to justify the bypass. This sets up a spiraling effect where the costs of rural and residential services are saddled on fewer and fewer large customers of the ILECs, causing more large customers to seek alternatives. This distortion has resulted in rapid expansion of CAPs into smaller markets, as well as increased CAP penetration of smaller customers which would not have been profitable before.¹⁸ There is nearly universal agreement that the existing collection system is inequitable, which Congress acknowledged in the Telecommunications Act of 1996, ordering explicit and fair subsidy collection.

Chapter V examines the targets of universal service support, the subsidy distribution system and the problems in the current system. The existing mechanisms allow companies and individuals to “game the system.” The current subsidy system only supports the traditional wired exchange monopoly, which due to new technology, may not be the most efficient way to serve many customers. The current subsidy system will effectively discourage new entrants from delivering the information age to consumers if they have to compete against an inefficient subsidized incumbent.

¹⁸ American Communications Services, Brooks Fiber Properties and GST Telecom all have a strategy of rapidly developing networks in smaller markets.

The current system has minimal accountability that the funds received are used as intended, that any goals are met, or that intended recipients are reached. Examples include low-interest and no-interest loans from the Rural Utilities Service (RUS) of the U.S. Department of Agriculture being used to build community centers and offices for telemarketing subsidiaries, and \$1.18 Million annually in high cost support for private network serving Walt Disney World.¹⁹

The 1996 Act requires that certain goals be set regarding rural, high-cost and insular areas, as well as low income households. The Act also requires advanced telecommunications services for education and health services, and discounts to support them. Chapter VI focuses on achieving the goals of universal service and competition in rural, high-cost and insular areas. Chapter VII focuses on achieving universal service to low income consumers, which requires a totally different approach than the high-cost goal.

Chapter VIII examines advanced information services and their benefits to society. The 1996 Act directs to FCC and industry to consider availability of these services to schools, libraries and health providers. The Act clearly intends to shift some of the financial responsibility for education from local school districts to the telecom industry, yet the carriers may actually benefit substantially from this burden through technology savvy consumers that result. This chapter looks at the incremental cost of providing the services required under the law, and how these services will be funded.

Chapter IX provides a summary and conclusion. It also proposes a range of acceptable solutions in the real world. The conclusion recognizes the economic, business and political concerns in a world where much of the new local communications industry is outside the jurisdiction of any single government regulator. Access to public safety and educational resources will still be necessary whether the local link is provided by a twisted pair loop, broadband physical media, or any of a variety of terrestrial or satellite wireless systems.

¹⁹ Federal Communications Commission, Monitoring Report - May 1996, (Washington, DC: Federal Communications Commission), Table 3.9. Data in the table represents 1994 statistics used to make universal service payments for 1996. Vista United Telecommunications Systems is owned jointly by Sprint Corp. and Walt Disney Company. Its draw was \$1,183,845.36 under the formula.

1.5. Research Methodology

The research for this thesis was carried out using several approaches. These approaches included collecting written materials from books, industry studies, industry specific periodicals, reliable electronic resources and interviews with people involved in various telecommunications industry. The research included analysis of the subsidies and economics of the industry.

Such information gathering included attending conferences and seminars, and participating in projects in Colorado, Texas, District of Columbia, Montana, Oklahoma and Massachusetts. Interviews with regulators and industry employees while working as an intern at the Federal Communications Commission provided a unique look at, and a new appreciation for the policy aspects of telecommunications. Working as senior access analyst for an interexchange communications carrier provided a first hand view of the developing local access networks, the increasing competition where these networks exist, and the extensive competitive pressure on IXC's to reduce their costs.

Chapter II Universal Service

“...so as to make available, so far as possible, to all the people of the United States, a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges . . . ”

Communications Act of 1934, Title I, Sec. 1

2.1. What is Universal Service?

Americans have come to expect availability of telephone service wherever they are. Unless we are in remote wilderness areas, we have come to expect the ability to call for help in an emergency. We have also come to expect to be able to obtain home telephone service almost anywhere in the country where we choose to live. We have also come to expect the price to be within a certain price range, usually around or less than \$20 a month, no matter where we live.²⁰ To support these expectations, we have developed a complicated subsidy mechanism to support affordable basic service anywhere. Affordable universal service is a national priority, however, we have never actually defined “universal service” or what its price should be to the consumer.

Congress directed the Federal Communications Commission (“FCC” or “the Commission”) to begin a proceeding to define Universal Service in the Telecommunications Act of 1996.²¹ We currently have only the regulations related to the accounting “separation” mechanisms, and rules governing the Universal Service Fund (USF) in Parts 36 and 69 of the Commission rules. The distribution of money from the USF is administered by the National Exchange Carriers Association,

²⁰ Federal Communications Commission, Reference Book: Rates, Price Indices and Household Expenditures for Telephone service, November 1995, (Washington, DC: Federal Communications Commission) p. 21. Also see FCC News Release for this document.

²¹ On March 8, 1996, the FCC issued a Notice of Proposed Rulemaking and Order Establishing a Joint Board (FCC 96-93 and CC Docket No. 96-45). This order addresses Congress’s intent in the 1996 Act. Much of the NPRM is in the form of an Notice of Inquiry as well as an NPRM, a tactic the Commission uses to ensure timely action when required in legislation, as is the case here.

a LEC-sponsored trade organization created by FCC rules after the AT&T divestiture to replace the monopoly “settlement” process.

The purpose of universal service is to provide certain benefits to American residents, generally including the capability to:

- Contact public safety assistance in an emergency,
- Contact public health authorities and/or hospitals,
- Call local authorities and government services,
- Participate in our democracy as a citizen,
- Contact educational service providers,
- Make contact present or potential employers,
- Conduct commerce locally, nationally, and globally.

In the 1996 Act, Congress defined universal service as “*an evolving level of telecommunications services that the commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services.*” Congress also directed the Joint Board and the

Commission to “*consider the extent to which such telecommunications services--*

(A) are essential to education, public health, or public safety;

(B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential consumers;

(C) are being deployed in public telecommunications networks by telecommunications carriers; and

(D) are consistent with the public interest, convenience and necessity.”²²

Most Americans have come to expect to be able to call municipal offices, public schools and local hospitals and businesses as part of a local calling area. The local calling area may include unlimited “free” calling as part of the basic service. As a result of these expectations being provided at a monthly price averaging less than

²² Telecommunications Act of 1996, U. S. Code, vol. 47 sec. 254 (c)

\$20²³ nationally, residential phone service penetration has reached 94% of households.²⁴

The cost of providing these services often is more than the price charged to the consumer. Particularly in rural areas where lines and switching equipment must be installed to provide services, but there are very few customers to pay for the expense. So the cost of installing and maintaining a switch and lines in a rural exchange are nearly as high as in an urban or suburban area, yet there are fewer consumers using and paying for the exchange equipment. Because we expect this availability and a reasonable price, the telecom industry and its regulators have devised a system to support universal service including settlements, cost averaging, access charges and hidden subsidies. Most noteworthy, we have achieved one of the highest residential penetration rates in the world in spite of extensive rural geography in America.²⁵

Nationally, basic telephone service includes:

- Dial tone²⁶
- Access to the public switched telephone network
- A local calling area (which may be one exchange)
- A listing in the “directory,”²⁷ and a printed annual directory

²³ The national average for basic telephone service including unlimited local calling is \$19.00. The average lowest priced option is about \$12.00. FCC Industry Analysis Division, Trends in Telephone Service, 1996, (Washington, DC: Federal Communications Commission), Table 6.

²⁴ Census data for 1995. FCC Industry Analysis Division, Reference Book: Rates, Price Indexes, and Household Expenditures for Telephone Service, November 1995, (Washington, DC: Federal Communications Commission), p.41.

²⁵ Countries with higher penetration rates include Singapore, Luxembourg, Switzerland and Sweden. Except for Sweden, these countries have substantially higher population density than the US. None have vast remote areas found in the American West where wireline phone service is usually available.

²⁶ In 1992, there were several “Mom & Pop” rural exchanges in Maine which are manually switched. These were to be phased out over several years.

²⁷ A directory listing means that the LEC provides its subscriber listing to all directory publishers on an equal access basis, including companies affiliated with the LEC. LECs are compensated for its listings according to prices stated in its tariffs. The fees for sale of customer data are used to offset the cost of basic telephone service. Directory companies include publishers of listings in books and on CD-ROM, and alternative providers of directory assistance.

Basic telephone service varies from state-to-state, exchange to exchange, and company to company. Basic telephone service may include some of the following:

- Touch-tone or DTMF dialing,
- Unlimited local calling,
- Single party lines,
- 911 emergency services²⁸
- Blocking of certain types of telephone numbers²⁹

Optional services available in some areas include:

- Expanded calling areas and plans,
- CLASS optional subscriber services,
- ISDN digital subscriber line services.
- xDSL compressed subscriber line broadband services.

Many local exchanges have replaced their old switches with switches capable of advanced optional services, including CLASS services such as call waiting, call forwarding and three-way conferencing. The ILECS claim that these advanced switches were often installed to support the requirements of interexchange carriers and various regulations. This results in the LEC justification to assign a portion of the new investment to the federal jurisdiction and to also recover any undepreciated embedded costs from interstate carriers. The incremental cost of the equipment and software to upgrade the new switch to add the CLASS services is relatively small compared to the cost of the new basic switch. Video service providers point out the same issue regarding deployment of fiber in the residential loop, where the implicit

²⁸ Many jurisdictions impose a separate charge on telephone bills for 911 service. (WUTC comments, PULP comments, NYPSC comments, USWest Boulder telephone bills, NYNEX Worcester bills). Individual deployment of 911 or E911 varies. Some states have ordered statewide E911 services, while other areas have implemented it on a city, town, county or regional consortium basis. (In many Massachusetts implementations, 911 is simply redirected to the local police number, town residents served by adjacent exchanges must dial the full 7-digit number in emergencies. If more than one town is served by an exchange, only one can have the 911 service.)

²⁹ For example: In Massachusetts, NYNEX provides optional blocking to 550, 976 and 1-900 numbers and automatically blocks 940 numbers. "Any customer wanting access to 940 (Adult) calling must give New England Telephone written authorization to remove the blocking" (NYNEX Information Resources Company, *NYNEX Yellow Pages: Worcester Central Area*, (Lynn, MA: NYNEX 1994), p. 19.

subsidy will pay for the deployment of substantial excess capacity, while the incremental cost of providing video and other broadband services is minimal.

2.2. Expansion of the Universal Service Concept for an Information Society

There are two components of universal service today: what is included in the monthly basic fee at a reasonable price, and what is available to the customer at an additional price.

The groundwork to evolve into an information society is in place and the pace of evolution keeps increasing. Children are using computers and networked resources to learn. Farmers are monitoring commodity prices and the weather on the Internet, and are even selling their future production electronically. Students in Singapore and Germany are using the resources of the University of Colorado, which are often inaccessible to rural Colorado residents who support these resources with their tax dollars. This prompts several questions for the information age:

- What resources should be delivered to the home?
- What resources should be delivered to schools, libraries and other public places?
- Should broadband resources be available for home delivery?
- Should access to the Internet be part of universal service?
- How should broadband data and video services be delivered to rural areas?

Congress has set minimum expectations for the availability of information services nationwide in the 1996 Act. It left the details to the FCC and the Joint Board. In its NPRM, the Commission solicited comments on its proposal to include these five services in its definition:

- Voice grade access to the public network,
- Single line service,
- Touch-tone service (and declared the term to be generic),
- Access to emergency services,
- Access to operator services.

It also solicited comments on adding access to relay services, directory listing, and equal access to interexchange carriers. Many who submitted comments agreed

with these additional services and many states include them in their basic service.

Other services proposed include:

- 911/E911,
- Free local calling areas,
- Local or toll-free access to the Internet,
- Toll-free access to emergency services,
- Integration of toll rates with US Mainland,
- Access to 800 numbers on US Mainland.

In many remote bush areas of Alaska, emergency services cover very large areas. Emergency services are generally not local and require interexchange toll calling. These bush areas are also served by analog satellite facilities which cannot carry modem speeds more than 9600 bits per second (bps) and is often restricted to 2400 bps.

Three remote Pacific Island territories will become part of the domestic network in August 1997. Guam, the Northern Mariana Islands, and American Samoa will move from World Zone 6, each with their own ITU country codes, to the North American Numbering Plan (World Zone 1) with their own domestic area codes. Currently, American citizens in these territories must use international facilities to call the American mainland. As a result, they do not have access to many features of the domestic network, such as toll-free 800 and 888 services. The 1996 Act requires the integration of these facilities into our domestic network and the “integration” of rates. With integration, these territories will have an equal standing with the other integrated states and territories which are not connected to the mainland including Alaska, Hawaii, Puerto Rico and the US Virgin Islands. A GTE local exchange customer in Saipan, in the Northern Marianas electing GTE for long distance will pay the same price to call Tampa, as a GTE long distance customer in Tampa will pay to call Saipan.³⁰ The FCC ordered carriers to file integration plans to serve these areas to be effective in mid-1997.³¹

³⁰ GTE Micronesian Telephone currently charges \$1.85 for the first minute and \$1.55 for each additional minute to the U. S. mainland. GTE’s domestic long distance rates are \$.25 for all minutes during weekdays and \$.10 nights and weekends. GTE will be required to integrate the Micronesian rates as it becomes a “domestic” site.

³¹ FCC Docket 96-61, August 7, 1996.