

National Regulatory Research Institute

**Fundamentals of
Telecommunications Regulation:
Markets, Jurisdiction, and Challenges**

Peter Bluhm

Director, Telecommunications Research and Policy

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Telecommunications Acronyms

AFOR – Alternative Form of Regulation

BPL – broadband over power lines

CETCs – competitive eligible telecommunications carriers

CLASS – customer local access signaling services

CLEC – competitive local exchange carrier

CPCN – certificate of public convenience and necessity

DSL – digital subscriber line

EAS – extended area service

ETCs – eligible telecommunications carriers

FCC – Federal Communications Commission

HCL – high cost loop support

ICLS – interstate common line support

ILEC – incumbent local exchange carrier

ISDN – integrated switch digital network

IXC – inter-exchange carrier

LATA – local access and transport area

LSS – local switching support

MTAs – major trading areas

NANP – North American numbering plan

NANPA – North American Numbering Plan Administrator

NECA – National Exchange Carrier Association

NPA – three-digit telephone area code

NXX – three-digit central office code

OSS – operational support system
RBOC – regional Bell operating company
POP – point of presence
PSTN – public switched telephone network
SLC – subscriber line charge
SPF – subscriber plant factor
TRS – telecommunications relay services
UNEs – unbundled network elements
USF – universal service fund
VoIP – Voice over Internet protocol

NRRI Fundamentals of Telecommunications Regulation:

Markets, Jurisdiction, and Challenges

I. Industry background and major regulatory challenges

A. Industry background

Public telecommunication is an important component of the American economy, comprising 2.6% of the national Gross Domestic Product. Today, most conventional (connected by wires) phone customers take service from large incumbent local exchange carriers (ILECs), the well-known telephone companies. About 1,000 small ILECs serve the remaining wireline customers, mostly in rural areas. In the 1980s, as a result of federal litigation, competition came to long-distance service. As a result of a court decree, interexchange carriers (IXC) initially offered service across the boundaries of so-called Local Access and Transport Areas (LATA) and then within LATAs. This broke the long-distance AT&T monopoly.

The 1996 Telecommunications Act opened local exchange services to competition. Many states have taken active roles in promoting that competition. Today, telecommunications services are also available from cable television companies, electric utilities (in a few areas), and increasingly, Internet-based companies.

Telecommunications markets are changing. ILECs are losing customers and revenues, as are IXCs. Competitive Local Exchange Carriers (CLEC) have claimed about one-fifth of the market for wireline local exchange. Wireless (cell phone) service has been growing rapidly, and today it claims considerably more subscribers than the wireline industry. Cable television companies are increasingly offering Voice over Internet Protocol (VoIP) services from fixed locations, and still other companies are offering “nomadic” VoIP services that can be connected to the Internet from anywhere.

Both state and federal laws impose regulatory obligations on the telecommunications industry. Federal law gives the Federal Communications Commission at least some jurisdiction over a wide variety of telecommunications services, information services (such as broadband Internet access), and cable television services. In many industries, federal authority has preempted substantial areas of state regulation.

A system of dual jurisdiction governs ILEC rates. The FCC has sole jurisdiction over rates for interstate services; state commissions have sole jurisdiction over rates for intrastate services. To allow each jurisdiction to set rates, a set of accounting rules called “jurisdictional separations” requires each ILEC to be virtually divided in two, with one part selling intrastate services and the other selling interstate services.

In setting rates for interstate services, the FCC continues to use rate-of-return (also known as cost-of-service) methods for smaller ILECs. For larger carriers, the FCC uses a system of price caps. Most states give ILECs wide discretion in setting rates within the states, although many states continue to apply rate-of-return methods in more limited ways.

States continue to impose a variety of standards on the retail service quality of wireline companies. States also oversee wholesale telecommunications markets and, using delegated authority, devote resources to conserving assignment of telephone numbers.

Federal law gives the FCC sole regulatory authority over rates and entry of wireless carriers, while states retain authority over other terms and conditions. Broadband Internet services are solely within the jurisdiction of the FCC, which has defined these services as “interstate information services.” Regulation of voice over Internet protocol (VoIP) services is an unsettled area of law, but is limited by FCC and court decisions declaring that service to be interstate as well.

The 1996 law gave the FCC a new mandate to preserve and advance universal service in partnership with state officials. The costs of providing service to some customers are much higher than for others. The FCC and the states each provide support to carriers serving high-cost areas, in hopes of keeping rates affordable and reasonably comparable between rural and urban areas.

Federal high cost support programs are multilayered. The National Exchange Carrier Association (NECA) operates two rate pools for smaller ILECs that provide administrative savings and allow many ILECs to lower their toll access rates charged to other carriers. The federal government provides high cost support through five major programs, the largest of which is the High Cost Loop program. Together, all five high-cost programs cost \$4.3 billion per year.

Federal universal service programs also provide subsidies for low-income customers, through the Lifeline and Link Up programs. The system also provides support for telecommunications service to schools and libraries and for rural health care. The total annual cost of explicit federal universal service telecommunications support is \$7.3 billion. The Federal-State Joint Board on Universal Service recommended fundamental revisions to federal universal service mechanisms in November of 2007.

Many states also operate universal service programs. The purposes include reducing local exchange rates in high-cost areas and replacing ILEC revenues lost through toll access reductions.

State commissioners have opportunities to participate on joint federal-state regulatory or advisory bodies. These opportunities include a “joint board” for separations (cost allocations) and another for universal service.

B. Major challenges

The telecommunications industry faces four major challenges. The broadest is to establish a balance between competition and regulation appropriate to modern technology, particularly as those technologies evolve and converge. Another is to preserve essential public benefits from legacy regulation. A third challenge is to find new ways to balance regulatory responsibility between federal and state authorities. The last challenge is to promote broadband in rural areas.

1. Competition and regulation

Alfred Kahn said that “competition and direct regulation are the two principal institutions of social control in a private enterprise economy.” Finding the best mixture of the two is, according to Kahn, the “central, continuing responsibility of commissions and legislatures.”¹ As telecommunications markets evolve and converge, finding and maintaining the proper balance is the greatest challenge facing telecommunications regulators. As Kahn notes, there are no simple, scientific rules, and good policy invariably calls for a judicious balancing, heavily informed by experience, of conflicting considerations and predictions.²

Many states have reduced or eliminated rate regulation of intrastate telecommunications services, usually after concluding that ILEC rates are now constrained by competitive market forces. Either through legislative or regulatory action, many states have abandoned cost-of-service regulation for some or all of their carriers. Other states have remained committed to cost-of-service analysis and have concluded that they should continue to exercise substantial oversight of local rates, even where competition has become relatively well-established in limited areas.

The trend at wholesale has largely been toward greater state regulation. The 1996 Telecommunications Act imposed new duties on ILECs to interconnect, provide services for resale, and unbundle network elements; the act also gave state commissions the authority to arbitrate disputes relating to these matters. State wholesale authority also increased as a by-product of having authorized regional Bell operating companies (RBOCs) to reenter toll markets. As part of the “section 271”³ cases before the FCC, the RBOCs were given very detailed service quality obligations designed to benefit their local exchange competitors. Today, many state commissions actively monitor how well the RBOCs meet these standards.⁴ As a result, some states are engaged in evaluating very fine details of complex intercarrier relationships.

¹ A. Kahn, *The Economics of Regulation, Principles and Institutions*, (1970 Wiley; repr. with new author’s Introduction, Cambridge, Ma.: MIT Press, 1988), Introduction at xxxvii, Vol. II at 114-15.

² *Id.* Vol. II at 115.

³ *See* 47 U.S.C. § 271.

⁴ RBOCs received authority to originate inter-LATA toll traffic under 47 U.S.C. § 271. As a part of the cases examining whether to grant that authority, RBOCs often established complex wholesale quality-of-service measurement systems that required measurement and reporting of dozens or even hundreds of performance measures and often mandated penalties for failures. These plans were often called “performance assurance plans” or “PAPs.” *See* Davis, et.al. *Performance Assurance Plans: State Experience So Far*, National Regulatory Research Institute, 2002, available at <http://nrri.org/pubs/telecommunications/02-12.pdf>.

Intercarrier compensation⁵ is an especially challenging area of wholesale market regulation. Internet services increasingly bypass classical PSTN toll-based access. States take disparate views of intrastate toll access rates. Some have aggressively lowered access rates, and most of these have created universal service programs to replace ILEC revenues lost through access reductions. At the other extreme, some states have left high access rates largely unchanged for decades. This strategy effectively exports some of an ILEC's costs to toll customers who call the ILEC's subscribers, but ILECs that rely on this strategy are especially vulnerable to bypass and revenue erosion.

Achieving the ideal mix between competition and regulation is complicated by the age and layered structure of the national telecommunications statutes. Over decades, Congress has enacted separate laws for individual industries, including telecommunications, cable television and wireless. The resulting legal structure has been compared to a series of "silos," in which each industry has its own independent set of rules. Although the industries are now increasingly entering each others' markets, each of the silos imposes different duties. Such partitioning inevitably creates disparate regulatory treatment and competitive inequalities.⁶ Politically, the silo structure has proven surprisingly stable, in part because each silo generates some unique advantages that a more general statute might jeopardize.

2. Preserving public benefits

The PSTN provides many benefits to the public. Many are available simply because state or federal regulators have been ordered to provide them. Table 1 lists a number of public benefits and the corresponding ILEC duties.

⁵ Intercarrier compensation is the term used to describe the many systems of wholesale compensation among telecom carriers. Once an ILEC or IXC accepts a subscriber, that carrier becomes obligated to complete all the calls that the subscriber places to the PSTN and therefore to make associated access and reciprocal compensation payments to other carriers.

⁶ The FCC has also enacted what amounts to still another silo by classifying broadband Internet services and nomadic VoIP services as "information services" subject to the FCC's ancillary jurisdiction. Unlike statutory silos, the ancillary jurisdiction silo gives the FCC broad discretion over what duties to impose on service providers.

Table 1. PSTN public benefits and ILEC duties

PSTN Benefit	Corresponding ILEC Duties
Nondiscriminatory service and rates	File public tariffs and contracts
Service is available almost everywhere	Serve all new customers seeking service from within franchise area (except for line extensions); administer or pay universal service surcharges
Low monthly rates for basic service	Submit rate designs for state commission approval
Customers can call any NANPA telephone number	Terminate all submitted PSTN traffic in real time, and sort out billing later
Emergency services, including E-911	Maintain customer location data and special purpose 911 trunks; operate “left-in” dial tone on disconnected telephones ⁷
Customer information protected	Maintain security for customer information
Law enforcement uses PSTN data for investigations	Use approved switching equipment; keep calling records; comply with pen register and wiretap orders
Assist hearing impaired customers	Contribute to Telecommunications Relay Service programs
Assist visually impaired customers	Provide discount services to visually impaired customers
Assist sick or vulnerable customers	Disconnect only under conditions authorized by state commissions

New services challenge these benefits. When a service provider uses a new technology (such as packet-based services) or a novel means of transmission (such as the broadband used for nomadic VoIP services), regulators may find it undesirable or even impossible to require that the new entrant comply with traditional ILEC duties. On the other hand, a decision to waive the obligation can put the ILEC at a competitive disadvantage.

For each public benefit, the regulator’s challenge is to find the best among a limited range of options. The most basic question is whether to retain the public benefit. If so, the second question is whether to convert it from an uncompensated duty to a financial inducement or

⁷ “Left-in” dial tone means that a telephone retains limited communications ability after it is disconnected for general service. Such a phone can make only emergency calls and calls to the telephone company’s business office.

contractual arrangement.⁸ Finally, if the duty is to be imposed, regulators must identify the carriers and service providers that will carry the duty. One choice is to maintain the status quo and apply the duty solely to more traditional carriers. Alternatively, regulators might broaden the duty and apply it to incumbents and new entrants alike.⁹

3. Federalism

The third major regulatory challenge is to find a federalism model that suitably allocates responsibility between the FCC and state regulators. Over time, state regulators and others have challenged the traditional wireline concept of dual jurisdiction.

Over the last 20 years, state commissions have exercised rate authority over a declining share of the telecommunications business. Legal changes are a major reason. Congress has reduced state authority over wireless telecommunications,¹⁰ and the FCC has preempted broad areas of state authority over growing new technologies, including broadband Internet services and VoIP services. Market evolution is an equally important factor. The remaining area of state rate-regulation authority—intrastate telecommunications services provided by non-wireless, non-Internet VoIP carriers—is a declining market.

Certainly, valid reasons for federal preemption exist, such as to have common technical, reporting and accounting standards for a common network. Common advertising, billing, and consumer protection standards also can reduce a carrier's cost of providing a regional or nationwide service.

Customers may nevertheless benefit more from allowing state participation, even with the inevitable policy variation. Under the 1996 Act and under subsequent FCC decisions, states have made a variety of policy contributions.

1. State participation is desirable whenever a sound regulatory decision requires knowledge of local conditions or when controversies are so numerous or time consuming as to be beyond the resources of the FCC. State commissions have, in the aggregate, far more fact-finding resources than the FCC.

⁸ For example, some states now provide explicit support for carriers who provide discounts to low-income and hearing-impaired customers.

⁹ For example, the FCC has recently required interconnected VoIP carriers to provide E-911 services and to provide for the porting of telephone numbers.

¹⁰ The FCC has plenary authority over rates, and states retain authority over line items and other terms and conditions. *Nat'l Ass'n of State Utility Consumer Advocates v. FCC*, 457 F.3d 1238 (11th Cir. 2006), cert.den. *Sprint Nextel Corp. v. Nat'l Ass'n of State Util. Consumer Advocates*, 128 S. Ct. 1119, 169 L. Ed. 2d 948 (2008).

2. State financial participation is preferable whenever it seems likely to advance the overall objective. For example, the courts and the Universal Service Joint Board have recognized the advantages of a state-federal partnership in universal service.

3. State enforcement of existing federal or state standards has sometimes been found to produce better results for retail or wholesale consumers. States are often the first point of contact for consumer complaints, and states ordinarily offer quicker and more effective responses to consumer complaints.

4. States are better able to respond to new problems where a single national policy would be premature. Early state actions regarding slamming and telephone number pooling, for example, guided subsequent FCC policies.

4. Broadband

The most immediate challenge for state regulators is to promote broadband. A majority of Americans now subscribe to some form of broadband service at home, usually in the form of a cable modem or DSL service. Broadband not only makes possible meaningful access to web-based services and new voice technologies, but also creates real economic opportunity in rural areas.

Customers in most urban and suburban areas already may buy broadband, and often they have a choice. In these areas the economic advantage of offering triple-play packages has led cable and telephone companies to build parallel networks, notwithstanding the risk that they will fail to gain a dominant share of the broadband market. In some urban areas, notably Verizon footprint areas in the East, customers also can subscribe to “fiber-to-the-home” service, which has bandwidth capabilities far above other systems.

The situation in rural areas is less encouraging. Smaller ILECs have been quite successful at deploying DSL services to nearly all their customers. In many other rural areas, however, the only broadband service available is through satellite service, which is expensive and subject to time delays.

States have been avid to get broadband into their rural areas.¹¹ Some legislatures have passed new statutes, including laws creating public authorities that issue bonds and laws promoting wireless broadband cooperatives. In other states, utility commissions have used their regulatory powers, including Alternative Form of Regulation (AFOR) plans, to increase broadband deployment. Finally, some states have imposed conditions mandating broadband deployment when they designate Eligible Telecommunications Carriers (ETCs) for federal universal service support.

¹¹ Although the FCC has preempted rate regulation all forms of broadband access to the Internet, most states still believe they have the authority to promote deployment of broadband facilities.

The federal government has also made some efforts to promote broadband. The Rural Utility Service has given loans and grants to many rural ILECs for this purpose. The Federal-State Joint Board on Universal Service has recommended that broadband be added to the list of services supported by existing universal service programs and provided with an independent support mechanism.¹²

II. Telecommunications fundamentals and history

The public telecommunications industry¹³ comprises a major part of the American economy. The telecommunications and broadcasting industries together added \$337 billion to the value of the American economy in 2006,¹⁴ or 2.6% of the Gross Domestic Product.¹⁵

The industry consists of an astonishing array of providers, from classical “telephone companies” (known as “local exchange companies”) through wireless companies and cable TV providers, and on to companies that sell Internet-based applications and may not even have a physical presence in the United States.

A. Circuit-switched technology

Before the 1990s, all telephone technology used a common architecture. The heart of the system was the “switch,” an electronic device that, in the 1940s, began replacing telephone

¹² FCC, *High-Cost Universal Service Support*, WC Docket No. 05-337, Recommended Decision, FCC 07J-4, 22 FCC Rcd 20,477 (November, 2007).

¹³ For the purposes of this paper, “telecommunications” is defined broadly as the assisted transmission of signals over a distance for the purpose of communication. The definition covers all of the services typically allowing the public to pass voice, text, video, or data to another person or location, regardless of the technology platform or the regulatory classification.

¹⁴ Department of Commerce, Bureau of Economic Analysis, *Value Added by Industry [Billions of Dollars]*, release date: January 29, 2008. Available at: http://www.bea.gov/industry/gpotables/gpo_action.cfm?anon=62205&table_id=20841&format_type=0

¹⁵ Department of Commerce, Bureau of Economic Analysis, *Value Added by Industry as a Percentage of Gross Domestic Product [Percent]*, Release date: January 29, 2008. Available at: http://www.bea.gov/industry/gpotables/gpo_action.cfm?anon=62205&table_id=20842&format_type=0

operators sitting at “switchboards.”¹⁶ Each switch is located in one of the carriers’ “central offices” or “wire centers.”

When a customer wants to make a switched call, the switch provides a “dial tone,” indicating that the switch is ready for a call. When the customer dials a telephone number, the switch automatically establishes an electronic “calling path” through the telephone network. The path allows electrical impulses to flow between the customer’s microphone and the other user’s speaker, and vice-versa. When the call is over, the switch breaks the connection and releases the network resources used for the calling path. Using this method, each customer needs only one pair of wires and can make calls to any other customer attached to the same switch.¹⁷ By adding interoffice transport and “tandem” switching,¹⁸ customers can speak to others anywhere on the worldwide switched network.

Because switching is so important, a customer who has dial tone service is said to have “switched service,” and the service is provided through a “switched access line.”¹⁹ The entire telephone network is also called the “switched network” or “public switched telephone network” (PSTN), although it also includes some “dedicated” or unswitched circuits.²⁰ The network is also described as a “circuit switched” network because specific circuits or electronic paths for the information are established during call setup.

Switches always contain internal information sufficient to complete at least some calls without assistance.²¹ Yet modern switches frequently seek external data, sometimes from databases hundreds of miles away. For example, a switch may need to consult a database to

¹⁶ Even into the 1980s, some rural areas still had manual offices that used human telephone operators.

¹⁷ This was the original meaning of “local exchange” service. Originally, a call beyond the area served by the local switch automatically would have been considered a “toll call.” Many states have established “extended area service” policies that allow callers to make “local” calls to customers served by other switches. Local service then became a legal concept instead of an engineering concept.

¹⁸ “Tandem” is a term applied to switches that connect local networks with long-distance networks. In one sense they operate as a “switch’s switch.”

¹⁹ These are also, more simply, called “access lines” or simply “lines.”

²⁰ As discussed below, unswitched services include “special access” lines, such as “T-1” lines and the more modern service of Ethernet transport. Internet-based voice services, discussed in more detail below, are not switched in the usual sense, because they are packet-based.

²¹ Some switches, called “remote switches,” are not fully functional and depend on more complex “host switches” for some software and information. Often in rural areas, a carrier will have few host switches and many remote switches.

complete a call to a customer who previously “ported” her telephone number to a competitive carrier. Or a switch may obtain information from a distant signal control point in order to set up an interoffice trunk.

The network also contains wires and fibers used to carry signals between customers and switches. A “loop” is used to connect a customer to the switch in the local central office.²² Loops usually are paired copper wires or “twisted pairs.” The entire network of loops surrounding a central office is called the “feeder and distribution network.” “Trunks” are used to interconnect switches; they make interoffice calling possible.²³

The telecommunications network traditionally relied on sending varying electric impulses over wires. Today, light signals and glass fibers have increasingly replaced this technology, both for interoffice trunks and for loops. Some companies offer light fiber all the way to the customer’s premises, which greatly increases data speeds.²⁴

Many carriers today use a “remote platform” or “pedestal” in the customer’s neighborhood. Newer versions of these platforms commonly use a light fiber connecting to the central office switch and a copper loop connecting to the customer. By using such fiber-fed remote platforms, a carrier can offer its higher capacity “Digital Subscriber Loop” (DSL) service to more remote customers.²⁵

The traditional telephone signal was “analog” because voltage changes on the wires were analogous to air pressure changes near the telephone’s speaker or microphone. Most voice signals today are “digitized” in central offices (or even in remote platforms). Digitizing is valuable because digital data can be more efficiently stored, transmitted, and retrieved, and because sound quality does not degrade over distance. Digitizing also offers opportunities to add new service features. Even where a signal has been digitized, most telephones still operate on analog voltages, and a digital signal must be converted back to analog form before another user’s telephone can reproduce the intended sound.

Originally, telephone switches established a unique a “calling path” similar to what an operator did at a switchboard. For each call, an electrical circuit was formed that allowed current to pass directly between two end user telephones. Today the switched network still “sets up” a

²² “Loop” is also sometimes used synonymously with “access line” or “line.”

²³ Some large volume customers purchase trunks directly. “Umbilical trunks” are special-purpose trunks that attach host and remote switches.

²⁴ This architecture is usually called “fiber to the home.”

²⁵ This architecture is sometimes called “fiber to the curb” or “fiber to the platform.”

requested call and “takes down” a completed call,²⁶ but the calling path is almost always a logical entity rather than a simple electrical circuit.²⁷

Today, switches are essentially computers with some extra hardware. Switches provide a range of services beyond local exchange and interconnection with long-distance “toll” networks. Modern switches also: (1) provide connection to various forms of assistance for hearing-impaired users (Telecommunications Relay Services or TRS); (2) provide connections to emergency services (911 and E-911) and to a telephone “operator; (3) provide “vertical services” such as three-way calling, call waiting, caller ID, and voice mail; and (4) provide billing information to the carrier. A newer form of switch, known as a “soft switch,” emulates switching functions, but it replaces circuit switching with packet-based networking.

B. Incumbent local exchange carriers

From the late 1800s until the 1980s, nearly all telecommunications services were provided by traditional “telephone companies.” These companies operated as licensed local monopolies within defined service areas. In 1996, Congress passed a major new law ending those monopolies (1996 Act). To differentiate the old from the new, Congress coined the term “Incumbent Local Exchange Carriers” (ILECs), to describe the telephone companies that provided “local exchange service”²⁸ at that time.²⁹

²⁶ Unlike switched networks, current packet networks generally do not establish anything like a “calling path” with dedicated facilities. Rather, packet networks break messages, including voice signals, down into packets, each with its own instructions for routing and reassembly. The packets are sent over transmission lines used in common by all customers. This design can reduce the cost of switching equipment and more efficiently use transport facilities. The design also can lead carriers to engage in “hot potato” routing, in which carriers design their networks to hand a packet off to another carrier at the earliest opportunity.

²⁷ One development that broke the traditional circuit was the introduction of “time division multiplexing” (TDM) technology. TDM divides each second into many very short “time slices,” and it allocates one time slice to each voice conversation. TDM increases efficiency by allowing many calls to share common facilities. Another development was the shift to digital formats on long-range calls.

²⁸ Federal law usually calls local exchange service “telephone exchange service.” *See* 47 U.S.C. § 153(26) (ILEC defined); 47 U.S.C. § 153(47) (telephone exchange service defined). Occasionally the Act uses the more common term “local exchange service.” *See* 47 U.S.C. § 227(c)(3)(C); 47 U.S.C. § 228(c)(5).

²⁹ *See* 47 U.S.C. § 251(h)(1)(A) (ILEC defined, in part, as company providing local exchange service in February, 1996).

ILECs are losing switched access lines. In 1999, ILECs had 181 million lines. At the end of 2006 ILECs had only 142 million lines, having lost more than one line in five.³⁰ A major cause of the line loss was competition from competitive wireline LECs (CLECs). Another was shifting customer preference to wireless phones. A third was the elimination of many “second lines” as customers shifted away from “dial-up” Internet access³¹ and toward broadband connections. The most common broadband connections are “DSL” services from telephone companies and “cable modem” services from cable television companies.

ILECs vary greatly in size. The largest companies are the successors of the seven “Regional Bell Operating Companies” (RBOCs) created by the breakup of AT&T in 1984.³² In 2005, RBOCs served about 132 million access lines in the country, about 84% of the national total. RBOCs typically serve large urban areas, although in many states the RBOC also serves some (and in a few states most) rural areas.

Through mergers, the number of RBOCs has been reduced to three. Verizon’s footprint ranges from Massachusetts to Virginia,³³ with about 32% of the national landline market.³⁴ Qwest serves northern states that are west of the Mississippi River, and has 9% of the national market.³⁵ With 43% of the national market, AT&T serves the rest of the country, including California, the Southwest, the South, and much of the Midwest.

The next tier is the set of so-called mid-sized companies. These firms typically are much smaller than RBOCs, although most operate in several states. As a group, these carriers serve about 7% of the switched telephone lines in the country.³⁶ Century Telephone, Embarq, and

³⁰ FCC, Wireline Competition Bureau, Industry Analysis and Technology Division, *Trends in Telephone Service*, Feb. 2007, (2007 Trends Report), available at www.fcc.gov/wcb/iatd/trends.html, Table 8.4.

³¹ During the 1990s, ILECs had experienced a large surge in second lines due to increased computer usage through “dial-up” lines.

³² In 1984, pursuant to a federal court order, AT&T was separated into seven regional Bell operating companies and a new AT&T offering toll services.

³³ Verizon also serves many other states through properties acquired from GTE.

³⁴ Verizon has sold its lines in Maine, New Hampshire, and Vermont to FairPoint Communications. FairPoint is treated as an RBOC for some legal purposes. Verizon also sold its lines in Hawaii.

³⁵ Qwest has sold large rural areas in some of its states.

³⁶ Independent Telephone & Telecommunications Alliance web site, at <http://www.itta.us/about/itta.html>. Qwest, which is an RBOC, is also a member of ITTA, and has been excluded from this percentage.

TDS Telecom are mid-sized carriers, each of which operates in more than a dozen states. Several of these mid-sized companies specialize in serving rural areas.

The remaining approximately 1,000 small ILECs serve about 8% of the access lines in the country. Some of these companies serve only a few hundred lines, and many serve the most rural and highest-cost areas of the country. Some of these companies are investor-owned; others are cooperatives.

Well before the Internet arrived, the Bell system developed its own retail packet-based service, ISDN, or Integrated Switch Digital Network. The ISDN service required special telephone equipment that used digital coding from end to end. Although telephone companies still sell ISDN lines, the widespread availability of broadband and the Internet has promoted other, less expensive, options.

ILECs also offer higher-capacity digital “special access” circuits.³⁷ These circuits offer “dedicated” or point-to-point unswitched communications on the public network. Unlike switched services, special access circuits have no dial tone and cannot be used to reach all the terminating points available on the network. But because these circuits are always “on,” they are useful components in larger systems. Some commercial customers buy special access circuits at retail. Most special access circuits are purchased by other carriers, including interexchange carriers and competitive local exchange carriers. Wireless carriers frequently use special access circuits to connect their wireless cell towers.

C. Toll competition

Several types of telecommunications carriers have come into existence since 1970. One of the earliest was the “Interexchange Carrier” (IXC), a carrier that offers “long distance” or “toll” services³⁸ but that relies on its customers to use their ILEC-connected telephones to reach the IXC’s toll network. In the 1990s, the largest IXCs were AT&T, MCI, and Sprint.

The IXC industry originated in the 1970s, largely through FCC decisions that allowed MCI, then a new company, to offer a service it called “Execunet.” MCI found a way for Execunet to function as a substitute for toll calling. In response, the FCC created “access

³⁷ A “T-1” or “DS-1” line, for example, is a special access circuit that offers 1.544 megabits of bandwidth.

³⁸ The term “toll” originated from the per-minute charges applied for these calls. Another term for toll traffic is “interexchange traffic,” although the term is misleading. Some calls actually travel from one exchange to another, yet they are treated for regulatory purposes as “extended area service” calls, a variety of “local” calling.

charges,”³⁹ a new system of payments in which other carriers pay the local ILEC a per-minute rate whenever the carrier originates or terminates a toll call on the ILEC’s facilities.⁴⁰

In 1982, the U.S. Department of Justice settled an antitrust case against AT&T.⁴¹ That settlement created the seven RBOCs in 1984, as Judge Harold Greene implemented the agreement. The court ordered the RBOCs to refrain from offering toll services across the boundary of any of 164 “Local Access and Transport Areas” (LATAs).⁴² This action left the toll market open primarily to the Interexchange carriers (IXC).

One objective of the divestiture was to give the IXCs rights to use local networks for their own customers’ calls. This required creating new regulatory obligations beyond the access charge system. Regulators imposed “equal access” obligations that allowed customers to “presubscribe” their toll service to an IXC rather than their ILEC.⁴³ Later, when “slamming” became a problem, regulators imposed more rules that limited the methods by which carriers might seek new subscribers.

Toll competition also generated some industry investment. To interconnect with ILECs, facilities-based IXCs established a “point of presence” (POP) in each LATA. For their part, the ILECs needed new “tandem” networks within each LATA to handle regional interoffice

³⁹ For the early history of the IXC and of access charges, including the original “ENFIA” agreement, see FCC, *MTS and WATS Market Structure*, 97 FCC 2d 834, ¶¶ 51-54 (1984).

⁴⁰ “Originating access” payments are made when the toll carrier’s customer dials a toll call using the ILEC’s local exchange facilities. “Terminating access” payments are made to an ILEC when the toll carrier’s customer places a call to a different customer who is connected to that ILEC’s facilities.

⁴¹ *United States v. American Telephone and Telegraph Co.* 552 F. Supp. 131 (D.D.C. 1982), *aff’d sub. nom. Maryland v. United States*, 103 S. Ct. 1240 (1983). The federal court’s order is often called the “Modified Final Judgment” or “MFJ.”

⁴² Originally, the RBOCs had been ordered to refrain from interexchange service. *Id.* at 330. Later, the court adopted LATA terminology. See *United States v. Western Electric Co. and American Telephone & Telegraph Co.*, 569 F. Supp. 990 (D.D.C. April 20, 1983).

⁴³ When a customer who is presubscribed to an IXC dials a “1” and then a ten-digit telephone number, the call is routed to the customer’s presubscribed IXC network. Customers may presubscribe to one carrier for interLATA calling and a different carrier for intraLATA calling. Other dialing patterns were also developed to allow customers to reach IXC networks, including “1010” prefix codes and ten-digit toll-free numbers. Today, some carriers call intraLATA toll service “regional” calling service.

transport between the IXC's POPs and the various ILECs.⁴⁴ Nearly all ILECs eventually purchased and installed equal access software in their switches.

Major IXCs later built their own switching and transport facilities. In the 1990s, AT&T, MCI, and Sprint invested in fiber optic-based networks, which have much greater capacity than traditional copper lines. Yet not all IXCs had facilities. Toll "resellers" operated by purchasing large blocks of toll capacity from facilities-based carriers and then reselling that capacity in smaller, higher-priced pieces.

The IXC industry declined after 2000,⁴⁵ as retail rates declined. Today, most customers can make interstate toll calls for a few pennies per minute, and many customers subscribe to unlimited usage plans. Regulatory changes contributed to these lower rates. The FCC decreased interstate toll access rates in 2000 and 2001,⁴⁶ and this decrease tended to reduce toll rates. Also, wireless competitors have had a regulatory advantage for regional toll calling, reducing their intercarrier costs as compared to wireline carriers.⁴⁷ Large ILECs have reentered the toll markets,⁴⁸ and they have proven themselves capable competitors. ILEC-sponsored toll services also have the advantage of being able to send a single monthly bill for local exchange and toll services. Mergers are the final reason for erosion of the IXC industry. AT&T and MCI, two of the three original principal IXCs, have now merged with the regional Bell operating companies.

⁴⁴ These tandem services were particularly important to rural ILECs, who generally did not operate their own tandems.

⁴⁵ IXC revenues were \$110 billion in 2000 and \$71 billion in 2004. *2007 Trends Report*, table 9.1. Although the FCC has not reported subsequent revenues, most observers agree that the decline continued after 2004.

⁴⁶ The FCC reduced access rates for large "price cap" companies in 2000. See FCC, *Access Charge Reform*, CC Docket No. 96-262, Sixth Report and Order, 15 FCC Rcd 12,962 (2000) (*CALLS order*). The FCC reduced rates for the smaller "rate-of-return" companies in 2001. FCC, *Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers*, Second Report and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 19613, 19667-68 (2001) (*MAG Order*).

⁴⁷ Calls involving wireless devices can be made within "Major Trading Areas" (MTAs) at lower wholesale and retail cost than IXC-carried calls that use wireline facilities. See discussion in text accompanying footnote 136 below.

⁴⁸ Under 47 U.S.C. § 271, the RBOCs had an opportunity to petition the FCC to reenter inter-LATA toll markets. The FCC has granted this right to RBOCs in every state.

D. Local exchange competition

The Telecommunications Act of 1996 established the right of any company to enter the local exchange business, notwithstanding state laws to the contrary.⁴⁹ New entrants, called “Competitive Local Exchange Carriers” (CLECs), today serve tens of millions of customer lines.⁵⁰ In June of 2006, CLECs served one switched access line for every five served by an incumbent ILEC.⁵¹

The 1996 law imposed new carrier duties and required new carrier investments. It contained several innovations intended to benefit the nascent CLEC industry. The new law recognized that ILECs would continue to control facilities that were essential for new competitors but that could not economically be duplicated. First, ILECs were required to offer their retail services for “resale” by other carriers.⁵² Second, the act mandated that ILECs offer certain “unbundled network elements” (UNEs), such as loops and switches, at wholesale prices.⁵³ Third, the 1996 law required that local exchange carriers make telephone numbers portable, so that customers might easily switch carriers while keeping their existing telephone number.⁵⁴

In promoting local exchange competition after the 1996 law, the FCC also imposed some costly new requirements. It mandated that large RBOC carriers establish “Operational Support Systems” (OSSs). These computerized interfaces allowed CLECs to place orders electronically using web sites or even using inter-computer file transfers. The FCC also mandated that ILECs establish “dialing parity” so that CLEC customers could use the same dialing patterns as ILEC

⁴⁹ See 47 U.S.C. § 253(a). Before 1996, three states had established some or all of the forms of local exchange competition authorized in the 1996 Act. New York authorized interconnection agreements for local exchange competitors and mandated ILECs to offer retail services at a discount that would promote resale. Illinois also mandated the ILEC to make residential services available for resale. Maryland approved applications by several carriers to provide local service to business customers. See Rosenberg, *Assessing Wireless and Broadband Substitution in Local Telephone Markets*, National Regulatory Research Institute, June, 2007 at 2, available at <http://nrri.org/pubs/telecommunications/07-06.pdf>.

⁵⁰ CLEC lines reached a peak of 34 million in June of 2005. By the end of 2006, CLECs supported only 29 million lines.

⁵¹ *2007 Trends Report*, Table 8.1.

⁵² 47 U.S.C. § 151(b)(1). Under resale, a CLEC would buy a residential access line from an incumbent provider at a wholesale discount and then resell it to the CLEC’s own residential customer.

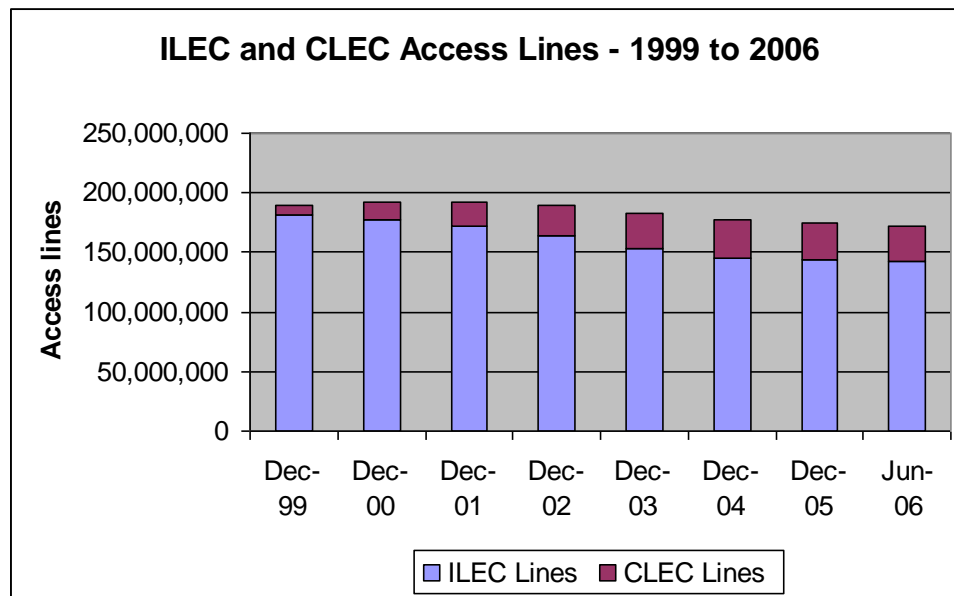
⁵³ 47 U.S.C. § 151(c)(3).

⁵⁴ 47 U.S.C. § 151(b)(2).

customers. Finally, the FCC took a broad view of the statutory obligation to make telephone numbers portable and mandated number portability among carriers, both wireline and wireless.⁵⁵

As Figure 1 shows, the wireline industry is serving fewer customers. ILECs and CLECs together reported 189 million switched access lines at the end of 1999. By June of 2006, that number had declined to 172 million.⁵⁶ While CLECs did gain a significant share of the market, their gains did not fully offset ILEC losses.

Figure 1. ILEC and CLEC Access Lines – 1999 to 2006



⁵⁵ Today, a customer may “port” a telephone number to or from a wireline carrier, a wireless carrier, and a Voice over Internet Protocol provider.

⁵⁶ *2007 Trends Report*, Table 8.1

E. Wireless carriers

The wireless telecommunications industry⁵⁷ has grown dramatically. From 2000 to 2006, the industry added lines at an annual rate of more than 15%.⁵⁸ By the end of 2007, the wireless industry reported 255 million subscribers,⁵⁹ almost 20% more than the number of landlines.⁶⁰ The industry claims that about 14% of households are now wireless-only,⁶¹ and that 98% Americans have a choice of three or more wireless carriers.⁶²

Wireless services are also becoming more sophisticated. Millions of wireless customers subscribe to advanced services that provide text messaging and email, and even video services.

The wireless industry is concentrating, in part because of inherent advantages of offering a wireless service with a national footprint. Larger companies can more easily avoid accessing service outside the company's dedicated territory, which reduces "roaming" charges. In the United States, the two largest wireless carriers are AT&T and Verizon Wireless, and they claim more than half the national wireless subscribers.⁶³

F. Cable television

Cable television has become a major competitor in telecommunications services. In the late 1990s, some cable companies offered switched telephone services. The new services rode the same distribution wires as TV signals, and the providers installed classical telephone switching equipment at their "head ends." Recently, many cable television systems converted these existing systems to digital packet formats, thereby enabling both digital television and more variety in the supported telecommunications services.

⁵⁷ The FCC often refers to wireless services as "commercial mobile radio services" (CMRS).

⁵⁸ The FCC reported that wireless lines increased from 91 million to 217 million during this period. *2007 Trends Report*, table 11.2.

⁵⁹ Cellular Telecommunications Industry Association web site, available at <http://www.ctia.org/advocacy/research/index.cfm/AID/10323> (accessed 4/28/08).

⁶⁰ The FCC reported 217 million wireless lines as of June, 2006. *2007 Trends Report*, Table 11.3.

⁶¹ CTIA ex parte presentation to FCC, PS Docket No. 06-229, Jan. 23, 2008, available at http://files.ctia.org/pdf/filings/080123_Ex_Parte_Wireless_2007_Facts_-_FILED.pdf (accessed 4/28/08) at 2.

⁶² *Id.* at 7.

⁶³ *Id.* at 8.

Deployment of cable television systems in rural areas is typically less than complete. In many small town and village areas, cable TV systems stop at the town edge, where lower customer densities make further line extensions unprofitable.

Having upgraded their networks for digital video, cable companies have been able to offer new services at a low incremental cost.⁶⁴ These include both cable modem connections to the Internet and voice over the network services. Most major cable providers are already offering voice services to their television and Internet customers.

Many cable companies offer so-called “Triple Play” services that combine television, high-speed Internet and unlimited voice service (including call waiting and other “vertical” services). For the single package, there is a single monthly bill.

Cable company sales have grown rapidly, both for Internet service and voice offerings. In 2007, cable systems provided high-speed Internet service to 36 million customers.⁶⁵ Voice customers grew very rapidly in 2006 and 2007, at an annual rate of approximately 60 percent. At the end of 2007, cable systems reported 15 million residential voice customers.⁶⁶

G. Electric utilities

Electric utilities have been experimenting with technologies that deliver Internet services using electric distribution wires. The technology is known as “broadband over power lines” or BPL. In October 2005, the city of Manassas, Virginia sponsored the first city-wide installation of BPL.⁶⁷

Early tests raised questions about whether BPL technology can operate without excessively interfering with amateur radios and other wireless communications systems. Equipment providers have made adjustments to their equipment, but interference issues may not

⁶⁴ In contrast, the costs can be much higher when adding video to a traditional voice network running on copper twisted pair loops.

⁶⁵ National Cable & Telecommunications Association web site, available at <http://www.ncta.com/Statistic/Statistic/Statistics.aspx> (accessed 4/6/08).

⁶⁶ National Cable & Telecommunications Association web site, available at <http://www.ncta.com/Statistic/Statistic/ResidentialTelephonyCustomers.aspx>, accessed (4/6/08).

⁶⁷ The BPL service in Manassas is offered by the City of Manassas in conjunction with Communications Technology, Inc. (COMTek). See City of Manassas web site, available at <http://www.manassascity.org/index.asp?nid=78> (accessed 4/6/08).

yet be fully resolved.⁶⁸ Some utilities have experimented with BPL, notably Cincinnati-based Cinergy, but the tests have not demonstrated commercial viability.

H. Data transmission services

Specialized companies today offer many wholesale telecommunications services used by other retail carriers. Some companies specialize in city-to-city transport of data and voice traffic using their own facilities. Some companies have even found ways to use the public Internet as a means of transporting telecommunications signals.

I. Voice over Internet

“Voice over Internet Protocol” service (VoIP) is the use of packet-based technology operating at broadband speeds⁶⁹ to provide voice telephone services. VoIP is not a single technology. Some VoIP carriers provide their own broadband transmission, bundled with the VoIP product. For example, many cable television companies offer a version of this service, running the voice service through their cable modems. These systems are sometimes called “fixed” or “non-nomadic” systems. Other companies offer “over-the-top” or “nomadic”⁷⁰ VoIP services that ride on broadband facilities provided by others. When nomadic VoIP providers interconnect with the switched network, they often pay other telecommunications providers for “gateway” service that can connect the VoIP carriers’ calls with the switched network. Some nomadic VoIP services are “interconnected” in the sense that they can make calls to the PSTN and receive calls from the PSTN.

VoIP cost characteristics differ markedly from switched technology. An “over-the-top” VoIP provider can operate with a single computer to serve all its customers worldwide. Indeed, with suitable software, a VoIP system can operate without a centralized switching computer of any kind. This decentralization allows non-facilities-based VoIP providers to charge rates well below traditional telephone rates, assuming the customer already has broadband. VoIP services have proven particularly popular for international calls, since VoIP allows carriers to avoid large fees and access charges that some countries still impose on incoming switched traffic. VoIP

⁶⁸ In November, 2007, the FCC’s Enforcement Bureau admonished Ambient Corporation, a BPL equipment provider, for violating the radiated emissions limits found in FCC rules, 47 C.F.R. § 15.109, in Briarcliff Manor, New York.

⁶⁹ Despite its frequent use, the term “broadband” is not defined in law. The FCC defines “high-speed lines” as those that can connect to the Internet at speeds that exceed 200 kbps in at least one direction. See FCC, Industry Analysis and Technology Division, Wireline Competition Bureau, *High-Speed Services for Internet Access: Status as of December 31, 2006*, 2007, at 2. Most commercial broadband services exceed this standard by a wide margin, at least on average.

⁷⁰ “Nomadic” refers to the service’s capability to operate at any location with a broadband Internet connection. Another term used for these services is “application-based” because they are based on computer programs or “applications.”

services also are increasingly popular with customers who have already purchased broadband and find VoIP to be an inexpensive substitute for wireline service.

The largest non-facilities based VoIP companies are Vonage and Skype. Vonage was an early VoIP entrant and did nationwide marketing. Vonage claims 2 million lines in the U.S.A.⁷¹ Skype⁷² operates a decentralized system that has a variety of services. Calls running entirely on the Internet from one Skype user to another are free. Skype offers other interconnected services that allow its customers to place calls to and receive calls from the switched network. Skype claims that it has registered 246 million users worldwide.⁷³

III. Regulation of telecommunications

Telecommunications companies are often called “common carriers.” Originally, a common carrier was a business that provided service to the public. The common law imposed specialized duties on common carriers, including the duty to carry all passengers without discrimination and the duty to charge uniform rates. Early common carriers were coaches and ferries, and eventually railroads. Later, the same concepts were applied to telegraph and telephone companies.

The primary sources of federal authority over telecommunications today are the Communications Act of 1934 (1934 Act) and the Telecommunications Act of 1996 (1996 Act).⁷⁴ Title II of the 1934 Act is titled “Common Carriers,” and federal common carrier regulation is often called “Title II” regulation.⁷⁵

States also have authority to prescribe rules and standards for telecommunications. State regulators often encounter federal terminology, particularly when state law replicates federal terminology or simply assumes federal definitions. Federal classifications often define the extent to which state authority has been preempted.

⁷¹ ISP Planet web site at http://www.isp-planet.com/research/rankings/2006/voip_q42006.html (1/31/08).

⁷² Skype has been acquired by E-Bay.

⁷³ Skype press release, January 8, 2008, “Skype Expands Mobile Strategy at 2008 International CES,” available at <http://about.skype.com/2008/01/> (accessed 1/31/08).

⁷⁴ *See, generally*, 47 U.S.C. Title 47. The 1996 Act amended the 1934 Act, but it is usually cited independently.

⁷⁵ Federal statute uses a circular definition of “common carrier.” It is defined as “any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or in interstate or foreign radio transmission of energy . . .” 47 U.S.C. § 153(10).

Between 1970 and 2000, telecommunications regulations accommodated, even encouraged, an increasing array of competitive services. Many decisions by the FCC and the courts opened many services to competition that previously had been provided on a monopoly basis. First, customer premises equipment (telephone handsets) and inside wiring were opened to competition. Then, long-distance toll markets opened in the 1970s and 1980s. Finally, state and federal actions opened local exchange markets (in-state calls).

A. ILEC rates for telecommunications services

Under federal law, “local exchange service”⁷⁶ is a form of “telecommunications service,”⁷⁷ which in turn is a form of “telecommunications.”⁷⁸ An “incumbent Local Exchange Carrier” (“ILEC”) is a carrier that offered local exchange service in 1996.

1. Dual regulation and separations

Consistent with limitations in the U.S. Constitution, property may not be taken for public purposes without just compensation. All governmental regulators, state and federal, must observe this restriction. Typically, the statutes articulate this standard as an obligation to ensure that carrier rates are “just and reasonable.”⁷⁹

An ILEC’s switched network functions as a single entity, but only some of its services cross state lines. The 1934 Communications Act, confirming earlier U.S. law, enshrined this distinction as fundamental to jurisdiction. Under federal law, the Federal Communications Commission has sole authority to approve or disapprove the rates charged by ILECs for telecommunications services that are jurisdictionally interstate.⁸⁰ Likewise, only the states have

⁷⁶ Federal law usually calls local exchange service “telephone exchange service.” *See* 47 U.S.C. § 153(26) (ILEC defined); 47 U.S.C. § 153(47) (telephone exchange service defined). Occasionally the Act uses the more common term “local exchange service.” *See* 47 U.S.C. § 227(c)(3)(C); 47 U.S.C. § 228(c)(5).

⁷⁷ “Telecommunications service” means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used. 47 U.S.C. § 153(46).

⁷⁸ “Telecommunications” means the “transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.” 47 U.S.C. § 153(43).

⁷⁹ E.g.: 47 U.S.C. § 201(b), 205(b) (all charges for interstate or foreign communication by wire or radio must be just and reasonable).

⁸⁰ The Communications Act of 1934 asserted federal jurisdiction over “all interstate and foreign transmission of energy by radio, which originates and/or is received within the United States.” It excluded from that federal jurisdiction, however, all “intrastate communications.” 47 U.S.C. § 152(a), (b). The FCC has also asserted jurisdiction over “interstate information

authority to require a carrier to alter its rates for telecommunications services that are jurisdictionally intrastate.⁸¹

The Act thus establishes a dual system of regulation. While each service provided by an ILEC is theoretically subject to either the federal or state regulator, the company as a whole must answer to two regulatory systems.

Traditionally, it was a simple matter to find the jurisdiction of a switched call. Jurisdiction is determined based on the location of the calling party and called party. A toll call is interstate if and only if the calling party and called party are in different states. Local exchange service was always deemed a state service because most local calls originate and terminate in the same state.⁸²

Even for switched traffic, there turned out to be cases requiring interpretive rules. The FCC developed two major rules for these questions. First is the “end-to-end” analysis rule under which multi-part communications are analyzed as a single call. Second is the rule for jurisdictionally mixed traffic. Where a service includes both intrastate and interstate component services, but the two are practically inseparable, the FCC has sole jurisdiction.

These rules were applied in a 1992 FCC decision involving voice mail. Suppose A makes an interstate call and leaves a voice message for B. B later retrieves that message through a local call. Under the end-to-end rule, the two calls are analyzed as a single interstate transaction. Under the mixed use rule, since some A’s will be in B’s state and other A’s will not, one cannot be sure of the jurisdiction of a particular call. Therefore the traffic is mixed but inseparable, and the FCC has sole jurisdiction.⁸³

services.” The FCC also asserts jurisdiction over interstate “information services.” See discussion below.

⁸¹ Each state has elected to create some form of commission to exercise this authority over intrastate rates. Details vary widely. For example, several states expressly deny their state commissions authority over wireless telecommunications services.

⁸² The “local calling area” of a customer is the area within which calls, when made, are not rated as toll calls. States set the boundaries of local calling areas, although the FCC authorizes local calling boundaries that cross state lines. Most states have adopted “extended area service” policies allowing customers to make “local” calls to other nearby exchanges.

⁸³ FCC, *Petition for Emergency Relief and Declaratory Ruling Filed by BellSouth Corporation*, Memorandum Opinion and Order, FCC 92018, 7 FCC Rcd 1619 (1992). The FCC holding was actually broader, ruling that all voice mail traffic is interstate. This was based on the mixed but inseparable traffic theory discussed below.

Earlier, the FCC applied the same analysis to “special access” circuits, point-to-point unswitched communications circuits on the public network.⁸⁴ The FCC determined that special access circuits can carry both intrastate and interstate communications, but that the two components were practically inseparable. Once again, that was a basis for holding special access to be interstate. In a slight variation from the usual rule, customers of special access may declare that interstate usage is “*de minimis*” (less than 10%), and the circuit will be treated as intrastate.⁸⁵ In practice, most customers elect to buy the interstate service.

Since the U.S. has a dual system, each rate-setting regulator needs information sufficient to set just and reasonable rates within its own jurisdiction. Each regulator therefore needs to compare jurisdictional revenues with jurisdictional costs. The process for dividing these revenues and costs between the interstate and state jurisdiction is known as “separations.”⁸⁶ Essentially, the separations rules direct ILECs to divide themselves financially into two virtual companies, one that sells interstate services and the other that sells state services.⁸⁷

Separation of revenue has been straightforward. Carriers record customer revenue in the same jurisdiction to which the service was assigned. Local exchange services and state tolls are state revenues. Interstate services produce interstate revenues.⁸⁸ The rules became less clear as carriers offer bundled services that include mixtures of interstate and state services.

⁸⁴ Originally, the term applied more narrowly to unswitched communications purchased by other carriers under wholesale tariffs. After AT&T’s breakup in 1984, many IXCs bought special access circuits. After the Telecommunications Act of 1996, CLECs also began buying special access circuits.

⁸⁵ FCC, *MTS and WATS Market Structure, Amendment of Part 36 of the Commission's Rules and Establishment of a Joint Board*, CC Docket Nos. 78-72 and 80-286, Decision and Order, FCC 89-224, 4 FCC Rcd 5660 (1989).

⁸⁶ See 47 C.F.R. Part 36.

⁸⁷ Typically the ILECs apply the separations rules by conducting the required underlying studies. Regulators see the results whenever they review the carrier’s rates.

Part 36 separations rules are mandatory for the states, but an exception exists for “average schedule” companies. For these small ILECs, the FCC sets interstate rates based upon an “average schedule” formula, and not based upon the use of Part 36 separations rules. In these cases the courts have allowed states to set rates for these companies on a “total company” basis, disregarding classical separations rules for the separation of investment, expense and revenue and treating the company as a single operating entity. See *Crockett Tel. Co. v. FCC*, 963 F.2d 1564 (D.C. Cir. 1992).

⁸⁸ More complex issues can arise when state and interstate services are bundled and sold as a unit, such as when an ILEC sells local exchange service bundled with an unlimited interstate and intrastate toll package.

The separation of costs (investment and expenses) is more complex. Separations rules prescribe distinct treatments for various “categories” of carrier investment. Where identifiable investments support services in only one jurisdiction, those investments are “directly assigned” to the relevant jurisdiction. For example, special access circuits are sold in one jurisdiction or the other, and that investment is directly assigned.

Switched traffic travels over facilities that are used in common by both jurisdictions, and direct assignment is not possible. Instead, this “common investment” is separated using “factors.” The majority of common investment, notably including customer “loops,” is separated using a “fixed” factor that uniformly assigns 75% of costs to the state jurisdiction.⁸⁹ Central office facilities are separated by other factors that are based on local calling patterns.⁹⁰

Expenses generally are separated using the factors that apply to the corresponding investments. In the end, about 70% of a large ILEC’s investment and expenses are typically assigned to the state jurisdiction, and these costs must be recovered from intrastate service revenues.⁹¹

In 2001, the FCC “froze” separations for five years. Under the freeze, ILECs continue to use usage-based separation factors for plant investment and expenses based upon their 2000 operations.⁹² In 2006, the FCC extended the freeze until 2009.⁹³

2. ILEC rates for interstate services

Once an ILEC’s interstate revenue, investment and expense have been determined by separations, the FCC can calculate an interstate revenue requirement (or interstate “cost-of-service”) for the ILEC and determine whether its existing interstate rates are just and reasonable. In actuality, the FCC applies this form of rate regulation only to smaller ILECs.⁹⁴

⁸⁹ 47 U.S.C. 36.154 (Exchange Line Cable and Wire Facilities, Subcategory 1.3).

⁹⁰ For example, if 15% of the ILEC’s network usage minutes had been used for interstate toll calls, then 15% of the ILEC’s central office investment would be separated to interstate.

⁹¹ Author’s calculation from ARMIS Report 43-04 for 2006, for all large ILECs.

⁹² Under the freeze, large “price cap” ILECs also were allowed to freeze investment “categories” at 2000 levels. In conjunction with an opinion from FCC staff, large carriers have stopped making annual direct assignments of special access facilities.

⁹³ FCC, *Jurisdictional Separations and Referral to the Federal-State Joint Board*, CC Docket No. 80-286, Order and Further Notice of Proposed Rulemaking, FCC 06-70, rel. May 16, 2006.

⁹⁴ These smaller ILECs are often known as “rate-of-return” companies.

Many rate-of-return ILECs share revenues and costs with other smaller carriers, through the National Exchange Carrier Association (NECA). All small ILECS that are NECA members participate in a “common line” revenue pool,⁹⁵ and most participate in a separate “traffic-sensitive” pool.⁹⁶ NECA prepares and files tariffs at the FCC on behalf of local exchange carriers. Pool members then charge both wholesale and retail customers the rates set in the NECA filings,⁹⁷ contribute their interstate revenues to NECA, and draw from NECA sufficient funds to cover their interstate revenue requirements. Pool members enjoy administrative savings (from not having to file their own FCC tariffs) and a more stable cash flow. The pools also allow high-cost companies to charge averaged access rates to other carriers. For high-cost companies, these averaged rates are lower than rates based on the carrier’s own costs and demand levels.

The FCC also has adopted a simplified approach to setting interstate rates for some very small ILECs. These “average schedule” companies are permitted to estimate their costs using a formula established by the FCC that considers only their size, not their actual costs. NECA annually files a tariff to set these rates.⁹⁸

For larger ILECs, the FCC sets rates using a “price cap” method. This system allows ILECs to adjust their rates annually based on a predetermined formula that does not require a detailed cost analysis for each company.

A major component of an ILEC’s federal retail rates is the “Subscriber Line Charge” (“SLC,” pronounced “slick”).⁹⁹ This fixed monthly charge requires the subscriber to pay all (or a large portion) of the loop cost that has been separated to the interstate jurisdiction. Currently the SLC is capped at \$6.50 per month for residential customers. The ILEC records SLC revenue as interstate, which is applied against the carrier’s interstate requirement in what the FCC calls the “common line” basket.¹⁰⁰

⁹⁵ The common line pool applies to loop costs. RBOCs are NECA members, but they do not participate in either pool.

⁹⁶ The traffic-sensitive pool applies to costs other than loop costs, including switches and interoffice trunks.

⁹⁷ NECA common line rates are the maximum SLC charges allowed by the FCC. For traffic-sensitive rates, NECA sets rates annually based on pool member costs and demand levels.

⁹⁸ A rate-of-return company that is not an “average schedule” company is often called a “cost company.”

⁹⁹ Another name for this charge, the official one, is the “End User Common Line Charge” or “EUCL.”

¹⁰⁰ The interstate common line requirement is that portion of the interstate revenue requirement derived from the local loop.

ILECs also derive revenue from other carriers, and the FCC has sole authority to limit intercarrier charges for interstate services. The most important categories of interstate intercarrier revenues are toll access charges for interstate switched toll calls and interstate special access circuits.

Under the 1996 Act, the FCC may “forbear” from applying certain federal statutes or rules. The statute requires the FCC to act on any petition for forbearance within 15 months. The FCC has granted many of these forbearance petitions: exempting broadband services from traditional common carrier rules;¹⁰¹ limiting carrier duties regarding cost allocations;¹⁰² and limiting carrier duties regarding service quality reporting.¹⁰³

3. ILEC rates for intrastate services

Once separation has determined an ILEC’s intrastate revenue, investment, and expense, the state commission may calculate the ILEC’s state revenue requirement and determine whether its existing intrastate rates are just and reasonable. To do this, the state commission takes the carrier’s intrastate investment and applies an allowed rate-of-return. The state commission then adds intrastate expenses, once again as determined by separations. Notwithstanding separations, states are free to adopt their own plant depreciation schedules.¹⁰⁴ The total of return on investment plus expense defines the carrier’s intrastate revenue requirement or “cost of service.”

Most states have made significant changes to their traditional cost-of-service policies. Initially, states adopted price cap plans for some or all of their carriers, most often the larger carriers. State reliance on price cap formulas varies greatly. Some states expect never to

¹⁰¹ E.g. FCC, *Petition of AT&T Inc. for Forbearance Under 47 U.S.C. § 160(c) from Title II and Computer Inquiry Rules with Respect to Its Broadband Services*, WC Docket No. 06-125, Memorandum Opinion and Order, FCC 07-180, 22 FCC Rcd 18705 (Oct. 2007).

¹⁰² E.g. FCC, *Petition of AT&T Inc. For Forbearance Under 47 U.S.C. § 160 From Enforcement of Certain of the Commission’s Cost Assignment Rules*, WC Docket No. 07-21, Memorandum Opinion and Order, FCC 08-120, 23 FCC Rcd 7302 (Apr. 2008).

¹⁰³ FCC, *Service Quality, Customer Satisfaction, Infrastructure and Operating Data Gathering*, WC Docket No. 08-190, Memorandum Opinion And Order And Notice Of Proposed Rulemaking, FCC 08-203 (Sept. 2008).

¹⁰⁴ States are not generally free to disregard the separations rules in 47 C.F.R. Part 36, but states may use their own depreciation rules for investment that has been separated to intrastate. *Louisiana Public Service Commission v. FCC*, 476 U.S. 355 (1986). Depreciation rules also affect depreciation expense. States may also disregard investment that was imprudent or that is not used and useful.

conduct rate-of-return analysis again, while others merely suspend that analysis for a specified period of years.¹⁰⁵

After adopting price cap plans, some states found that customer service quality declined and carrier investment lagged. Renewed plans frequently contained new elements such as detailed investment and retail quality-of-service standards, and some included formulas to calculate automatic penalties for serious or repeated failures. Most recently, some plans have included commitments to build broadband. Later versions of such plans commonly were called “Alternative Form of Regulation” (AFOR), “alternative regulation” or “incentive regulation” plans.

An even more recent development is outright deregulation of rates in specified markets, often called “pricing flexibility.” These flexibility provisions have increasingly been incorporated into commission-prescribed AFOR plans.

An increasing number of state legislatures have enacted laws that eliminate or restrict commission rate authority over some or all ILECs. Some of those statutes also prescribe maximum permissible rate increases in future years and thus function as a kind of legislated price cap plan.

Most states also set limits on the wholesale access rates charged by ILECs for origination and termination of intrastate toll calls. Many states have decided to “mirror” interstate access rates. In these states, access rates are low, but the ILECs often are allowed to recover some or all of their lost revenues in other ways, such as through state universal service funding (discussed below). Taking the opposite approach, other states have left their access rates unchanged for many years, and access rates in these states can be many times higher than the analogous interstate rates.

Classically within the PSTN, there is an important distinction between a “local” and a “toll” call. Unlike toll, a local call usually generates no incremental retail charge.¹⁰⁶ The toll-local distinction usually carries into wholesale payments as well.¹⁰⁷ For landline calls, state commissions define the “local calling area” that is the boundary between a local and a toll call. Originally, “local” calls were simply calls within the originator’s own exchange that could be

¹⁰⁵ *E.g. Investigation into a Successor Incentive Regulation Plan for Verizon New England Inc., d/b/a Verizon Vermont*, Vermont Public Service Board Docket No. 6959, Order, Sept. 26, 2005, available at <http://www.state.vt.us/psb/orders/2005/files/6959finalorder.wpd> (reviewing cost of service at beginning of five-year incentive regulation plan).

¹⁰⁶ The exception is where a carrier has “local measured service” per-minute charges or “local measured calling” per-call charges.

¹⁰⁷ Toll calls generate “access” payments. As discussed in the next section, local calls generate “reciprocal compensation” payments.

served by a single wire center. Later, most state commissions changed the boundary and established “Extended Area Service” (EAS) areas that allow local calling between exchanges.

4. Wholesale reciprocal compensation rates

“Reciprocal compensation” is a form of wholesale compensation that carriers pay one another for some local calls.¹⁰⁸ If ILEC A has a customer who makes a local call to a customer of ILEC B, then it is common for A to make intercarrier compensation payments to B on a per-minute basis. The purpose of these payments is to share with B some of the revenue A earned from its subscribed customer.

Two local exchange carriers might decide that the cost of administering such a reciprocal compensation payment system exceeds its benefits.¹⁰⁹ These carriers would be likely to adopt what is called a “bill and keep” system. Under bill and keep, each carrier keeps all the revenue it receives from its own subscribers.

The state role in setting reciprocal compensation does not have the same legal basis as access charges, and dual jurisdiction does not apply. Under this newer system created by the 1996 Act, reciprocal compensation rates are established by carrier negotiations.¹¹⁰ Where the carriers cannot agree, either party may request the state commission to arbitrate. The state commission’s decision must comply with the FCC’s rules regarding pricing methodology.¹¹¹

B. CLECs

States typically allow CLECs to enter the local exchange market after obtaining a Certificate of Public Convenience and Necessity (CPCN). In many states, a certificate can be obtained soon after making a simple filing.

Most states decline to regulate actively the retail intrastate rates of Competitive Local Exchange Carriers, although the 1996 Act does not preempt their authority to do so. In nearly all

¹⁰⁸ The FCC has construed the reciprocal compensation statute as limited to local traffic. *See* 47 CFR § 51.701(a). If customers A and B were not in the same “local calling area,” and if the call was carried by an IXC, then, as explained above, the IXC would pay “access charges” to A for originating the call and to B for terminating the call.

¹⁰⁹ For example, two carriers may have roughly equal proportions of originating and terminating traffic. To measure the traffic and charge reciprocal compensation in both directions would require both carriers to incur a relatively large overhead charge but would not produce a significant payment from one to the other.

¹¹⁰ *See* 47 U.S.C. §§ 251(b)(5), (c)(1).

¹¹¹ *AT&T Corp. v. Iowa Utilities Board*, 525 U.S. 366, 119 S.Ct. 721 (1999).

states, either CLEC retail rates are not reviewed or CLECs have been granted wide flexibility in setting rates.¹¹² A few states do impose limits on CLEC intrastate access charges.

C. Retail service quality

Many states impose retail service quality standards on wireline telecommunications carriers.¹¹³ Typically, state commissions establish standards in a variety of performance areas. Each performance area has one or more performance “metrics” or measures, and each metric has a standard for carrier performance.

The most common area for carrier performance is service availability. A common metric measures the percentage of new service requests that are completed within a fixed number of days.¹¹⁴ Most states also have metrics for service reliability, typically measuring trouble report rates and the timeliness and percentage of success in clearing reported troubles that affect service.¹¹⁵ Many states also measure carrier responsiveness, such as the average time taken by a carrier to answer customer calls for assistance from an operator, directory assistance, business office assistance, or repair calls.¹¹⁶

As states have increasingly adopted new price cap or AFOR plans, they often have incorporated specific retail service quality provisions. Some of these price cap plans have provisions for financial penalties when service quality standards are violated.¹¹⁷ Some state

¹¹² See Perez-Chavolla, *State Retail Rate Regulation of Local Exchange Providers as of September 2004*, National Regulatory Research Institute, November 2004, available at <http://nrri.org/pubs/telecommunications/04-13.pdf>.

¹¹³ See Davis, et.al, *Telecommunications Service Quality*, National Regulatory Research Institute, March, 1996, available at <http://nrri.org/pubs/telecommunications/96-11.pdf> (Davis, 1996). See also, Perez-Chavolla, *Survey Of State Retail Telephone Quality Of Service Regulations For Selected Categories Of Service: Metrics, Penalties And Reports*, National Regulatory Research Institute, May 2004, available at <http://nrri.org/pubs/telecommunications/04-09.pdf>.

¹¹⁴ E.g. 170 Indiana Administrative Code § 7-1.2-9 (92% of installation requests must be met within five business days).

¹¹⁵ Davis, 1996, at 243. See, e.g. Regulations of Connecticut State Agencies, Section 16-247g-2 Quality of Service Standards (90% of all service repair requests in any given 24-hour period shall be cleared within 24 hours); 170 Indiana Administrative Code § 7-1.2-13(c) (90% of troubles shall be cleared within 48 hours, excepting weekends and holidays).

¹¹⁶ E.g. 170 Indiana Administrative Code § 7-1.2-16(a) (average speed of answer for calls to repair service shall not exceed 60 seconds).

¹¹⁷ See, e.g. *Verizon New England Inc., d/b/a Verizon Vermont, Request for Waiver of Compensation to Consumers pursuant to Verizon's Retail Service Quality Plan*, Vermont Public

commissions have found that carriers have knowingly incurred financial penalties rather than improve service.

Technological improvements have made irrelevant a few traditional service quality standards. For example, past service quality standards routinely measured the average “off-hook” time delay before a customer received a dial tone. Newer switching technologies have largely eliminated this concern. Conversely, new technologies also sometimes prompt new standards. For example, some states have standards relating to the frequency and length of signaling system failures.¹¹⁸

D. Wholesale markets

In most states, utility commissions have authority to intervene in wholesale disputes among telecommunications providers. Many states have statutes that authorize commissions to mandate that telephone companies interconnect their networks and establish rates for use of interconnected facilities. Some of these state statutes date back many decades.¹¹⁹ State commissions also have authority to oversee wholesale rates for intrastate services.

The 1996 Act aims to promote local exchange competition. One provision requires ILECs to provide unbundled network elements (UNEs). Under the Act, an ILEC must provide a UNE whenever its absence would impair competition.¹²⁰ Another statutory provision establishes specific interconnection duties for specific classes of telecommunications carriers. If disputes arise between two such carriers, section 252 authorizes state commissions to arbitrate, using a broad pricing standard set in federal law.¹²¹ These statutes have generated lengthy and complex dockets at some state commissions.

Service Board, Docket No. 6984, Order on Motion for Reconsideration, September 20, 2004, available at: <http://www.state.vt.us/psb/orders/2004/files/verizonwaiverfnlruling&dissent.wpd>.

¹¹⁸ Signaling systems are used by the PSTN to set up and take down calls and to manage trunks and other resources. In more modern networks, “signaling system 7” is the standard for a PSTN signaling system, and it operates on circuits independent from those carrying voice signals.

¹¹⁹ The vintage of some of these statutes can be inferred from their texts, which frequently refer to both telephone and telegraph companies. *E.g.* Cal. Public Utilities Code § 766 (allows state commission, after hearing, to order telephone or telegraph companies to interconnect where physical interconnection “can reasonably be made” and to joint rates, tolls, or charges for service over each others’ lines); Vt. Statutes Annotated, Title 30, § 2701.

¹²⁰ 47 U.S.C. § 251(d)(2)(A), (B).

¹²¹ 47 U.S.C. § 252(b).

The 1996 Act aimed to promote competition, but in some ways it has actually limited state authority to promote competition. The Act allows the FCC to define when UNEs are required and to set the rules for pricing UNEs.¹²² Under this legal structure, the courts have not allowed state commissions to impose supplemental UNE obligations on ILECs.¹²³

E. Telephone numbers

Under the North American Numbering Plan (NANP),¹²⁴ a customer's telephone number has ten digits. The first three digits are the "NPA" or "area code."¹²⁵ The second set of three digits is called the "NXX," "exchange code" or "central office code." The last 4 of the 10 digits have no geographic meaning and are individually assigned to customers. Each central office code can generate 10,000 usable telephone numbers.¹²⁶

The switched network uses the six digits of the NPA and NXX as proxies for locations in North America. Each NPA/NXX "code" corresponds to a call center (often an ILEC switch) at a particular location. Under this plan, switches can route calls efficiently based upon prearranged tables that translate number sequences to locations.¹²⁷ The NPA/NXX code is also used to

¹²² *AT&T Corp. v. Iowa Utilities Board*, 525 U.S. 366, 119 S.Ct. 721 (1999).

¹²³ *Verizon New England, Inc. v. Maine Pub. Util. Comm.*, 509 F.3d 1, 20 (1st Cir. 2007) (allowing states to impose additional UNE obligations could retard investment, handicap competition detrimentally, and discourage alternative means of achieving the same result that could conceivably enhance competition in the long run).

¹²⁴ The NANP historically was developed and administered by the wireline telephone industry. After the 1984 breakup of AT&T, administration was transferred from AT&T to Bell Communications Research, Inc. (Bellcore), an entity owned by the seven Regional Bell Operating Companies (RBOCs).

Under the 1996 Act, the FCC now has "exclusive jurisdiction over those portions of the North American Numbering Plan (NANP) that pertain to the United States." 47 U.S.C. § 251(e). The FCC has contracted out the administration of numbering to a North American Numbering Plan Administrator (NANPA). Currently, the NANPA is Neustar Inc.

¹²⁵ Area codes are derived from Numbering Plan Areas (NPAs) created in the 1940s by AT&T as part of an integrated toll dialing plan that involved dividing the U.S. and Canada into eighty-three "zones," each of them identified by three digits.

¹²⁶ Each of the four digits has ten possibilities, from 0 to 9. Therefore each code contains 10^4 or 10,000 possible numbers.

¹²⁷ This geographic assignment system is becoming less reliable. For example, some VoIP carriers assign telephone numbers to customers without regard to the customer's actual location. Customer A in California, for example, might receive a Manhattan telephone number. When A uses that Manhattan number, the switched network will for some purposes treat the call

determine when a call is “rated” as local or toll and sometimes to determine when a call requires 10-digit or 7-digit dialing.

With the arrival of competition in the local exchange market, many competitive carriers needed telephone numbers for their new subscribers. The smallest unit assignable at the time was a full central office code, which included 10,000 numbers. When a new CLEC entered the market, NANPA would give the CLEC 10,000 numbers. Many CLECs received codes after 1996, but they sometimes used relatively few of the telephone numbers in their codes.¹²⁸ This raised a fear that some NPAs would be quickly exhausted and new NPAs would be needed to meet the demand. Opening a new NPA, however, was stressful. States were forced to choose between an “overlay” NPA¹²⁹ or a “split” of the existing NPA.¹³⁰ Either choice could impose inconvenience and costs on millions of customers. At the time, some observers even saw a risk of using up all the reserve NPAs and thereby exhausting the entire North American Numbering Plan.

To reduce these risks, and with encouragement from the states, the FCC established a newer system of “pooling” for thousand-number “blocks.”¹³¹ Now, when a new carrier enters the market, it receives a “block” of 1,000 numbers, rather than 10,000. The FCC also established number utilization and reclamation procedures. These procedures ensure that issued blocks are fully utilized before new empty blocks are made available. Together, thousands-block pooling and reclamation have extended the life of many area codes by years or decades.

Acting under delegated federal authority, many state commissions today are active partners with the NANPA in number conservation and management. Commissions frequently assign staff members to manage their state’s number pools. When an NPA is expected to be

as originating in Manhattan, regardless of where A is actually located and regardless of where the call enters the switched network. Likewise, a Manhattan customer with the same NXX as A will be able to place a “local” call that actually reaches A in California.

¹²⁸ In some cases, codes were issued to carriers who had no physical presence in the state where the NPA had been assigned.

¹²⁹ An “overlay” places the new NPA over the same geographic area as the old NPA. Once an overlay is in place, 10-digit dialing is required for all calls made from the area.

¹³⁰ A “split” leaves a portion of the existing customers with the same NPA and assigns a new NPR to the remaining customers. A split requires a large portion of the existing customer base to change the NPA portion of their telephone numbers and to incur a variety of costs, including reprinting letterhead and business cards and reprogramming business telephone systems.

¹³¹ “Blocks” or “thousands blocks” are composed of the last three numbers of the ten digit telephone numbers. They therefore have 10^3 or 1,000 possible numbers per block.

exhausted, state commissions also participate in planning for the new NPA and deciding whether it will be through an overlay or split.

F. Wireless carriers

Federal law prescribes a unique jurisdictional allocation for wireless carriers. No state or local government has any authority to regulate the entry of or the rates charged by wireless carriers.¹³² States, however, do retain authority over “other terms and conditions,” which the courts have found includes control over line items on the customer’s bill.¹³³

State authority over wireless carriers varies by state and is a dynamic area of law. A majority of state legislatures have decided not to regulate wireless services. In addition, Congress has considered several bills promoted by the wireless industry that would broadly preempt state authority over service quality.¹³⁴

Wireless carriers have distinct regulatory advantages and disadvantages. One disadvantage is that wireless carriers are not permitted to purchase unbundled network elements (UNEs).¹³⁵ On the other hand, wireless can offer lower rates for some calls because they have lower wholesale costs.¹³⁶

¹³² 47 U.S.C. § 332(c)(3).

¹³³ *Nat’l Ass’n of State Utility Consumer Advocates v. FCC*, 457 F.3d 1238 (11th Cir. 2006), cert.den. *Sprint Nextel Corp. v. Nat’l Ass’n of State Util. Consumer Advocates*, 128 S. Ct. 1119, 169 L. Ed. 2d 948 (2008).

¹³⁴ Some state commissions do assert authority over wireless carriers when they designate those carriers as “Eligible Telecommunications Carriers” for federal universal service support. Some states have imposed facilities build-out requirements.

¹³⁵ FCC, *Unbundled Access to Network Elements; Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, Order on Remand, 20 FCC Rcd 2533, 2552, ¶ 34 (2005) (*TRRO Order*).

¹³⁶ Carriers pay reciprocal compensation rates for a local call, which usually is lower than the toll access rate. For landline calls, state commissions define local calling areas, and this is often the boundary between access and reciprocal compensation payments. When a call is to or from a wireless phone, however, FCC rules apply. The FCC has decided that reciprocal compensation must be paid within large areas called “Major Trading Areas” (MTAs). FCC, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, ¶ 1036, 11 FCC Rcd. 15,499, 16014 (1996). MTAs generally are much larger than local calling areas. Therefore, calls from wireless phones to a destination within the MTA but outside the local calling areas can be made at lower wholesale cost by a wireless carrier.

G. Broadband Internet services

Federal law makes a distinction between “telecommunications services”¹³⁷ and “information services.”¹³⁸ At one time, the FCC defined “information services” broadly as anything but basic transmission.¹³⁹ Common information services in the 1990s consisted of value-added data processing services available online, such as Lexis and America Online. These services provided information, often copyrighted, over telecommunications facilities. Typically, a customer would “dial up” an information service like Lexis using the telephone network and then interconnect with the information service by establishing a modem-to-modem connection over the telephone line. Later, customers began using broadband to reach these services, including DSL services and cable modem services.

In a series of decisions beginning in 2002, the FCC reexamined and broadened the definition of information service. These decisions have implications for the extent of both federal and state regulation of broadband services, and they clarified the FCC’s interpretation of several important terms found in the 1996 Act.

The first was the FCC’s *Cable Modem Declaratory Ruling*, issued in 2002.¹⁴⁰ The FCC classified cable modem service¹⁴¹ as an “information service”¹⁴² and not a “telecommunications

¹³⁷ “Telecommunications service” is defined in federal law as the “offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.” 47 U.S.C. § 153(46).

¹³⁸ “Information service” is defined in federal law as “the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.” 47 U.S.C. § 153(20).

¹³⁹ In 1980 the FCC adopted a definition of “enhanced services” as anything but “basic transmission service,” which consisted of “a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information.” FCC, *Amendment of Section 64.702 of the Commission's Rules and Regulations*, Docket No. 20828 (*Computer II Proceeding*), Order, FCC 80-189, 77 ¶¶ 96-97, 77 FCC 2d 384, 415-421 (1980). Later, the FCC determined that “Congress intended the categories of ‘telecommunications service’ and ‘information service’ to parallel the definitions of ‘basic service’ and ‘enhanced service’ developed in [the] *Computer II* proceeding” *National Cable & Telecommunications Ass’n v. Brand X Internet Services*, 545 U.S. 967, 992-94 (2005).

¹⁴⁰ FCC, *Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, GN Docket No. 00-185, Declaratory Ruling and Notice of Proposed Rulemaking, FCC 02-77, 17 FCC Rcd 4798 (2002) (*Cable Modem Declaratory Ruling*).

¹⁴¹ “Cable modem” service is a broadband Internet service offered over cable television systems.

service.”¹⁴³ In that context, the FCC held that cable modem service does not fall under the “common carrier” rules prescribed in Title II of the 1934 Act. Instead, the FCC claimed “ancillary jurisdiction” under Title I of the Act. The extent and nature of ancillary jurisdiction is not well defined in statute.¹⁴⁴ The FCC has wide latitude to regulate various aspects of a Title I service, so long as those regulations are “reasonably ancillary” to its statutory authority.¹⁴⁵ In addition, the FCC also declared this new information service to be an “interstate” service, and it preempted state regulatory authority.¹⁴⁶ In 2005, the Supreme Court upheld the FCC’s decision.¹⁴⁷

¹⁴² The FCC’s information service holding was based on the FCC’s perception of cable modem customers’ perceptions. The FCC concluded that end users do not perceive cable modem service as consisting of both a data processing component and a transmission component. Rather, the FCC said they view it as an integrated service combining Internet access service with “the transmission of data with computer processing, information provision, and computer interactivity, enabling end users to run a variety of applications.” *Cable Modem Declaratory Ruling*, ¶ 38.

¹⁴³ The FCC acknowledged that cable modem service is provided “via telecommunications,” but it concluded nevertheless that the service does not include a separate “telecommunications service.” *Cable Modem Declaratory Ruling*, ¶ 39. Whether VoIP service provided over a cable modem is telecommunications service is discussed below.

¹⁴⁴ The key statutory provision charges the FCC with “execut[ing] and enforc[ing] the provisions of this Act.” 47 U.S.C. § 151. This authority extends “to all interstate and foreign communication by wire or radio . . . and . . . all persons engaged within the United States in such communication.” 47 U.S.C. § 152(a).

¹⁴⁵ See *United States v. Southwestern Cable Co.*, 392 U.S. 157, 178 (1968). See also *FCC v. Midwest Video Corp.*, 440 U.S. 689 (1979); *United States v. Midwest Video Corp.*, 406 U.S. 649 (1972) (“*Midwest Video*”).

¹⁴⁶ The FCC’s preemption analysis was brief. The FCC stated that although Internet-bound traffic “is both interstate and intrastate in nature,” it is “properly classified as interstate and it falls under the Commission’s jurisdiction.” The decision noted that based on an “end-to-end analysis,” cable modem communications “often” travel to points in “different states and countries.” *Cable Modem Declaratory Ruling*, ¶ 59 (internal quotations omitted).

¹⁴⁷ *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Services*, 545 U.S. 967, 125 S. Ct. 2688 (2005) (*Brand X Internet Services*).

Later in 2005, the FCC issued its second decision in this line, determining that Digital Subscriber Line broadband service (DSL)¹⁴⁸ is an interstate information service.¹⁴⁹ Parallel holdings followed in 2006 for broadband provided over power lines¹⁵⁰ and in 2007 for broadband using wireless facilities.¹⁵¹

By classifying the broadband services as information services, these decisions eliminate the possibility of traditional common carrier-like federal regulation. Also, by declaring that all current forms of broadband communications to the Internet are interstate services, the FCC preempted at least many forms of state regulation, certainly including rate regulation. The outer boundary of that preemption is still uncertain.

H. Voice over Internet Protocol services

State regulation of Voice over Internet Protocol (VoIP) services is limited in some ways by the technology itself. As noted above, with suitable software, a VoIP service can operate on the Internet without a centralized switching computer of any kind. Indeed, some computer software, such as games and instant messaging, often use the Internet to transmit voice but incidentally to other kinds of communication. This blurring of product lines between telephone

¹⁴⁸ “DSL” is a broadband Internet service offered over telephone wires.

¹⁴⁹ FCC, *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33, Report and Order and Notice of Proposed Rulemaking, FCC 05-150, 20 FCC Rcd. 14,853, ¶ 5 (2005). The FCC also allowed ILECs, for purposes of wholesale sales to other companies, to offer broadband Internet access transmission arrangements for wireline broadband Internet access services on a common carrier basis or a non-common carrier basis. If a carrier does elect to offer wireline broadband Internet access on a common carrier basis, it may be allowed to include the supporting facilities and associated expenses in its costs that are subject to separations, and therefore it may be able to recover some or all of those costs through regulated rates in both jurisdictions. The FCC’s order was upheld on appeal. *Time Warner Telecom, Inc. v. FCC*, 507 F.3d 205 (3rd Cir. Oct 16, 2007).

This may be the only instance in which a carrier has been allowed to decide finally whether a certain investment shall be included in regulated rate base. Under this rule, certain kinds of investment and expenses are in regulated costs in some parts of the country and unregulated costs in other parts of the country.

¹⁵⁰ FCC, *United Power Line Council’s Petition for Declaratory Ruling Regarding the Classification of Broadband over Power Line Internet Access Service as an Information Service*, WC Docket No. 06-10, Memorandum Opinion and Order, FCC 06-10, 21 FCC Rcd 13281 (2006).

¹⁵¹ FCC, *Appropriate Regulatory Treatment for Broadband Access to the Internet Over Wireless Networks*, WT Docket No. 07-53, Declaratory Ruling, FCC 07-30, 22 FCC Rcd 5901 (2007).

service and Internet software reduces the perceived need for regulation. Instant messaging and gaming communications, for example, undoubtedly involve telecommunications, but they have no history of providing public benefits comparable to the telephone network, and most observers want to keep them free separate from common carrier regulations. In some ways VoIP services are like these incidental Internet communications. In addition, the fluidity of the VoIP technology limits the possible interactions between the service provider and the state regulator. For some kinds of VoIP services, it may not be possible even to compile a list of the companies that provide the service, a list that is usually the prerequisite to establishing an effective system of regulation.¹⁵²

State regulation of VoIP services is also limited by federal law. In a major 2004 decision, the FCC clarified the status of an “over-the-top” VoIP service offered by Vonage Holdings Corp.¹⁵³ The FCC preempted state regulation on the ground that the Vonage VoIP product is a jurisdictionally mixed service, containing both intrastate and interstate components, and it is impossible or impractical for VoIP providers to separate the two components.¹⁵⁴ Specifically, the FCC preempted the Minnesota commission from requiring that Vonage obtain a state certificate to operate. The FCC also preempted application of other regulations that Minnesota had applied to “telephone companies,” including a requirement that Vonage provide and fund the state’s 911 services.¹⁵⁵ The FCC decision was upheld on appeal by the Eighth Circuit.¹⁵⁶

2004 may have been the high water mark for VoIP deregulation. In later decisions, the FCC imposed a number of traditional telephone company duties on “interconnected VoIP” providers that offer their customers at least some interaction with the PSTN. These decisions required interconnected VoIP providers to offer emergency “Enhanced 911” services to their customers,¹⁵⁷ to contribute to federal universal service programs,¹⁵⁸ to protect customer

¹⁵² When VoIP service includes the ability to pass calls to and from the PSTN, the case may be different. See discussion below of recent FCC orders regarding “interconnected” VoIP providers.

¹⁵³ The FCC declined to rule on whether the service was a “telecommunications service” or an “information service.”

¹⁵⁴ A key fact was that Vonage customers could originate calls anywhere on the Internet, and Vonage could not identify from where a given call actually originated.

¹⁵⁵ FCC, *In re Vonage Holdings Corp.*, WC Docket No. 03-211, Memorandum Opinion and Order, 19 F.C.C.R. 22404, ¶ 23 (2004).

¹⁵⁶ *Minn. Public Util. Comm v. FCC*, 483 F.3d 570 (8th Cir. 2007).

¹⁵⁷ FCC, *IP-Enabled Services*, WC Docket No. 04-36, First Report and Order and Notice of Proposed Rulemaking, FCC 05-116, 20 F.C.C.R. 10245 (2005) (requiring VoIP providers immediately to provide E-911 service that identifies customer locations, but allowing VoIP providers to require customers to self-report those locations).

proprietary network information,¹⁵⁹ to comply with common carrier disability access requirements,¹⁶⁰ to contribute to “TRS” programs for the hearing impaired,¹⁶¹ and to make telephone numbers portable when customers change providers.¹⁶²

The FCC has created a watershed boundary between “nomadic” VoIP providers and “fixed” VoIP providers. As noted above, states (or at least states in the Eighth Circuit) may not require registration or certification of nomadic VoIP carriers like Vonage. States may also be unable to require contributions from VoIP providers to their universal service funds.¹⁶³ Yet these limitations apply, at most, to nomadic VoIP services.¹⁶⁴ Where a provider has fixed transmission

¹⁵⁸ FCC, *Universal Service Contribution Methodology*, WC Docket No. 06-122, Report and Order and Notice of Proposed Rulemaking, FCC 06-94, 21 FCC Rcd 7518, 7538-43, paras. 38-49 (2006) (*VoIP Contributions Order*), *aff'd in part, vacated in part, Vonage Holdings Corp. v. FCC*, 489 F.3d 1232, 1244 (D.C. Cir. 2007).

¹⁵⁹ FCC, *Implementation of the Telecommunications Act of 1996: Telecommunications Carriers' Use of Customer Proprietary Network Information and Other Customer Information; IP-Enabled Services*, CC Docket No. 96-115, WC Docket No. 04-36, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 6927, 6954-57, ¶¶ 54-59 (2007).

¹⁶⁰ FCC, *IP-Enabled Services*, WC Docket No. 04-36, Report and Order, 22 FCC Rcd 11275, ¶¶ 17-31 (2007).

¹⁶¹ *Id.* at ¶¶ 32-43. TRS, created by Title IV of the Americans with Disabilities Act of 1990 (ADA), enables a person with a hearing or speech disability to access the nation's telephone system to communicate with voice telephone users through a relay provider and a Communications Assistant. *See* 47 U.S.C. § 225(a)(3); *see also* 47 C.F.R. § 64.601(14) (defining TRS).

¹⁶² FCC, *Telephone Number Requirements for IP-Enabled Services Providers*, WC Docket No. 07-243, Report and Order, Declaratory Ruling, Order On Remand, and Notice of Proposed Rulemaking, FCC 07-188, 22 FCC Rcd 19,531 (2007).

¹⁶³ *See Vonage Holdings, Corp. v. Nebraska Pub. Serv. Comm.*, Case No. 4:07CV3277, Memorandum and Order, (U.S. District Court, D. Nebraska, Mar. 3, 2008) (preliminary injunction granted against state commission seeking to require nomadic VoIP provider to contribute to state universal service fund).

¹⁶⁴ The FCC has suggested that it may no longer be willing to apply its *Vonage* holding to a nomadic service where the provider can find a way to track the geographic end-points of its customer's calls. *VoIP Contributions Order*, above, ¶ 56.

facilities and therefore has the technical ability to determine the state in which its customer is located, the FCC has not preempted state jurisdiction.¹⁶⁵

I. Joint federal-state boards

State regulators have an interest in coordinating their activities with the FCC. A variety of formal mechanisms exist to allow state and federal regulators to work together. Joint boards and committees provide the states with a forum for direct interaction and negotiation with FCC members regarding issues of common interest. Generally, the FCC has the final say, but historically the FCC has often adopted recommendations from a joint board or committee. Three of those joint activities are described here.

In 1971, Congress mandated the creation of a Federal-State Joint Board for Separations.¹⁶⁶ The FCC must refer a separations issue to this body whenever it proposes to formally change separations rules. The Separations Joint Board has four state members who are state utility commissioners. This joint board issues recommended decisions that are not binding on the FCC.

In 1996, Congress created a new joint board for universal service.¹⁶⁷ The Federal-State Joint Board on Universal Service has four members who are state commissioners and one member who represents the National Association of State Utility Consumer Advocates. This joint board also issues recommended decisions, although the FCC must act on any recommendation within one year.

Also in 1996, Congress mandated cooperation by the FCC and the states to encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans.¹⁶⁸ The FCC convened a Federal-State Joint Conference on Advanced Services in 1999. The Joint Conference was reactivated in 2008, and it also includes commissioners from state public utilities commissions.

¹⁶⁵ *Id.* Missouri Public Service Commission, *Staff of the Public Service Commission of the State of Missouri v Comcast IP Phone, LLC*, Case No. TC-2007-0111, Report and Order, (Nov. 1, 2007) (ordering provider of VoIP service over cable TV facilities to obtain state certificate of service authority); *Minn. Public Util. Comm. v. FCC*, 483 F.3d 570, 582-83 (8th Cir. 2007) (dismissing as unripe the question of whether FCC preemption covers fixed VoIP services).

¹⁶⁶ Pub. L. 92-131, creating 47 U.S.C. § 410(c).

¹⁶⁷ 47 U.S.C. § 254(a).

¹⁶⁸ Pub. L. 104-104 § 706.

IV. Universal service

“Universal service” is a controversial subject within the telecommunications community. The phrase first appeared in a motto adopted by AT&T in 1908: “One policy, one system, universal service.” The intent of AT&T’s leader, Theodore Vail, was to promote his company as a single, regulated telephone monopoly in the country. Over the next 70 years, a number of federal and state universal service mechanisms were implemented, all of which had a principal goal of increasing the telephone “penetration”¹⁶⁹ by reducing fixed monthly local exchange rates for residential customers.

A. Pre-1980s implicit subsidies

One method to reduce customer A’s fixed monthly rate is to increase her usage rates; another is to increase B’s fixed rates. Over the years, both of these kinds of rate designs have been characterized as “subsidies.” The subsidies were said to be “implicit,” because the shifting of costs and benefits were hidden within various regulatory mechanisms and the resulting dollar flows were not measured. A more correct term might be “implicit support.”¹⁷⁰

One implicit support mechanism was a flow from interstate toll and access rates to local rates. The mechanism had two components: (1) separations rules assigned a high percentage of costs to the interstate jurisdiction; and (2) the FCC authorized recovery of ILEC interstate costs primarily through per-minute toll and access charges. The combined effect was that when a dollar of ILEC cost was assigned to interstate, that dollar of cost could not be recovered through fixed monthly charges.

For regulators looking to make residential service more affordable, this mechanism offered a temptation. During the 1970s, regulators succumbed to that temptation by adopting “Subscriber Plant Factor” (SPF) as the separations factor for loop plant.¹⁷¹ SPF assigned a percentage of costs to interstate that was much higher than interstate’s network usage. SPF

¹⁶⁹ Penetration data report on the percentage of residential households that have telephone service or that have telephones available nearby.

¹⁷⁰ A subsidy in economic terms occurs when the price to customer A goes up to fund service to B, and B’s service is priced below what an economist would call the incremental cost of that unit of service. The telecommunications industry depends heavily on sunk investment in common facilities. Once the network is in place, it often costs little to add an additional service or to serve an additional customer. Therefore, incremental cost is usually small, and it is difficult to prove that any particular telecommunications rate design produces economic subsidies. Universal service commenters usually assume a looser definition of subsidy, equating it with improper or imprecise allocations of common costs. That concept is here termed “implicit support.”

¹⁷¹ The SPF factor originated with the so-called “Ozark Plan.”

therefore created a large support flow from interstate toll and access rates to intrastate rates, including local exchange rates.

On the intrastate side, state commissions also fell prey to similar temptations. They often allowed ILECs to impose high access rates for intrastate toll calls, or failed to update access rates when costs fell. This practice left many customers paying high rates for intrastate toll calls.

Fixed business and residential rates created a different kind of implicit support, or subsidy. In the 1980s, the average business monthly local exchange bill was 230% of the average residential bill.¹⁷² At one time this rate difference may have been justified because business customers tended to make more calls at peak hours. The reasoning weakened over time, though, as network costs dropped and as switch improvements increased peak network capacity. Moreover, in the 1990s peak network usage shifted to the early evening, when residential lines, not business lines, tended to be in use. But the business-residential rate differential remained largely intact.

When digital switches arrived in the 1980s, “vertical services” became available. These included “call forwarding,” “call waiting” and “caller ID.”¹⁷³ Once the digital switch was in place, the incremental cost of vertical services was small, but the rates were set far above cost. This produced a support flow from the purchasers of vertical services to those who bought only more basic services.¹⁷⁴

Geographic cost variation also generates implicit support. When ILEC investments are allocated to smaller geographic areas, the per-customer cost varies enormously.¹⁷⁵ Costs typically vary from one exchange to another by factors of ten or more. Within exchanges, the cost variation can be even greater. Individual customers who live in the so-called “donut” far

¹⁷² In 1986, the average residential total monthly charge in urban areas was \$17.70. The average business rate was \$41.25. *2007 Trends Report*, tables 13.1, 13.2.

¹⁷³ These services are also sometimes called “CLASS services” (Custom Local Access Signaling Services).

¹⁷⁴ A similar but earlier phenomenon was the practice of adding a charge for “touch tone” calling. This dialing method operated slightly faster than the older “pulse” dialing pattern. Often the incremental cost of touch tone was negative, since it shortened each call by a few seconds.

¹⁷⁵ Usually that ideal cost distribution is estimated on an exchange-by-exchange basis using a computer program that models the cost of constructing a new undepreciated telecommunications network. Important common assumptions are: (1) that current telecommunications technology will be used; and (2) that all common facilities will be included to serve all of the ILEC’s current subscribers.

from the central office can have long loops, and their per-line cost can be hundreds of times higher than for customers who live in the “hole” near the central office.¹⁷⁶

Until the 1990s, no state commission had explicitly “de-averaged” rates, charging rural customers in a given franchise area more than urban customers. On the contrary, in many states, the urban customers paid more.¹⁷⁷

These five implicit support flows are summarized in Table 2.

Table 2. Implicit Support Flows in the 1980s

<i>Subsidy</i>	<i>Mechanism</i>	<i>Contributing Customers</i>	<i>Assisted Customers</i>
Interstate toll and access	High separation factor to interstate, no fixed interstate charges	Heavy interstate toll users	Light interstate toll users
State toll and access	High intrastate toll and access rates, low local exchange rates	Heavy intrastate toll users	Light intrastate toll users
Business to residential	High fixed local exchange rates for business, low for residences	Business customers	Residential customers
Vertical services	Intrastate rate designs	Purchasers of vertical services	Other customers
Urban to rural	Geographically uniform local exchange rates	Customers in low-cost exchanges and customers located near central offices	Customers in high-cost exchanges and customers located far from central offices

¹⁷⁶ The geographic subsidy argument usually adapts to the finest scale cost data currently available. In the 1990s, the best cost models aggregated costs by telephone exchange, and it was frequently said that urban exchanges subsidized rural exchanges. More sophisticated models make it possible to calculate the costs of serving individual customers. Now the subsidy argument has been extended to apply to support flows among customers within single exchanges.

¹⁷⁷ Local rates often were based on “value of service” concepts. Urban customers usually could reach more subscribers with a local call than rural customers, and they often paid higher monthly rates.

B. Federal high-cost programs

Today, federal universal service fund (USF) programs expend approximately \$7.3 billion per year. About 60% of this, \$4.3 billion, is spent for “high-cost” programs aimed at keeping rates low in high-cost rural areas.¹⁷⁸ As discussed in the following sections, the FCC operates five major high cost support mechanisms.

1. High cost support in the 1980s

Universal service mechanisms changed dramatically in the 1980s. First, in 1983, the FCC created the National Exchange Carrier Association (NECA).¹⁷⁹ As discussed above, the NECA cost pools allow high-cost companies to reduce the rates they charge other carriers for interstate toll access rates, while still recovering their full interstate revenue requirement.

In 1984, to avoid further increases in interstate access rates, the FCC abandoned SPF. The new factor uniformly allocated 75% of loop costs to the state jurisdiction,¹⁸⁰ thereby increasing the intrastate costs for many carriers. The FCC anticipated local exchange rate increases in some areas. To mitigate the risk, the FCC established the first formal universal service support program. Originally, the new program was separations-based. By an “expense adjustment” that moved loop costs from state to interstate,¹⁸¹ the program reduced the cost pressure on local rates. Today, this program is an explicit universal service mechanism known as the “High Cost Loop Support” (HCL) program.¹⁸² HCL currently distributes \$1.3 billion per year.¹⁸³

¹⁷⁸ The estimate is based on the annualized cost of USAC estimates for 2008Q1 and 2008Q2. As discussed below, the remaining programs provide support for schools and libraries, low-income customers, and rural health care, and they are discussed below.

¹⁷⁹ FCC, *MTS and WATS Market Structure*, CC Docket No. 78-72, Phase I, Third Report and Order, 93 FCC 2d 241 (1983), effective 01/01/84; *see, generally*, 47 C.F.R. Part 69, Subpart G (rules for Exchange Carrier Association). NECA’s original name was “Exchange Carrier Association.

¹⁸⁰ *See* 47 C.F.R. § 36.154(c); FCC, *Jurisdictional Separations Procedures, Amendment of the Commission’s Rules and Establishment of a Joint Board*, CC Docket No. 80-286, Decision and Order, FCC 83-564, 96 F.C.C.2d 781 (1984).

¹⁸¹ *See* 47 C.F.R. § 36.631.

¹⁸² *See* 47 C.F.R. § 36.631(c) and (d).

¹⁸³ The FCC has a separate support program for the intrastate costs of large so-called “nonrural” companies. The \$1.3 billion figure and other expenditures reported below include support to ILECs and to competitive carriers serving those same ILEC study areas.

In 1986 the FCC created the federal “Subscriber Line Charge” (SLC), a fixed interstate monthly charge. ILECs apply their SLC revenues to their “common line” interstate revenue requirement, most of which arises from the cost of customer loops. Creating the SLC allowed the FCC to reduce per-minute rates for interstate toll calls, which the FCC believed to be higher than incremental cost. For many years, the SLC for residential customers was capped at \$3.50 per month per line.¹⁸⁴

The SLC broke the classical formula that a dollar of ILEC cost that separations moved to interstate became a dollar that could not be recovered through fixed monthly charges. With the SLC in place, if that dollar of cost related to loops, moving it to interstate would simply increase the SLC charge. The net effect of reducing local rates and increasing the SLC would be small, at best, and it could not materially affect affordability.

In 1988, the FCC created a second universal service support program, “DEM Weighting.”¹⁸⁵ As with HCL, the mechanism chosen for this new program was separations. The new program shifted some of the costs of local switching from the state jurisdiction to the interstate jurisdiction. Only carriers with fewer than 50,000 access lines were eligible, and the very smallest carriers received the largest benefit.¹⁸⁶ As with HCL, the net effect was to increase interstate toll and access rates and to reduce the cost pressure on local rates. Today, DEM Weighting is known as “Local Switching Support” (LSS), and it still supports the switching cost of small companies with fewer than 50,000 lines.¹⁸⁷ The LSS program distributes \$0.5 billion per year.

2. Post-1996 high-cost programs

The Telecommunications Act of 1996 dramatically changed the legal context of universal service policies. For the first time, the FCC was given a statutory duty to “preserve and advance” universal service. More specifically, the 1996 Act directed the FCC to provide sufficient support so that rates would be “affordable” and so that rates and services would be

¹⁸⁴ The SLC is currently capped at \$6.50 per month.

¹⁸⁵ FCC, *MTS and WATS Market Structure*, CC Docket No. 78-72, Report and Order, 2 FCC Rcd 2639 (1987). See 47 C.F.R. § 36.125.

¹⁸⁶ For carriers with 10,000 lines or less, the measured interstate usage of the switch was multiplied by 3.0. 47 C.F.R. § 36.125(f). For example, if 20% of a carrier’s switch time (Dial Equipment Minutes) was used for interstate calling, the carrier’s switching investment would be separated, with 60 percent assigned to interstate. Smaller multipliers were used for carriers with more than 10,000 lines but less than 50,000 lines.

¹⁸⁷ Today, many NECA pool carriers contribute their LSS revenues to the NECA pool and therefore treat LSS support as interstate revenue. Some states are still using LSS revenues to offset intrastate costs.

“reasonably comparable” between urban and rural areas.¹⁸⁸ The Act also required that federal universal service mechanisms be “explicit.”¹⁸⁹

After 1996, the FCC defined three classes of receiving carriers. Under the Act, high cost support can be provided only to “Eligible Telecommunications Carriers” (ETCs). Most states conduct proceedings to determine which carriers qualify for this designation. Among ETCs, there are three important classes: “rural” ILECs,¹⁹⁰ “nonrural” ILECs,¹⁹¹ and “competitive ETCs” (CETCs).

In 2000, the FCC added a third high-cost program. “Model-Based Support” distributes support to nonrural carriers serving states with high average cost. Model-based support is based upon a per-line cost estimate generated by a complex computer “model” that estimates “forward-looking” telephone company costs.¹⁹² Today this program distributes \$0.3 billion annually. Model-based support is controversial, in part because the support is distributed to carriers in only ten states. In 2005 the Tenth Circuit remanded this program to the FCC, concluding that the FCC had not demonstrated the sufficiency of its support.¹⁹³

In 2000 and 2001, the FCC added its fourth and fifth USF programs as part of comprehensive plans to reform interstate access charges. At that time the FCC decided to

¹⁸⁸ 47 U.S.C. § 254(a), (b), (d).

¹⁸⁹ 47 U.S.C. § 254(e).

¹⁹⁰ Generally, carriers with less than 100,000 lines qualify as rural. *See* 47 U.S.C. § 153(37)(D).

¹⁹¹ Nonrural carriers are carriers that are not qualified to be rural carriers. Far more rural customers are actually served by “nonrural carriers” than by “rural carriers.”

¹⁹² Forward-looking models attempt to estimate the cost of providing service using current technologies and component costs. In contrast, the “embedded” method of measuring costs is based on an ILEC’s actual historical investment, as shown in its accounting records. Embedded costs are the basis for support in all other USF high-cost programs, including HCL, LSS, IAS and ICLS.

Embedded costs tend to be the lower than forward-looking costs when embedded plant is highly depreciated and when labor cost or material cost has increased. Forward-looking costs tend to be lower when existing networks do not have modern feeder and distribution plant designs.

¹⁹³ *Qwest Communications Int’l Inc. v. FCC*, 398 F.3d 1222 (10th Cir. 2005).

eliminate the “common line” component of access charges¹⁹⁴ and to lower access rates generally. To replace the lost interstate revenues, the FCC authorized ILECs to increase the SLC for residential users to \$6.50 per month. Where revenue losses were not fully offset by those increased SLC revenues, the FCC made up the shortfall with universal service support.

The FCC acted twice in similar ways, creating two new support programs. For the large “price cap” companies, the FCC adopted a modified version of the “CALLS” plan and created the Interstate Access Support (IAS) program.¹⁹⁵ For the smaller “rate-of-return” companies, the FCC adopted a modified version of the “MAG” plan and created Interstate Common Line Support (ICLS).¹⁹⁶ Together, IAS and ICLS distribute \$2.3 billion annually. These two programs, devoted to post-1996 reform of interstate access charges, thus generate slightly more than 50% of all current federal high cost support.

Table 3 summarizes for ILECs the eligibility for and costs addressed by each of the major federal high cost programs.¹⁹⁷

¹⁹⁴ An ILEC’s “common line” revenue requirement is that portion of its interstate revenue requirement associated with loops. “Common line” charges thus were per-minute access charges, paid by other carriers, intended to recover loop costs.

¹⁹⁵ See FCC, *Access Charge Reform*, CC Docket No. 96-262, Sixth Report and Order, 15 FCC Rcd 12,962 (2000) (*CALLS order*).

¹⁹⁶ FCC, *Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers*, Second Report and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 19613, 19667-68 (2001) (*MAG Order*).

¹⁹⁷ The table excludes financially minor high cost programs. The table includes National Exchange Carrier Association pools because they also serve universal service objectives.

Table 3. Purposes of Major Federal High Cost Programs

	<i>Small ILECs - State Costs</i>	<i>Small ILECs - Interstate Costs</i>	<i>Large ILECs - State Costs</i>	<i>Large ILECs - Interstate Costs</i>
Loop costs	High Cost Loop Support	NECA Common Line Pool	Model-based	
Switching costs	Local Switching Support	NECA Traffic Sensitive Pool	Model-based	
Interoffice trunking costs		NECA Traffic Sensitive Pool	Model-based	
Interstate access reform		Interstate Common Line Support		Interstate Access Support

As noted above, rural ILECs and nonrural ILECs receive support under different mechanisms. Competitive ETCs receive support under yet a third rule. ILECs and CETCs each report quarterly on their line counts, by ILEC exchange. Under the so-called “identical support rule,” CETCs receive the same per-line support in each exchange as the local ILEC. Support under the identical support rule increased rapidly from 2001 to 2007, in part due of the large numbers of CETCs designated in some high-support states. In May of 2007, the Federal-State Joint Board on Universal Service recommended imposing a cap on CETC support.¹⁹⁸ Later in 2007, the joint board recommended abolishing the identical support rule.¹⁹⁹ In April of 2008, the FCC did cap support to most CETCs.²⁰⁰

¹⁹⁸ FCC, *Matter of High-Cost Universal Service Support*, WC Docket no. 05-337, Recommended Decision, 22 FCC Rcd 8998 (May, 2007).

¹⁹⁹ FCC, *High-Cost Universal Service Support*, WC Docket No. 05-337, Recommended Decision, FCC 07J-4, 22 FCC Rcd 20,477 (November, 2007).

²⁰⁰ FCC, *High-Cost Universal Service Support; Federal-State Joint Board on Universal Service; Alltel Communications, Inc., et al. Petitions for Designation as Eligible Telecommunications Carriers; RCC Minnesota, Inc. and RCC Atlantic, Inc. New Hampshire ETC Designation Amendment*, WC Docket No. 05-337, Order, FCC 08-122, 23 FCC Rcd 8834 (rel. May 1, 2008).

C. Federal low income programs

The FCC provides support for two programs that assist low-income consumers. The “Lifeline” program provides discounts on monthly local exchange service charges.²⁰¹ States may define the qualifications of low income customers eligible for this program, and states may define the methods of enrollment.²⁰² Customers enrolled in the program receive a benefit equal to a full waiver of the Subscriber Line Charge plus an additional discount of \$1.75 from the usual local exchange rate. Many states increase the discount with supplemental state funds, and a 50% FCC match is available.²⁰³

The “Link-Up America” program reduces telephone installation costs for low-income consumers, up to \$30 per installation.²⁰⁴ Carriers who provide these customer discounts receive reimbursement from the FCC.

The annual federal cost for Lifeline and Link-Up programs is \$0.8 billion.

D. Federal schools and libraries; rural health care

The 1996 Act included authorization for universal service support to schools and libraries. Today that support distributes \$2.1 billion per year.

The Act also authorized support for telecommunications to rural health care facilities. Today that program distributes \$0.2 billion per year.

E. State universal service programs

Several states have adopted their own, supplemental, universal service programs. The purposes vary.²⁰⁵ Some states used universal service to replace carrier revenues lost during intrastate access reforms. Other states provide support to carriers who otherwise would be allowed to charge high rates for local exchange service in their rural areas. About two-thirds of

²⁰¹ See generally, 47 C.F.R. § 54.400-54.410.

²⁰² See 47 C.F.R. § 54.409. A default definition applies in states that have not adopted their own definition. 47 C.F.R. § 54.509(b).

²⁰³ 47 C.F.R. § 54.403. Additional discounts are available for qualified subscribers living on tribal lands.

²⁰⁴ See, 47 C.F.R. § 54.411- 54.416.

²⁰⁵ See generally, Liu, Rosenberg, *State Universal Service Funding Mechanisms: Results of the NRRI's 2005-2006 Survey*, National Regulatory Research Institute, Report No. 06-09, available at <http://nrri.org/pubs/telecommunications/06-09.pdf>.

the states provide state-generated support to further reduce rates for Lifeline customers. A few states also provide support for telecommunications in schools and libraries and for rural health care.

F. Implicit subsidies today

Subsection A above discussed five implicit subsidies that supported low local exchange rates in the 1980s. When the 1996 Act passed, many observers expected that local exchange competition would force ILECs to eliminate these subsidies. Since CLEC customers generally did not have to make similar contributions, many predicted that ILECs would either eliminate the subsidies, largely through redesign of their rates, or seek to convert them into explicit subsidies through state universal service funds. These predictions have proven to be only partly accurate.

The subsidy within interstate toll rates has largely disappeared. As noted above, in 2000 and 2001, the FCC adopted the CALLS and MAG plans and reduced interstate access charges. These orders eliminated per-minute interstate access elements that previously supported loop costs.²⁰⁶ Some commenters see a need for still more access rate reductions, because most interstate access rates remain above incremental cost and because ILEC access revenues are facing increasing competitive pressure.²⁰⁷

The second subsidy, within intrastate toll rates, has been greatly reduced, but only in some states. Either by legislation or by commission action, many states now “mirror” interstate access rates. Some of these states replaced lost carrier revenues with universal service support. In contrast, other states continue to allow carriers to charge intrastate rates that are much higher than the comparable interstate rates. In some of these states, intrastate access rates are as much as ten times as high as equivalent interstate rates.

²⁰⁶ After CALLS and MAG, all common line costs were recovered from a combination of SLC charges, universal service support payments, and, in the case of NECA carriers, revenues from the NECA common line pool.

²⁰⁷ Industry efforts after 2001 to reduce intercarrier compensation (including interstate access and intrastate access) have not been successful at the FCC. *See generally*, Liu, *Intercarrier Compensation Reform at Debate: Major Issues of the Missoula Plan*, National Regulatory Research Institute, Report No. 07-05, available at <http://nrri.org/pubs/telecommunications/07-05.pdf>.

Subsidies from business to residential customers have eroded but still exist. From 1986 through 2005, the ratio of average business local exchange service to average residential local exchange service declined from 230% to 177%.²⁰⁸ Although the differential is now smaller, it still has little relation to cost.²⁰⁹

Subsidies from purchasers of vertical services have also eroded. Competitors, particularly application-based competitors like nomadic VoIP, typically offer vertical services at no extra charge, and this has put competitive pressure on ILECs. Some have reduced vertical service charges. Others have bundled vertical services into larger packages that include local and toll calling.

The final subsidy, from urban to rural customers, has been the most durable. In most states, the ILECS still charge approximately the same local rates in their low-cost urban areas as in their high-cost rural areas.²¹⁰ To the extent that this arrangement subsidizes customers in the rural areas, making that subsidy explicit would require a large amount of new USF funding, probably several billions or even tens of billions.²¹¹

²⁰⁸ During this period, the average rates for both groups increased, but the residential increase was larger. In 2005, the average residential total monthly rate in urban areas was \$24.74. The average business rate was \$43.94. *2007 Trends Report*, tables 13.1, 13.2.

²⁰⁹ Average local exchange rate data may overstate the remaining differences between residential and business. Many business customers do not buy simple business lines for their telecommunications service. Larger business customers can often benefit from additional discounts from their local ILEC or from a CLEC. Larger businesses also commonly buy more sophisticated equipment, such as “private branch exchange” (PBX) switches and then purchase special access circuits from the local exchange carrier. Those discounts and service substitutions are not captured by published rate data.

²¹⁰ Wyoming is a notable exception. A 1995 Wyoming law directed its commission to eliminate urban-rural subsidies. Accordingly, rural Wyoming residents can pay ILEC local exchange rates significantly higher than in Wyoming’s cities. The state has reduced the rate differences with state universal service funds. In other states, more modest forms of “rate rebalancing” have occurred, usually within the context of a price cap or AFOR cases.

²¹¹ An estimate of the increased demand for support can come from the current federal model-based support mechanism. Currently that program provides support to nonrural companies based on forward-looking costs. A central design element is that costs are averaged at the state level before support is calculated. That policy is appropriate if, within every state, implicit rural-urban subsidies either remain intact or are replaced by explicit state support programs. On the other hand, if implicit support within each state can no longer be assumed, then federal support should be calculated at a finer scale. If the existing mechanism were changed solely by calculating using wire center costs rather than state costs—and this is not the smallest scale possible—then the program size would increase by a factor of ten, from \$0.3 billion to approximately \$2.4 billion.

The political dimension may be more important. Most state regulators don't see a pressing need to eliminate implicit rural subsidies. To do so would make the urban-to-rural support more visible politically and thus more controversial than a support mechanism buried within a uniform rate design.²¹² Explicit funds also raise complex issues about contributions from CLECs and wireless carriers.

Nevertheless, the issue of rural subsidy is unlikely to disappear. Rural ILECs are increasingly claiming that the existing implicit system discourages investment in their more remote exchanges. As ILECs continue to lose lines and revenues to competitors in their more densely populated areas, and as state regulators seek additional rural investment for broadband, the ILECs are likely to press harder for explicit new state and federal USF support programs.

In November 2007, the Federal-State Joint Board on Universal Service recommended fundamental revisions to federal universal service mechanisms. It recommended three separate funds: broadband, mobility, and provider of last resort.²¹³ The first two of these funds would be new and would be aimed primarily at promoting deployment of new facilities. Initially, the Joint Board thought that the Provider of Last Resort Fund should continue all legacy high-cost programs, but that eventually the FCC should develop a more comprehensively integrated system.

This estimate covers only nonrural companies, because rural companies have different support mechanisms. Rural carrier support mechanisms generally average costs over study areas rather than states, but the costs tend to be higher because rural carriers serve some of the very highest-cost areas in the country. Calculating support by wire center for these rural companies would also increase their support, but that amount is more difficult to estimate.

One version of the rural subsidy argument suggests making support explicit as to cost differences *within* individual exchanges. The argument is that the “hole” areas near the central office switch subsidize the more remote “donut” areas. If costs were calculated at this finer scale, still more support would be needed because implicit subsidies within exchanges could no longer be assumed.

²¹² On the other hand, making subsidies explicit creates opportunities to expand the contribution base to more customers, including customers of wireless and VoIP service providers.

²¹³ FCC, *High-Cost Universal Service Support*, WC Docket No. 05-337, Recommended Decision, FCC 07J-4, 22 FCC Rcd 20,477 (2007).